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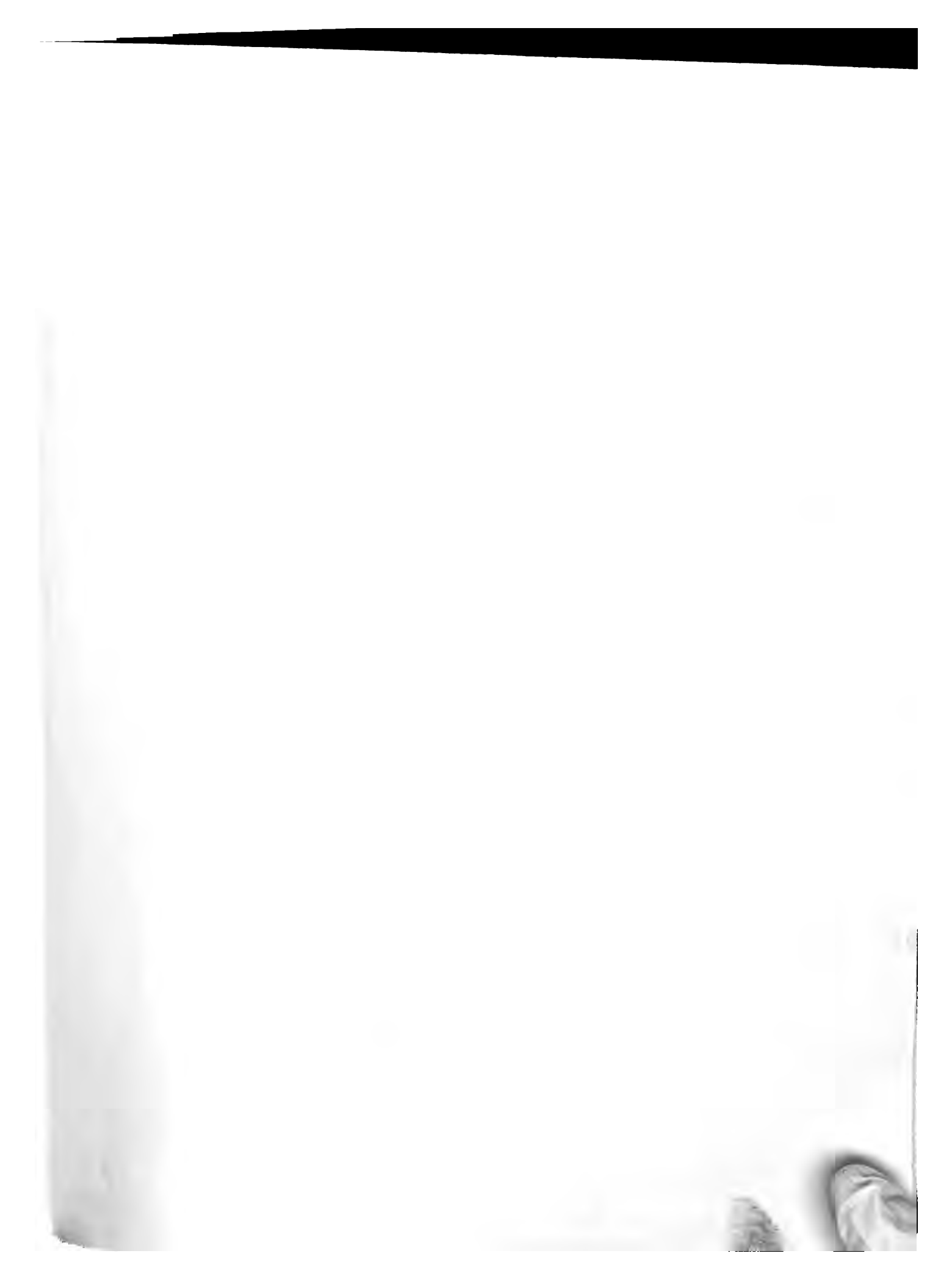

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THE

Popular Educator.

VOLUME THE FIRST.

Parent of learning, Language, art divine!
To God we owe thee, as his gift benign;
Grammar, and Logic too, descend from thee,
Rhesis, Belles Lettres, and sweet Poesie.
Nor less those gifts are His, who rules the skies,
Which teach us how to measure, and to rise
From earth to heav'n; by truths of Geometrie,
To scan the land and comprehend the sea.
For when Almighty Power created all,
And spann'd with compass this terrestrial ball,
Its vast foundations were by Number laid,
By Weight and Measure, and by Wisdom's aid.
"Knowledge is power," a truth by all confess'd,
If rightly used and heav'nward bound, is bless'd:
Deep study only is the way to gain
That learning, which brings Wisdom in its train.
Nature unfolds to view her kingdoms three,
And of her laws, reveals the mysterie;
Drink deep, my friends, of her perennial stream,
And bask in Wisdom's all-reviving beam.

LONDON:

JOHN CASSELL, LA BELLE SAUVAGE YARD, LUDGATE HILL.

MDCCCLII.

~~250. d. 36.~~
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TO OUR READERS.

A GLANCE at the opposite Index will show to the purchasers of this volume what we have done, and are now doing, for the Education of the People. Our exertions have met with wide-spread and heart-felt encouragement, and we gratefully express our acknowledgments for the same. We shall make it our endeavour still more to deserve the encouragement of our subscribers, by increased efforts for their advancement in knowledge and learning. We intend to finish in the next volume, if possible, all the subjects which have been begun in this volume. Of course, it cannot be expected, under such circumstances, that we can commence a great variety of new subjects; as we wish to do justice to those which we undertake. Some of these, however, may be mentioned, as Penmanship, Short-hand, Mechanics, Chemistry, Astronomy, and Natural Philosophy. We have still much to do in Arithmetic, Geometry, and Geography, subjects of the greatest importance to the community at large, and subjects well calculated to expand, improve, and strengthen the reasoning powers; but as the bow must not be always bent, we shall endeavour, from time to time, to relieve these with lighter studies, as we have done in the present volume.

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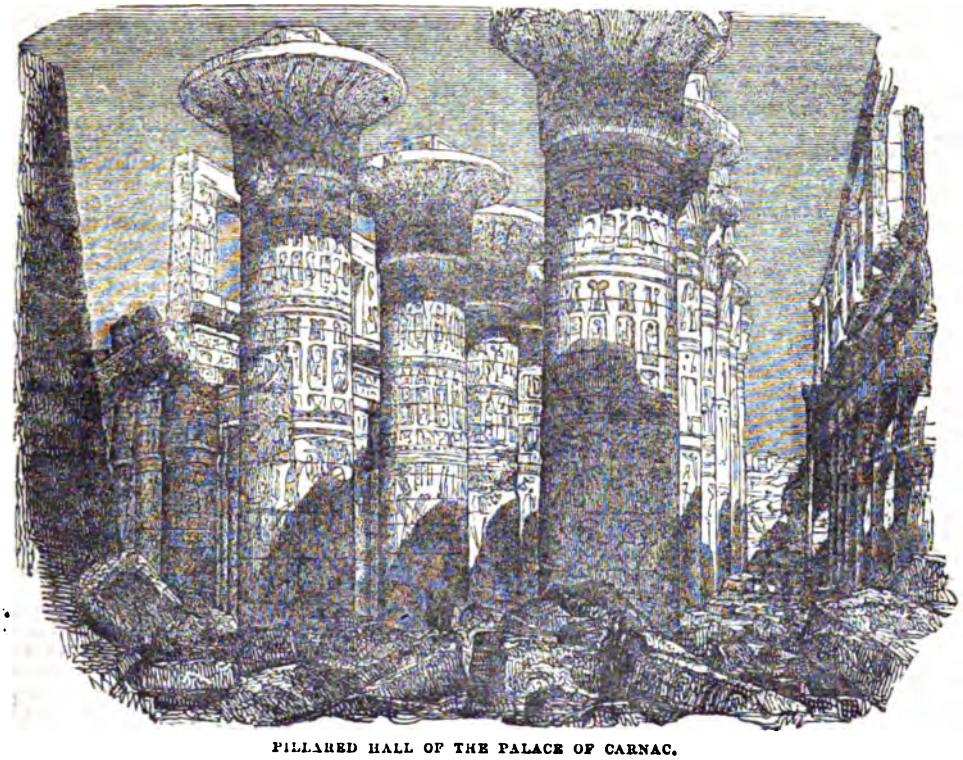
The Popular Educator.

LESSONS IN ANCIENT HISTORY.—No. I.

History, in its narrowest sense, is the recital of past events. In its wider and higher meaning, it not merely relates bygone occurrences, but inquires into their causes and consequences. These descriptions will hold good at whatever branch of it we look. There is Natural History, which has for its subjects the various natural occurrences which have taken place in the world and the different orders of animal and vegetable life which inhabit it; there is Life History, or biography, which records the sayings and doings of individual men; and lastly, there is the History of Nations, which tells of the various changes and revolutions which have occurred in human society, with the causes which led to them and the results by which they have been followed. It is to this last class of subjects that the *general* term History is usually applied.



PILLARED HALL OF THE PALACE OF CARNAC.

Now as all the changes which have taken place in the internal or external circumstances of nations, from the earliest ages up to the present time, have appeared only the visible results of the workings of individual minds, it follows that history, in its most exalted province, becomes a record of the human mind in the successive developments which it has undergone, and of the progress which it has made from age to age. But this is, as we have said, the highest department of historical science; and before attempting the study of it, an intimate familiarity with the *facts* of history is necessary. We cannot properly put a value upon the motives which have influenced the achievers of great actions or the committers of great crimes, unless we have a thorough acquaintance with all the details of the act, whatever it may have been, to which those motives have led. By it, as by their fruit, we judge of them; and thus form our opinions of the characters of those men who have acted a great part in the history of individual nations, or of the world at large. As man's actions are the truest clue to his character, so it is only from the actions of Alexander, Julius Cæsar, Cromwell, Washington, and Napoleon, that, bearing in mind the outward circumstances which pressed upon each of them, we can form an intelligent and just opinion of the characters of these men. Nor is the making us acquainted with great actions, and thus with their authors, the only or chief advantage which a knowledge of history brings with it. Presenting human nature, as it does, in so many different lights, it spreads out, as in a map, the varied experience of ages, for the instruction and self-guidance of him who reflects while he reads. And from this he learns that the chief elements of human character are the same in all; that the same mental system, however undeveloped in some, and highly cultivated in others, belongs to the whole human family; and thus the wholesome and warning lesson is taught him, that, in all ages of the world, and under every variety of circumstances, whether it refer to men as individuals, or men collectively as nations, the maxim holds good, that "vice is its own punisher, and virtue its own rewarder." How great, then, is the advantage of the man who is well versed in history, over

those of his fellows who are not! He possesses a rich and varied store of experience, ampler than the longest lifetime could give him. His acquaintance with the springs of human action is more intimate and correct than could be gained from the most extensive personal intercourse with society. But then, be it remembered, it is not from a mere vague and disjointed knowledge of the main facts of history, a mechanical remembrance of events and their dates, that these advantages need be expected. Such an amount of historical knowledge may be sufficient, if cleverly used, to gloss over a man's ignorance, but it will not strengthen his understanding or improve his judgment. To reap from it this advantage, history must be *studied*. The facts stated must be considered rather as elements for thought, than as forming in themselves the sole end of historical reading.

As a necessary accompaniment to the study of history, an acquaintance with two allied branches of knowledge is indispensable; we mean GEOGRAPHY and CHRONOLOGY, which Dr. Hales calls "the joint handmaids of history." Geography gives the student a clear idea of the *places* in which the events he reads of occurred; whilst Chronology teaches him the relation in which they stood towards each other in point of *time*. To the former of these important subjects, a special department of the POPULAR EDUCATOR will be devoted; whilst it will be our object to combine all necessary instruction in the latter, with the main subject of these papers, so far as they extend. It is hoped that the student will thus be furnished with such an epitome of geographical and historical knowledge as shall not altogether imperfectly supply the place of costly and discursive works upon these important branches. Endeavouring to attain the medium between a mere dry detail of facts, and diffuse reflection upon them—the first being insufficient, and the last unnecessary, for the purposes of popular education—we shall aim at giving the reader as interesting and connected a sketch of the history of the ancient world, as the best sources of information will furnish, and as the nature of the subject itself will permit. We insert on the opposite page an ethnographic table, showing the descent of the various nations of the earth from the families of the sons of Noah; it will go a great way to supply the want of the early history of nations, being founded on the account given in the tenth chapter of Genesis, which is the most ancient and most valuable historical document in the world. In the construction of this table, very considerable use has been made of two similar tables of great value, recently published; the one, by Dr. Rosenmuller, to be found in his "Biblical Geography;" and the other, by the late reverend and learned Dr. J. Pye Smith, inserted in the "Biblical Cyclopædia."

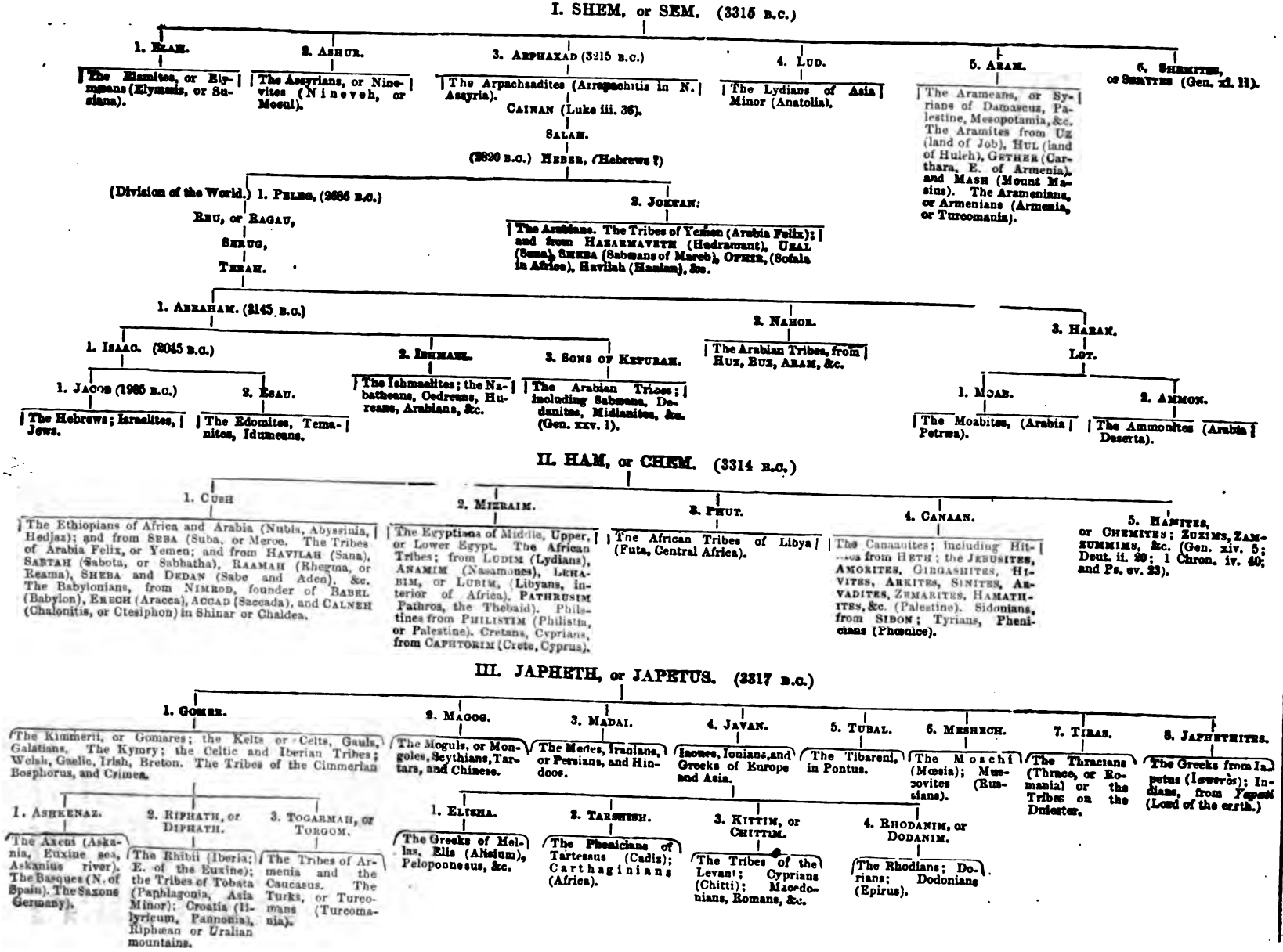
Ancient History, in its widest sense, extends from the creation of the world to the overthrow of the Roman Empire in the West, about the year 476 of the Christian era. The knowledge which we possess of the earliest ages through which it carries us, is necessarily scanty and obscure. Darkness all but impenetrable everywhere surrounds our path. Our only sources of trustworthy information are the Mosaic records. These go back to a period long before the formation of regular states or communities, and, being long prior to the authentic annals of the profane nations, are therefore our only lights on those distant and dark ages of the infancy of the human race. By them, we are told of the creation of the world "in the beginning;" of the creation and fall of man; of the flood, and of the subsequent settlement of Noah and his family in the plain of Shinar, where they built the tower of Babel, and where the confusion of their language took place, which caused their dispersion into the different regions of the earth. The sacred records afterwards confine themselves to the history of the Israelitish people, and refer to the annals of the other nations which, in process of time, had risen into existence after the scattering of the tribes at Babel, only so far as they are connected with those of the chosen people. Their annals will form no part of this summary of ancient history; being recorded in the sacred writings they ought to be as well known as not to require it. Passing then from the Israelities, we find at the point where profane history may be said to begin, three principal nations, an account of which, and of some other secondary Asiatic communities, will embrace all, or nearly all, the points of interest or importance in the history of antiquity. These three nations are the *Egyptians*, the *Assyrians*, and the *Persians*. Which is the most ancient? This question has been much discussed, but the weight of authority assigns the palm of antiquity to the first. Adopting this opinion, which is by far the most general, we shall begin our brief sketches of the profane history of the ancient world with an account of the inhabitants of "the land of Egypt."

HISTORY OF EGYPT.

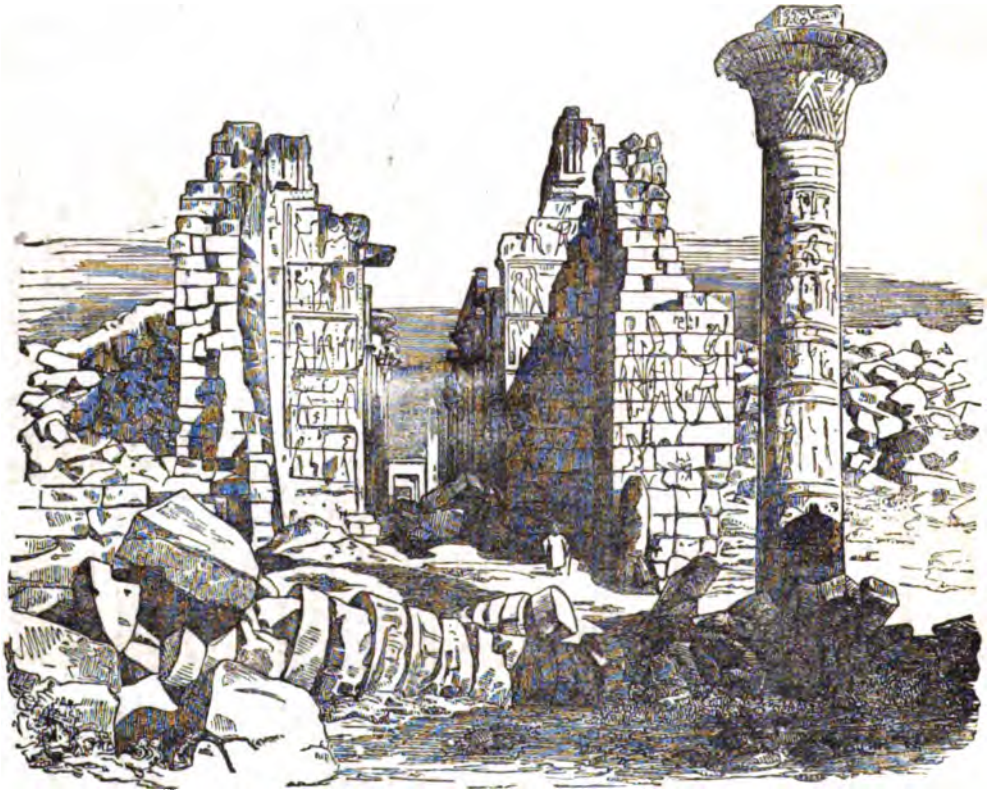
The earliest tribes which peopled Egypt, probably came from Abyssinia or Sennaar. The stream of population appears to have descended along the banks of the Nile, and to have gradually overspread the valley fertilised by its floods. The date of this first migration, however, cannot be fixed. These remote settlers in Egypt were nomadic, that is, moved about from place to place for convenience of pasturage, and had not more fixed habitations than the Bedouin Arabs of the present day. After ages spent in the pastoral state, they began to apply themselves to agriculture, and to erect permanent villages to dwell in. During these ages they were governed by priests, who pretended to have received the laws which they enforced, immediately from the gods. This form of government, which is called a theocracy, afforded the widest opportunity for the exercise of priestly injustice and oppression, and for a very long period retarded the progress of civilisation. It had divided the nation into three distinct classes or castes; first the priests, then the military, and, lastly, the people. The people alone laboured, and all the fruit of their toils was devoured by the avarice of the priests, who paid the military for keeping the rest of the population in check. A time at length arrived, however, when the military themselves became weary of yielding a blind obedience to their priestly masters, and a revolution took place which entirely and forever changed the form of government. Theocracy was exchanged for monarchy, or government by a king Menes was the leader of the revolution, and the first king of Egypt. Different chronologers give different dates for this very remote event, but that deduced from recent discoveries fixes its occurrence about the year 2782 B.C. Josephus says that Menes lived many years before Abraham, and that he governed Egypt more than 1300 years before Solomon. All that is known of his reign has been conveyed to us through the obscure and uncertain channel of tradition. This tells us that he diverted the course of the Nile, which before his time had washed the base of the sandy ridge, near the borders of the Libyan desert, and thus protected from the overflowings of the river, the ground on which Memphis, the future capital of the kingdom was afterwards erected. He also acquired glory in war; but his best renown consists in having liberated and improved his country, and instructed his subjects in the useful arts of life. The royal power was handed down to his descendants in the direct line, under whom it became gradually still milder and more enlightened. Thebes, "the city of the hundred gates," which had been built long before the overthrow of the priestly power, was the sole capital of the country, till Memphis, whose foundations had been laid by Menes, at a short distance from the Nile, was completed by his son, and made a second capital of the rapidly flourishing Egyptian kingdom.

Of the succeeding kings who belonged to the dynasty founded by Menes, even tradition tells us almost nothing. The last of them was Timaus, who was driven from his throne by the invasion of the Hycsos, or Shepherd-kings, which took place about 2400 years before the birth of Christ. Accompanied by a fierce people, they poured into Egypt from the east, and under their rule, which lasted for more than two centuries and a half, the progress of civilisation was completely suspended. They were at length driven from the country by Amosis, a chief of Upper Egypt, whose father had prepared the way for complete expulsion of the invaders, which his son effected. According to Manetho, a celebrated Egyptian writer, who lived in the time of Ptolemy Philadelphus, the vanquished shepherds crossed the desert, and entered Syria; but fearing the Assyrians, who were then very powerful, they entered what was afterwards called the land of Judea, and settling there, built Jebus or Jerusalem.

On the expulsion of the Shepherd kings, Amenoph, the son of Amosis, was raised to the throne, and founded the eighteenth dynasty of Egyptian kings. His entire reign, and those


I. SHEM, or SEM. (3315 B.C.)
1. ELAM.
The Elamites, or Elymeans (Elymais, or Susiana).
2. ASHUR.
The Assyrians, or Ninevites (Nineveh, or Mosul).
3. ARPHAXAD (3215 B.C.)
The Arpachsadites (Arrapachitis in N. Assyria).
CAINAN (Luke iii. 36).
SALAH.
(3030 B.C.) HEBER, (Hebrews?)
4. LUD.
The Lydians of Asia Minor (Anatolia).
5. ARAM.
The Arameans, or Syrians of Damascus, Palestine, Mesopotamia, &c. The Aramites from Uz (land of Job), HUL (land of Hulch), GETHER (Carthara, E. of Armenia), and MASH (Mount Masius). The Aramenians, or Armenians (Armenia, or Turcomania).
6. SHEMITES, or SEMITES (Gen. xi. 11).
(Division of the World.)
1. PELEG, (2686 B.C.)
REU, or RAGAU,
SERUG,
TERAH.
2. JOKTAN:
The Arabians. The Tribes of Yemen (Arabia Felix); and from HAZARMAVETH (Hadramaut), UZAL (Sana), SHEBA (Sabeans of Mareb), OPHIR, (Sofala in Africa), Havilah (Hasalan), &c.
1. ABRAHAM. (2145 B.C.)
1. ISAAC. (2045 B.C.)
1. JACOB (1985 B.C.)
The Hebrews; Israelites, Jews.
2. ESAU.
The Edomites, Temanites, Idumeans.
2. ISHMAEL.
The Ishmaelites; the Nabatheans, Cedreans, Hureans, Arabians, &c.
3. SONS OF KETURAH.
The Arabian Tribes; including Sabeans, Dedanites, Midianites, &c. (Gen. xxv. 1).
2. NAHOR.
The Arabian Tribes, from HUZ, BUZ, ARAM, &c.
3. HARAN.
LOT.
1. MOAB.
The Moabites, (Arabia Petræa).
2. AMMON.
The Ammonites (Arabia Deserta).
II. HAM, or CHEM. (3314 B.C.)
1. CUSH
The Ethiopians of Africa and Arabia (Nubia, Abyssinia, Hedjaz); and from SEBA (Suba, or Meroe. The Tribes of Arabia Felix, or Yemen; and from HAVILAH (Sana), SABTAH (Sabota, or Sabhatha), RAAMAH (Rhegma, or Reama), SHEBA and DEDAN (Sabe and Aden). &c. The Babylonians, from NIMROD, founder of BABEL (Babylon), ERECH (Aracca), ACCAD (Saccada), and CALNEH (Chalonitis, or Ctesiphon) in Shinar or Chaldea.
2. MIZRAIM.
The Egyptians of Middle, Upper, or Lower Egypt. The African Tribes; from LUDIM (Lydians), ANAMIM (Nasamones), LEHABIM, or LUBIM, (Libyans, interior of Africa). PATHRUSIM Pathros, the Thebaid). Philistines from PHILISTIM (Philistia, or Palestine). Cretans, Cyprians, from CAPHTORIM (Crete, Cyprus).
3. PHUT.
The African Tribes of Libya (Futa, Central Africa).
4. CANAAN.
The Canaanites; including Hittites from HETH; the JEBUSITES, AMORITES, GIRGASHITES, HIVITES, ARKITES, SINITES, ARVADITES, ZEMARITES, HAMATHITES, &c. (Palestine). Sidonians, from SIDON; Tyrians, Phenicians (Phœnice).
5. HAMITES, or CHEMITES; ZUZIMS, ZAMZUMMIMS, &c. (Gen. xiv. 5; Deut. ii. 20; 1 Chron. iv. 40; and Ps. cv. 23).
III. JAPHETH, or JAPETUS. (3317 B.C.)
1. GOMER.
The Kimmerii, or Gomares; the Kelts or Celts, Gauls, Galatians. The Kymry; the Celtic and Iberian Tribes; Welsh, Gaelic, Irish, Breton. The Tribes of the Cimmerian Bosphorus, and Crimea.
1. ASHKENAZ.
The Axeni (Askania, Euxine sea, Askanius river). The Basques (N. of Spain). The Saxons Germany).
2. RIPHATH, or DIPHATH.
The Rhibii (Iberia; E. of the Euxine); the Tribes of Tobata (Paphlagonia, Asia Minor); Croatia (Illyricum, Pannonia), Riphæan or Uralian mountains.
3. TOGARMAH, or TORGOM.
The Tribes of Armenia and the Caucasus. The Turks, or Turcomans (Turcomania).
2. MAGOG.
The Moguls, or Mongoles, Scythians, Tartars, and Chinese.
3. MADAI.
The Medes, Iranians, or Persians, and Hindoos.
4. JAVAN.
Iaones, Ionians, and Greeks of Europe and Asia.
1. ELISHA.
The Greeks of Hellas, Elis (Alisium), Peloponnesus, &c.
2. TARSHISH.
The Phœnicians of Tartessus (Cadiz); Carthaginians (Africa).
3. KITTIM, or CHITTIM.
The Tribes of the Levant; Cyprians (Chitti); Macedonians, Romans, &c.
4. RHODANIM, or DODANIM.
The Rhodians; Dorians; Dodonians (Epirus).
5. TUBAL.
The Tibareni, in Pontus.
6. MESHECH.
The Moschi (Mœsia); Muscovites (Russians).
7. TIRAS.
The Thracians (Thrace, or Romania) or the Tribes on the Dniester.
8. JAPHETHITES.
The Greeks from Japetus (Iaweros); Indians, from Yapeti (Lord of the earth.)

his three successors, Thothmosis I, Thothmosis II., and Mœris or Thothmosis III., were devoted to the object of re-establishing a regular government, and raising up the nation, which had been crushed by so many years of servitude under a foreign yoke. At the time of their invasion, they had burned the cities, thrown down the temples of the gods, put the inhabitants in large numbers to death, and spread ruin all over the land. On their expulsion, therefore, everything had to be re-constructed. Amenoph and his successors gradually re-established order throughout the whole kingdom. The canals, which had been neglected or destroyed, were repaired or re-formed; whilst agriculture and the arts, encouraged and protected by the sovereigns, soon brought back abundance, and at once increased and perpetuated the resources of government. In a little time the towns were re-built; edifices consecrated to religion appeared on all sides, and several of the monuments which even yet excite the admiration of the traveller on the banks of the Nile, belong to this interesting



THE GRAND COURT OF THE PALACE OF CARNAC.

epoch of the restoration of Egypt by the wisdom and energy of its kings. Of this number are the monuments of Semneh and Amada in Nubia, and several of those of Carnac and Medinet-Abou, which are the works of Thothmosis I., or of Mœris, Thothmosis III. This latter king, under whom the two obelisks of Alexandria were erected, is the Pharaoh who achieved the greatest undertakings; it is to him that Egypt owes the existence of the great lake Fayoum. By immense works which he executed, and by means of canals and sluices, this lake became a reservoir, which served to maintain, in the lower country, a perpetual balance between the overflowings of the Nile; to supply water when these were insufficient, or to withdraw it when they were excessive. Formerly it went by the name of its constructor, being called Lake Mœris; it now bears the Arabic name Birket-el-Karoun.

Whilst Egypt was thus advancing in civilisation and internal prosperity, several nations of Asia had extended their power to the borders of the Red Sea, and threatened encroachment upon the Egyptian territory. Mœris and his successors were thus drawn into wars, which resulted in constant advantages to the Egyptian nation. Amenoph II., the son of Mœris, rendered tributary Syria and the ancient kingdom of Babylon; Thothmosis IV. invaded Abyssinia and Sennaar; whilst Amenoph III. made equally successful expeditions into other parts of Asia. It was the latter king who built the temple of Sohleb, in Upper Nubia, the magnificent palace of Luxor, and all that part south of the grand palace of Carnac at Thebes. It is conjectured that it was under one of the princes of this dynasty, 1864 B.C., that Joseph the son of Jacob became prime minister of Egypt, and afterwards brought thither the family of his father, which thus became the source of the Israelitish nation. In the history of the eighteenth dynasty, we meet with nothing of interest or importance, till we come to the reign of Rameses the Great. This prince, who is known also in history by the name of Sesostris, was the first mighty warrior whose conquests are recorded with any degree of clearness. The date of his reign, which is the most extraordinary portion of Egyptian history, has been variously fixed. Some chronologers are of opinion that he is the Shishak who plundered Jerusalem in the reign of Rehoboam 986 B.C.; others contend that he was the Pharaoh who pursued the Israelites, and was drowned in the Red Sea 1639 B.C.; whilst by others, with more probability, the commencement of his reign is fixed about the beginning of the thirteenth century before Christ. His whole history seems largely tinged with fable and romance; it deserves, however, a more lengthened notice than has been given to any of his predecessors.

His father was told in a dream, by the god Ptha (so goes the story), that his son, then newly born, should be lord of the whole earth. Upon the credit of this vision, he collected all the males of Egypt who were born on the same day with

Rameses, appointed nurses to take care of them, and had them treated like his own child; being persuaded that they who should be the constant companions of his youth, would prove the most faithful ministers and soldiers in his riper years. As they grew up, they were inured to laborious exercises, and in particular, were never permitted to taste food till they had performed a journey of upwards of twenty-two of our miles. When the old king imagined they were sufficiently trained in martial exercises, he sent them, under the command of Rameses, against the Arabians. The young prince and his companions were completely successful; the Arabians, who had never been conquered before, were subdued. He was then sent westward, where he conquered a large part of Africa, and was only stopped in his career of victory by the Atlantic Ocean. Whilst he was absent on this expedition, his father died; and Rameses then resolved to fulfil the prediction of the god Ptha, and become the conqueror of the world. With this view he divided the kingdom into thirty-six provinces, and endeavoured to insure the loyalty of the people by gifts, both of money and land. He forgave all who had been guilty of offences, and discharged the debts of the soldiers. He then appointed his brother Armais regent during his absence, forbidding him, however, to use the kingly diadem, and commanding him to abstain from all injury to or undue familiarity with the queen and the royal concubines. His army consisted of 600,000 infantry, 24,000 cavalry, and 27,000 chariots. Besides these land forces, he built one fleet on the Mediterranean, for conquests in the West, and another on the Red Sea for operations in the East. The former of these conquered Cyprus, in the Levant, the coast of Phœnicia, and several of the islands, called Cyclades, which lie to the south of the island of Delos; and the latter fleet subdued all the coasts of the Red Sea; but shoals and other nautical difficulties stopped its further progress. With the land forces, Rameses marched against the Troglodytes (an ancient people of Ethiopia), whom he conquered, obliging them to pay him a tribute of gold, ebony, and ivory. He then proceeded as far as the promontory of Dira, which lay near the straits of Babelmandeb, where he set up a pillar, with an hieroglyphic inscription. Pursuing his conquest on the continent of Asia, he crossed the Ganges, and erected pillars likewise on its banks; then marching northward he ascended the plateau of central Asia, subdued the Assyrians and Medes, after which he directed his course towards the Caspian, and the Black Sea, and invaded Scythia and Thrace. This latter country seems to have been the utmost limit of his conquests, for beyond it his pillars were nowhere to be seen. These pillars generally bore the following or a similar inscription: "*Sesostris, King of Kings, and Lord of Lords, subdued this country by the power of his arms.*" Besides these, in some places he also left statues of himself, armed after the Ethiopian and Egyptian manner, with a javelin in one hand and a bow in the other; whilst across the breast a line was drawn from shoulder to shoulder, with this inscription: "*This region I obtained by these my shoulders.*" The abandonment of his project of universal conquest, was caused by the news of his brother's having assumed the diadem and violated his queen. Hearing this, Rameses hastened from Thrace, and nine years after he had set out on his expedition, reached Pelusium in Egypt, attended by vast multitudes of captives, and laden with the spoils of Asia. His brother met him at this city, where, as is very improbably reported, Rameses accepted an invitation to an entertainment given by the traitorous regent. On this occasion, he drank freely, the queen and the other members of the royal family joining in the festivities. During the course of the entertainment, the treacherous Armais caused a quantity of dried reeds to be laid round the apartment where they were to sleep; and as soon as the party, filled with wine and wassail, had retired to rest, he set fire to the reeds. Rameses was the first to perceive the danger, and finding that his guards, from the effect of their carousals, were incapable of aiding him, he rushed through the flames, and was followed by his queen and the royal children. Armais was eventually driven out of Egypt, and withdrew into Greece, where, under the new name of Danaus, he acquired great renown.

RUINS OF THE MEMNONIUM, NEAR THEBES.

The illustrious hero of these romantic details is generally supposed to have been one of the best of princes, as well as the bravest of warriors. During his reign the star of the Pharaohs reached its zenith. He founded new cities, dug new canals, and erected many of those magnificent structures whose remains even yet afford material for the increasing wonder and admiration of the Egyptian traveller. In his reign were reared the monuments of Ibsambul, Derri, Guircheh-Hassan, and Wady-Esseboual, in Nubia; and in Egypt those of Kournah, of El Medineh near Kournah, a portion of the palace of Luxor, and the great hall with columns in the palace of Carnac, which had been begun by his father, Menepthah I. The latter is the most magnificent structure ever reared by the hand of man. Nor were these his most important achievements. Not content with adorning his kingdom with sumptuous edifices, being desirous to promote the real welfare of his people, he published a body of new laws, the most important of which was that

which gave to all classes of his subjects the right of property in its fullest extent. By this, he divested himself of that absolute and unlimited power which his ancestors had preserved after the overthrow of the Shepherd kings, and immortalised his name. Under him, it was, that Egypt arrived at its highest pitch of internal splendour and political power. His sway, either as sovereign or receiver of tribute, extended over Egypt, Nubia, Abyssinia, Sennaar, several countries of the south of Africa, all the wandering tribes of the desert, east and west of the Nile, Syria, Arabia, the kingdoms of Babylon and Nineveh, a great part of Asia Minor, the island of Cyprus, some islands of the Archipelago, and a large part of Persia. Besides intercourse with these countries, regular commercial communications were carried on with India. The discoveries of Indian stuffs and other materials, which have been made in the tombs of Thebes, prove the existence of such a commerce between the two countries at a time when the European tribes and a great portion of the Asiatics existed in a state of barbarism. Thebes and Memphis were the first central depots of this commerce, ages before Babylon, Tyre, Sidon, Alexandria, Palmyra (Tadmor), or Bagdad were founded. Egypt was at this period divided into thirty-six provincial governments, presided over by officers of different ranks, who administered justice according to a complete code of written laws. Of the population, which amounted in all to about six millions, a part specially devoted to the study of the sciences, and the advancement of the arts, was charged, besides the ceremonies of religion, with the administration of justice, the assessment and collection of the taxes, and with all the branches of the civil government. This was called the *Sacerdotal* (or priestly) *Caste*. The chief duties of this class were exercised or directed by the members of the royal family. A second portion of the people formed the *Military Caste*, out of which soldiers were exclusively drawn for the standing army, which averaged about 180,000 men. The third portion of the population constituted the *Agricultural Caste*, which had the sole cultivation of the soil, the product of which belonged to them alone, subject only to the deduction of a portion for the king, and another for the support of the sacerdotal and military castes. The fourth, and last, was the *Industrial Caste*, which included artisans of all kinds, and merchants. It was the productions of this class which raised the country to its highest pitch of prosperity.

Antiquities of Egypt.

Several allusions having been made in the preceding lesson on Ancient History, to the remarkable antiquities which have been found in the Thebaid, or Upper Egypt, we have taken the opportunity to introduce, for the benefit of our young readers, several illustrations of these antiquities, which will serve to convey an idea of their magnitude and their magnificence, and which will, in the absence of authentic historical documents, relate even to a certain extent their own extraordinary tale. In the vicinity of Thebes, the ancient capital of Egypt, and on its eastern side, distant from each other about two miles, stand the wonderful ruins of the ancient palaces of Carnac or Karnac and Luxor; and on the western side, Medinet Abou, the Memnonium, and the tombs cut in the mountain behind. Carnac surpasses in grandeur every other structure in Thebes, and in the world. On the north-east entrance to Karnac, the ancient Egyptians appear to have lavished all their magnificence. The approach is by a long avenue of sphinxes, the largest in Egypt, leading to a succession of portals with colossal statues in front. These are distinguished even by the variety of the materials in which they are cut. A calcareous stone, compact like marble, and variegated siliceous lime-stone, and beautiful rose-coloured and black marbles of Syene, have all been used in their structure. There are two obelisks; one of 91 feet high, the loftiest in Egypt, adorned with sculptures of perfect execution. The *principal hall*, represented in our *first page*, is 318 feet long, and 159 broad, having the roof supported by 136 columns; the two middle ranges of these are about 70 feet high, and 11 feet in diameter; the others are 7 feet in diameter. This immense hall or vestibule leads into a court where there are four obelisks and twelve colossal figures. Two other courts conduct to what is supposed to be the apartments of the kings. One of these, called the *Grand Court* is represented in our *fourth* page; and the ruins of the *Hall of Kings*, is represented in our *eighth page*. Adjacent to the great palace, are many other extensive buildings connected with it by avenues of sphinxes, lions, and rams, some of the avenues extending towards Luxor. The effect of these ruins on the mind of the spectator is that of awe and sublimity. He seems to be entering a city of departed giants—to be alone in the midst of all that is sacred in the world.

The entrance to the palace of Luxor is composed of two obelisks, which are about 70 feet above the surface of the ground, and are understood to be about 30 feet below it; two colossal statues of black granite, each 38 feet high, and two great masses of building of an oblong plan and tapering sides, 55 feet high, and covered with hieroglyphics. On the Libyan side of Thebes, is the site of the Memnonium, represented in our *fifth page*, and the immense statue of red granite, 64 feet in height, thrown down by Cambyses. The ruins of this edifice, which is by some called the tomb of Osymandyas, or Sesostris, consist of three colossal statues—the one just mentioned is within the edifice, and the other two are in the adjoining plain. The former is entirely broken into fragments, and cover a space sixty feet square, making it resemble a quarry. It was composed of a single block, which must have weighed two millions of pounds. The two statues on the plain, called by the country people Iama and Chama, still remain in their original position, but so mutilated as to render it impossible to judge of the sculpture. One of them, from the numerous inscriptions on it, appears to have been the vocal statue of Memnon, celebrated by the ancients as emitting a musical sound at sunrise, or when struck at particular times of the day. No modern visitor has been able to elicit these sounds; and there can be no doubt that they were produced by some contrivance of the Egyptian priests. Karnac, Luxor, and the Memnonium, from the nature of the sculptures and distribution of the apartments, are supposed to have been the palaces of kings. At all other places, the ancient buildings are considered to have been temples of the gods. From the accounts which have reached us of the nature of the authority exercised by the Egyptian priesthood, it is highly probable that at ancient Thebes, the palace and the temple were united. How degrading to think that Karnac, with all its magnificence and glory, was dedicated to the impure god Priapus!

With regard to the history of Rameses the Great, or Sesostris, king of Egypt, we may believe that he gained many victories and subdued many regions, although we cannot fix the date of his reign or the limits of his empire, nor tell what humbled nations bowed before his throne, or what captive kings were yoked to his triumphal car. He is represented in the engraving on our *seventh page* as in the act of beheading a number of his vanquished enemies. The sculpture from which it was taken was most probably intended only to indicate their complete subjugation. Could the hieroglyphics, literally *sacred engravings*, on the stone from which it was taken be properly read, the story of the conquest might be learned. Hitherto, this ancient book is sealed. Many attempts have been made in vain to discover a key to this mystic mode of writing on monuments, practised by the Egyptian priests.

Questions on the preceding Lesson.

What is history in the various senses in which this term is employed?

What are the advantages to be gained by the study of history?

What sciences are called the joint handmaids of history, and what is their object?

What are the limits assigned to the period of ancient history?

What are the most authentic sources of information on ancient history?

What three nations claim to be the most ancient, in the history of the world?

What was the original state of the earliest tribes that peopled Egypt?

How were these people governed? and what was the form of government called?

State the nature of the different castes into which the Egyptians were divided.

Who was the first king of Egypt? and how many years did he live before Solomon? State some of his mighty acts; and the names of the early and later capitals of the kingdom. Who was the last of the dynasty which he founded, and what befel him?

Name the invaders who overran Egypt, and state who drove them out.

What does Manetho relate concerning them, and who was he?

Who founded the eighteenth dynasty of Egyptian kings?

Who were his three successors, and how did they benefit the kingdom?

Who was Sesostris, and what various epochs have been assigned for his reign?

Give some account of the story of this king, and state what extraordinary titles he assumed.

Mention some of the wonderful monuments that were erected in his reign.

SESOSTRIS, OR RAMESES THE GREAT, CONQUEROR OF NATIONS.

What countries or kingdoms did Amenoph II. render tributary?

What magnificent palaces were built by Amenoph III.?

State some of the monuments which they constructed, and great works in which they engaged.

What changes did he introduce into the government? and how far did his sway extend?

What commercial relations did he establish? and how was their existence proved?

Name and describe the different castes which existed in Egypt at this period.

Give some account of the ruins of the palace of Carnac, especially the pillared hall, the grand court, and the hall of kings?

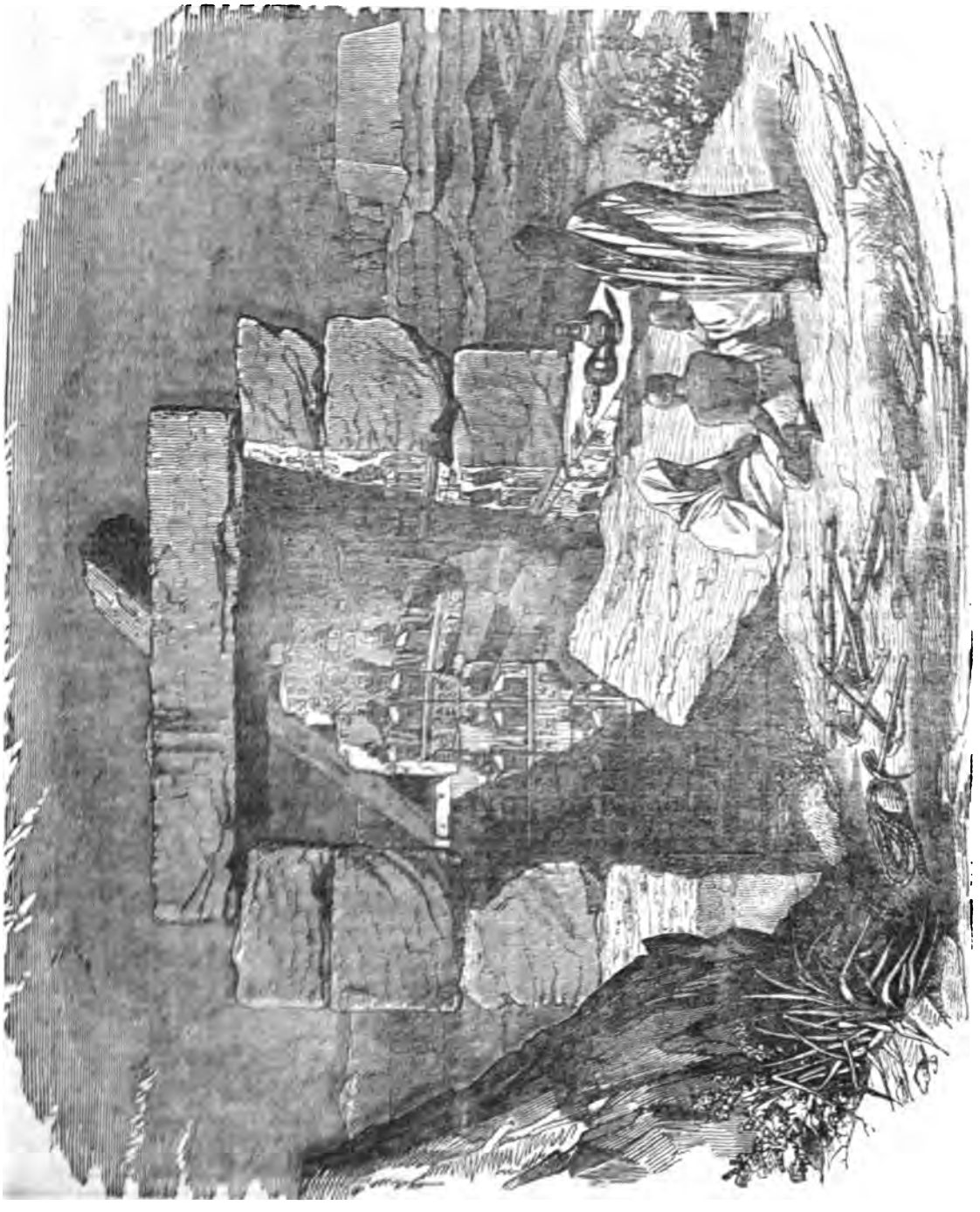
What is the nature of the buildings adjacent to this palace and connected with it?

What effect does the sight of these ruins produce on the mind of the spectator?

Give some account of the Memnonium, and of the vocal statue?

State the supposed nature of the wonderful ruins, and the uses for which they were erected?

Describe the nature of the sculptured hieroglyphic stone which represents the Conqueror of Nations?



THE HALL OF KINGS IN THE PALACE OF CARNAC.

TO THE READER.

In entering upon a new work, the leading features of which are so novel, it may be well to state clearly what we expect of the reader, and what he is to expect of us, so that there may be no disappointment or misunderstanding on either side. The success of the French Lessons, published in the *Working Man's Friend*, places it beyond doubt that it is possible to make a periodical the medium of conveying a large amount of information on all subjects, coming within the limits of what may be called an ordinary education. It is a well known fact that the acquisition of learning must be in every case the work of the pupil himself. In schools and colleges the master or professor does little else than direct, control, or stimulate. Where a difficulty occurs he may explain, or remove it, but it must be remembered that this may be done so frequently as to become positively injurious. Whatever he can do with the living voice may be done by us with the pen. But the materials on which we work differ widely. We can exercise no restraint, no oversight, and no coercion. Those who propose to accompany us through the columns of the *Popular Educator* must love knowledge for knowledge' sake, and be content to acquire it through labour and perseverance. Doubts we can remove, difficulties we can explain, but it must be upon demand. Much as must be done by ourselves, still more must be done by the reader. Eagerness in learning has done infinitely more for the world than ardour in teaching. But singularly enough the very profusion with which the stores of knowledge are laid around, is tending every day to embarrass and perplex those who can devote but little time to their selection and appropriation. The great mass of the people know not where to begin and what to choose. "What book shall I read on such a subject?" is a question which is every day asked by boys and men. "Why there are so many good ones that I hardly know which to recommend you," is the answer in nine cases out of ten. And even if it were more satisfactory, how many are there amongst the young and the working classes whose spare money is not a tenth part of what would be sufficient to procure even a scanty supply of those works which would be necessary to supply the amount of knowledge which any man laying a claim to be considered educated must possess.

There are numerous instances in every hamlet in England, of dwarfed intellects and disappointed aspirations, in consequence of the want of means to procure even elementary works on common subjects in this age of cheap literature; and there are thousands of youths throughout the land whom a simple and concise digest of the facts and bearings of leading subjects would have converted into diligent and earnest votaries of knowledge, but whom confused plenty has disgusted and sent away empty.

What we propose to do, is to present from week to week, a concise but ample statement of all that is known, and all that *must* be learned in the various departments of Botany, Natural History, Astronomy, Latin and English Grammar and Composition, History, Jurisprudence, Political Economy, &c., commencing with the simplest elements, and progressing step by step, until we leave the reader at such a point that he will no longer need our assistance. We do not pretend that we shall exhaust each subject. It would be impossible to expect this within the limits of a small and cheap periodical; but we may safely promise to supply every man with the means of exhausting it himself, if time, inclination, and circumstances allow him. But, of course, in this, as in other things, a great deal depends upon the co-operation we shall receive. It is comparatively easy to supply the materials of education, but no one can supply brains, perseverance, and energy to use them. If, in the course of our articles, anything should appear doubtful or obscure—if anything should seem to have been passed over lightly, or left altogether untouched, we shall be happy to afford the desired explanation upon application by letter. But it must be strictly understood, that we can give no direct answers to individuals. Everything must be in general terms for the benefit of all, and we must, of course, reserve to ourselves the right of deciding as to the pertinency of the queries which may be addressed to us. As we proceed, readers and authors will doubtless acquire more confidence in one another, and it must always be remembered that every obstacle overcome is a help in all after progress.

In a few weeks we shall commence a series of "Lessons in German," upon the same plan as those in French and Latin, and shall continue them until the pupil is enabled to read with ease the works of standard authors. In the interval, however, we shall go on with the latter. Upon the importance of attention to these three languages it is scarcely necessary to say one word. To have mastered them, is to have obtained the key to new fields of literature of the highest order, full of the soundest instruction, and possessing all the charm of novelty for the English reader. Now that travelling is becoming so cheap, and intercourse with foreign nations so close and frequent, many of our readers may some day find the use of our lessons in visits to France or Germany; but putting this out of the question, we hope, at all events, to enable them to enjoy one of the richest treats which any ardent and enthusiastic self-educator can receive—the power of reading the great works of Rome, of Germany, and of France, in the original tongues. The best translation can give but a faint idea of any one of them; and it must be remembered, also, that the more familiar we become with foreign languages, the greater skill do we acquire in the use of our own. In learning languages, as in everything else, strength comes from striving, and every difficulty overcome is an aid in the achievement of still greater victories.

LESSONS IN ENGLISH GRAMMAR.—No. 1.

INTRODUCTION.

The English Language is made up of several extinct tongues or dialects, but the Anglo-Saxon enters more largely into its composition than any other. The earliest inhabitants of Great Britain were the Ancient Britons, who spoke the old *Celtic*, which is now nowhere to be found except in Wales and Cornwall, and in a different form in Ireland and the Highlands of Scotland. When the Romans invaded the country, *Latin* of course became the language of law, literature, and fashion, and continued to be so during the four hundred years of their occupation. But, singularly enough, upon their departure not a trace of it remained behind, except a few names of places such as Lancaster, Chester, Manchester, all of them compounds of the Latin *castra*, meaning a camp. It is now a well established fact that there are not five words of Latin origin in our language which can be traced so far back as the period of Roman domination.

After the invasion of the Saxons, the Britons were driven into the north-western and western corner of the island, and there as we have already said, have preserved their ancient dialect. The Saxons and Angles took complete possession of the rest of the country, and their language became that in common use. A few words of British origin are, however, proved to have crept into it at this period, such as *basket*, leather (meaning *smooth* in the Welsh), bride (meaning something *won*), and about twenty others.

When the Normans conquered England, the Norman-French superseded the Saxon amongst the higher and educated classes. The latter being entirely abandoned to the common people, lost most of its force, flexibility, and precision

Many of its inflections were altered, and many were lost altogether. The power of expressing different shades of meaning by the change of termination in verbs and nouns, or by the addition of prefixes, fell into disuse. Prepositions and auxiliary verbs were employed instead.

The greater inherent strength of the Saxon language, however, at last enabled it to overcome and root out its rival, and establish itself firmly as the English tongue. In the hands of *Geoffrey Chaucer*, and other writers, it was moulded almost into its present form; but it must be remembered, that the Anglo-Saxon and modern English are now totally different. Many words of Norman origin are retained. All those relating to the chase, falconry, cookery, &c. are derived from this source, as also many law terms. Shakspere and Milton did a vast deal to fix the English language on a firm basis, and their works prove how easily it may be adapted to the highest purposes of oratory and poetry. At a later period, Dr. Johnson and other writers made it more flowing, sonorous, and majestic, by the introduction of many words of Greek and Latin origin; and it is now unequalled by any language in the world, for harmony, richness, variety, force, and precision.

Every Englishman ought to account it his duty and his honour, to be well acquainted with the language of his own country, not only for its own sake, but as it will be a key to the knowledge of those of other countries.

The power of making thoughts known, either by speaking or by writing, is peculiar to human beings. But, in order that we may express our real meaning, we must write and speak according to some given rules. These rules make up what is called GRAMMAR.

The RULES of GRAMMAR therefore must be understood. Their study may seem rather dry and difficult at first; but by a little attention and the exercise of memory you will be able to master one rule at a time, and by degrees you will master the whole. And this is well worth a little trouble; because you will then speak and write correctly, and you will be able to see and enjoy the beauty of the different books you may have the means of reading. Books will thus become a rich treat, and the knowledge you get from them will be of great service to you through life, whatever station you may be called to fill.

The word GRAMMAR is formed from the Greek word *gramma*, signifying *literature;* and it means the art of speaking or writing a language *properly;*—that is, according to rules agreed upon in the country in which a person lives.

ENGLISH GRAMMAR is the art of speaking or writing the English language so that every word shall have its proper place in a sentence, and every sentence be placed in proper order. Unless these rules be understood and attended to, a person will neither make his own meaning plain, nor will other persons understand what he writes or says.

English Grammar is divided into *four* parts:—

First, ORTHOGRAPHY. This word is formed from the Greek word *orthographia*, signifying *writing correctly;* and it teaches the shape and sound of the letters of the alphabet, the art or practice of spelling rightly, or the putting of the letters properly together, as their nature and sounds may require, so as to form words according to rule. Under this head is included ORTHOEPY, a word formed from the Greek word *orthoepeia*, signifying *correct speaking;* and it means the art of *pronouncing* words properly.

Secondly, ETYMOLOGY. This word is formed from the Greek word *etymologia*, signifying the *analysis of a word so as to find its origin;* and it means the science which explains the true nature and meaning of words by pointing out how they have been formed; also the several kinds of words and the changes of which they admit.

Thirdly, SYNTAX:—from the Greek word *syntaxis*, signifying *a putting together in order*. It means that part of grammar which teaches the mutual connexion and dependence of words, and how they should be put together so as to form regular and connected sentences.

Fourthly, PROSODY, from the Greek word *prosodia*, signifying *the doctrine of accentuation and rhythm*. It is that part of grammar which teaches in what tone and emphasis words are to be pronounced; also the measure of verse or poetry; so that we may know how sentences, either in prose or verse, ought to be written, spoken, or read.

Each of the above parts of English Grammar will now be considered separately.

I. ORTHOGRAPHY and ORTHOEPY, or the correct spelling and pronunciation of words. Words are formed of the letters in the alphabet. ALPHABET is the name given to the whole set of letters in any language; it is so called from the first two letters in the Greek Alphabet, namely, *alpha* and *beta*.

In the English Alphabet there are *twenty-six* letters, *a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z*. Now, before we can put any of these letters properly together so as to make words, we must understand the nature of their *sounds*, otherwise we might put letters together which would not make a word, and which could not be spoken. For instance, the letters *g, m, r*, if put together, will not make a word, but the letters *g, r, a, m, m, a, r*, put together, make the word grammar.

The letters used in the English language are divided into two classes, vowels and consonants. *Vowels* are letters having a clear and distinct sound, and which may be uttered by themselves: they are six in number; *a, e, i, o, u*, and *y*. The remaining twenty letters are called *consonants*, because they cannot be distinctly sounded unless a vowel be added to them; *b, p*, and *g*, are consonants, but in order to sound them we must add a vowel, as *eb, pe, gee*.

SOUNDS OF THE VOWELS.

a, the first letter or vowel in the alphabet, has three distinct sounds, as in the words *all, am*, and *ale;* the last two are the most *proper* sounds because they belong to this letter and to no other.

e, has also three sounds, as in the words *then, the*, and *me*. The first and second are the most proper sounds of this letter, for the *e* in *the*, and the *ee* in *thee*, are not to be sounded exactly alike. From want of observing the exact sound, many words in the English language are sounded alike which ought to be sounded with some difference, as, for example, *the* and *thee—meet* and *meat—beet* and *beat*, and many more which might be named.

i, has three sounds; as in the words *find, third*, and *hill*. The first of these is the proper sound, the second being nearly the same as the full *u*, and the third as the narrow sound of *e*.

o, seems to have four distinct sounds, as in the words *cloth, ton, bone*, and *womb*. The third of these sounds is the most proper, as the first is very like the broad sound of the *a*, the second resembles the broad sound of the *u*, and the fourth that of *oo*.

u, has three sounds, as in the words *us, use*, and *mule;* of these, the middle is the most pure and proper sound, as the first nearly resembles the second sound of *e*, and the third is like the sound of *oo*.

y, is sounded nearly the same as *i*, and in many cases may be regarded as a substitute for it in sound.

w, is used as a vowel when it does not begin a word or part of a word, as *vow, towel;* and *y* is used as a consonant when it begins a word, as *you, yoke*, &c.

Besides these seven *proper* sounds of the vowels, there are some other sounds in the English language which can only be expressed by uniting two vowels, as *o e*, written *oe*, or *o e*, written *oa*, &c. These are called *diphthongs*, or double vowels; and where *three* vowels come together they are called *triphthongs*.

The *æ*, though two letters, has but one sound, as *Cæsar*, sounded *Cæsar*.

The *a t* also combines the sounds of the two vowels in *on*. as in *praise, fail, rail, frail*, &c.

The *a u* has three sounds, as in the words *author, aunt, grape*
The *a w* has one sound, as in the words *awl, bawl* &c.
a y has one sound, as in *bay, lay, say*, &c.
e a has three sounds, as in *heart, heaven, seat*.
e e has one sound, as in *see, thee, sheep*, &c.
e i has two sounds, as in *weight, deceit*.
e o has three sounds, as in *George, leopard, people*.
e u has one sound, as in *feud;* and *eu* one, as in *few*.
e y has two sounds, as in the words *eye* and *key*.
i e has three sounds, as in *tie, friend, chief*.
o a has two sounds, as in *broad, boat*.
o i has but one sound, as in *oil, toil, voice*.
o o has three sounds, as in the words *door, flood, fool*.
o w has two sounds, as *know, now*.

o o has one sound, as in *Phœbe.*
o u has three sounds, as in *noun, could, though.*
o y has one sound, as in *toy, boy, joy.*
u a has two sounds, as in the words *guard, persuade.*
u e has but one sound, as in *true, blue.*
u i has three sounds, as in *guide, guilt, fruit.*
e a u has two sounds, as in the words *beauty, beau.*
i e u has two sounds, as in *lieu,* and in *lieutenant* as it is usually pronounced, when it has the sound of *lef,* as *leftenant.*

Diphthongs are divided into proper and improper. A *proper* diphthong is one in which both the vowels are sounded by a single effort of the voice, as *o i* in *voice,* or *o y* in *joy.* An *improper* diphthong is one in which though two vowels are joined, only one is sounded, as *e a* in *beagle,* and *o a* in *boat.* This includes also triphthongs, as *eau* in *beau,* and *iew* in *view.*

The Consonants.

Consonants are divided into three classes, semivowels or half vowels, liquids, and mutes. *Semivowels* have a sound of their own, though it is not so perfect as that of the vowel; they are *f, j, l, m, n, r, s, v, x, z,* and *c* and *g* soft. Four of these, *l, m, n, r,* are also called *liquids,* because they readily unite, and sound pleasantly with any other letters, as *lemon, melon, nectar, rose,* &c. The *mutes* are letters that cannot be sounded at all without the help of a vowel; they are *b, d, k, p, q, t;* and *c,* and *g* hard.

Some letters require to be sounded *hard* and others *soft,* some *sharp,* and others *flat.* This should be borne in mind, so that your words may be pronounced correctly.

C is either *hard* like *k,* as in *cull,* pronounced *kull;* or soft, like *s,* as in *cell,* pronounced *sell.* *C* is always hard before *a, o, u,* and all consonants, and at the end of words, as *call, coal, cut* and *public.* It is soft before *e, i,* and *y;* as in *cease, city, cypress.*

G is likewise either hard or soft; *hard,* as in *gun; soft,* as in *gin.* It is always *hard* before *a, o, u,* and all consonants, and at the end of words; as for example, *get, got, gut, glad, fug.* It is, for the most part, *soft* before *e, i,* and *y;* as in the words *gem, gill, clergy.* In most of the names of persons or places in the bible, *g* is sounded hard before *e* and *i,* as in *Gera, Gilboa, Gilead,* &c. *G* is likewise hard in many English words before *e* and *i,* as in *geese, get, gear, girl, give, giddy, dagger, anger,* and many more.

Ch has one hard and two soft modes of sound; *hard,* as in *Baruch; soft,* as in *arch, chaise,* &c. It is generally hard in words derived from the Greek and Hebrew; and soft in words that come from the French.

Ph, when united in the same syllable, is sounded like *f,* as in *asaph, elephant.*

S has a flat and a sharp sound; *sharp* as in *this; flat,* as in *those.* The flat sound prevails in all words made plural, or increased by the addition of *s,* as in *pins, foxes, gloves.*

Th also has a sharp and a flat sound; *sharp,* as in *thin; flat,* as in *thine.*

Ti before a vowel is frequently softened down to *sh*; as in *station, nation,* &c.; in these words the sound of the *t* is nearly if not quite lost.

W when used as a *vowel,* has the sound of *u,* as in *few, new,* but when used as a *consonant,* it has a sound peculiar to itself, as in the words *William, we,* &c.

The letter *h* can hardly be called a vowel or a consonant; it is a sort of breathing or aspiration. It is found both at the beginning and in the middle of words, and also at the end.

It is not necessary to remark on the other consonants, as they have little or no variation.

Use of the Letters of the Alphabet.

Of the letters of the alphabet, words, syllables, sentences, paragraphs, chapters, and volumes are made. A word is composed of one or more syllables. A syllable is any complete sound spoken at one effort, as *man, book, give, take,* &c. A word of one syllable, as *man,* is called a monosyllable; a word of two syllables, as *manly,* a dissyllable; a word of three syllables, as *man ess,* a trisyllable; and a word of four or more syllables, as *polyanthus,* is called a polysyllable.

A sentence is as many words put together as will make complete sense, or express a whole thought or a distinct division of a train of thoughts; as, "I wish to learn grammar." —"If I knew the rules of grammar, I should be able to write and speak correctly." —"I mean to take in the Popular Educator, and hope by reading it carefully that I shall become acquainted with many useful branches of knowledge of which at present I know little or nothing." These are all sentences.

A paragraph consists sometimes of one long sentence, but more commonly of several sentences put together in proper order, so as to form a distinct part of a letter or discourse. Paragraphs are often used to break into shorter portions, a letter, discourse, or essay, which might otherwise fatigue the reader.

A section, or chapter, consists of a number of paragraphs put together in order, either to form one complete part of a whole work, or to give the reader a little time to rest or think. For instance, the instructions in grammar in the Popular Educator, which contain a number of paragraphs, are put together so as to form one complete lesson or chapter.

A book, or a volume, is made up of many sentences, paragraphs, sections, or chapters, and varies in length and bulk, according to the nature of the subject, or the intention of the writer.

Questions on the foregoing Lesson.

What is grammar?
Why is a knowledge of it necessary?
Into how many parts is English grammar divided?
What is orthography?
What is orthoepy?
What is etymology?
What is syntax?
What is prosody?
What part of grammar is that which teaches the art of spelling and pronouncing words correctly?
How many letters are there in the English alphabet?
Is there more than one class of letters in the alphabet?
Which are called vowels?
How many sounds has the letter *a*?
What are the sounds of the other vowels?
What are the names given to the double and treble vowels?
Mention the sounds of some of the diphthongs.
What is the difference between a proper and an improper diphthong?
What are consonants?
How are they divided?
Describe a semi-vowel, a liquid, and a mute.
How are consonants sounded?
Give an example of the hard sound.
Also of the letters sounded softly.
How is a word or syllable made up?
What is a sentence?
What is that portion of a letter, speech, or discourse called which contains either one long sentence, or several sentences?
What is a section, or chapter?
What is the principal subject of this lesson?

MATHEMATICS.

The word *mathematics,* which is derived from the Greek verb, *manthano* (to learn), was originally applied to *learning in general,* but it was afterwards restricted to the knowledge of what are now called the *exact sciences.* This restriction began with Plato and Aristotle, in whose writings the term was especially applied to skill in the sciences of Arithmetic, Geometry, and Astronomy, the latter science having been cultivated at a very early period of the world's history. So high an opinion had the former philosopher of the value of these sciences, and particularly of the second, that he placed over the door of the academy or school founded by him at Athens, this inscription: "Let none ignorant of geometry enter here." Passing over the "dark ages," when religion and philosophy were alike encrusted with the ignorance and prejudice of mankind, we come to the opinion of one who mightily assisted in the "advancement of learning." Lord Bacon, in his treatise on this subject, expresses his opinion of the nature and value of the exact sciences, in the following appropriate words: "The mathematics are either pure or mixed. To the pure mathematics belong those sciences which handle *quantity determinate,* merely severed from any axioms of natural philosophy, and these are two, geometry and arith-

metic, the one treating of *quantity continued*, and the other of *quantity dissevered*. Mixed mathematics hath for subject some axioms or parts of natural philosophy, and considers *quantity determined*, as it is auxiliary and incident unto them; for many parts of nature can neither be discovered with sufficient subtilty, nor explained with sufficient perspicuity, nor accommodated unto practice with sufficient dexterity, without the aid and intervention of the mathematics; of which sort are perspective, music, astronomy, cosmography, architecture, engineering, and divers others. In the mathematics, I can discover no deficiency, except it be that men do not sufficiently understand the excellent use of the pure mathematics, in that they do remedy and cure many defects in the wit and faculties intellectual. For if the wit be dull they sharpen it, if too wandering they fix it, if too inherent in the sense they abstract it; so that as tennis is a game of no use in itself, but of great use in respect that it maketh a quick eye, and a body ready to put itself into all postures, so in the mathematics that use which is collateral and intervenient, is no less worthy than that which is principal and intended. And as for the mixed mathematics, I may only make this prediction, that there cannot fail to be more kinds of them as nature grows farther disclosed."

The admirable distinction between pure and mixed mathematics, which is drawn by the celebrated Lord Chancellor, in the preceding extract, remains correct to the present day; but the wonderful verification of his own prediction, has added in an extraordinary degree to both kinds. Hence, under *pure mathematics* are now included, arithmetic, algebra, called by Newton universal arithmetic, logarithms, or exponential arithmetic, and the theory of equations, probabilities, &c. Also geometry, plane, solid, and analytical; trigonometry, or the application of arithmetic to geometry, plane, spherical, and analytical; and the new geometry, or the differential and integral calculus, including the whole theory of curves and curved surfaces. Under *mixed mathematics*, are included mechanics, which comprehends statics and dynamics, hydrostatics, and hydrodynamics or hydraulics; also pneumatics, optics, heat, electricity, and magnetism; with astronomy, plane, nautical, and physical; the latter being sometimes denominated celestial mechanics. To these may be properly added many other mixed sciences, which perpetually call in the aid of pure mathematics; as geology, geography, geodesy, land-surveying, navigation, civil, practical, and military engineering, life assurances, steam-locomotion by sea and land, &c.

It will be the object of the "Popular Educator" to make its readers acquainted more or less with the subjects just enumerated, and their application to the present state of society; and to convey instruction in such a manner, as that any one willing to learn, may do so without the aid of a master, provided he can only read and write. That this can be done, has been often proved by the history of those who have followed "the pursuit of knowledge under difficulties." The example of Edmund Stone may be cited for the encouragement of all. He was the son of the gardener of the Duke of Argyle. At the age of eight years he was taught to read; and, at that of eighteen, he had, without assistance, made such progress in mathematical knowledge, that he could read the works of Sir Isaac Newton. As the duke was one day walking in his garden, he saw a copy of Newton's Principia lying on the grass, and called some one near him to take it back to his library. Young Stone modestly observed that the book was his own. "Yours!" replied the duke; "do *you* understand geometry, Latin, Newton?" "I know a little of them," said the young man, with an air of simplicity. The duke was surprised, and having himself a taste for the sciences, he entered into conversation with the young mathematician. He asked him several questions, and was astonished at the force, the accuracy, and the candour of his answers. "But how," said the duke, "did you come by the knowledge of all these things?" Stone replied: "A servant taught me ten years ago to read. Does any one need to know more than the letters of the alphabet, in order to learn any thing else he wishes?" The duke's curiosity was [illegible]: he sat down on a bank, and requested a detail of [illegible] proceedings. "I first learned to read," said Stone; "[illegible] were then at work upon your house; I went [illegible] day and saw that the architect used a rule and compasses, and that he made calculations. I inquired what was the meaning and use of these things, and was informed that there is a science called arithmetic. I purchased a book of arithmetic, and learned it. I was told there was another science called geometry; I bought the books, and learned geometry. By reading, I found that there were good books on these two sciences in Latin; I bought a dictionary and learned Latin. I understood also, that there were good books of the same kind in French; I bought a dictionary and learned French; and this, my lord, is what I have done. It seems to me, that we may learn everything when we know the letters of the alphabet." The duke highly pleased with this account, brought the young man out of obscurity, and provided him with an employment, which left him leisure to apply himself to the sciences. Edmund Stone, F.R.S., was the author of a new Mathematical Dictionary, published in 1726; a treatise on Fluxions and Fluents, 1730; the Elements of Euclid, 1731; and a variety of other useful works, besides papers in the Philosophical Transactions.

With the example of Stone before us, we propose to begin our Mathematical Lessons with one on Arithmetic, which will be followed by one on geometry; and so on alternately, until we come to the applied sciences. This will leave a fortnight's interval between each lesson; and we sincerely hope that many of our readers will avail themselves of this interval to master each lesson in succession. In order to keep up the spirit of inquiry, and to bring out the latent abilities of those who nobly and generously aspire to be learned, we shall insert in each number "Queries and Problems," relating more or less to the subjects in hand. In general, these shall be proposed one week and solved the next. It is hoped that these also will afford both pleasure and instruction to our readers in general.

LESSONS IN ARITHMETIC.—No. I.

The term *Arithmetic*, which is derived from the Greek verb *arithmeo, to count*, is properly applied to the *science of numbers*. To a certain extent, this science must have been coeval with the history of man. As an art, it is indispensable in daily business; and the man who is best acquainted with its practical details has always the preference in every mercantile establishment. Our object in these lessons shall be twofold—to develop its principles as a science, and to show the application of its rules as an art. For this purpose, it will be necessary to begin with the first principles of *Numeration* and *Notation*, and to give such rules as will enable any one to read and write a given number correctly.

NUMERATION.

In almost all languages, ancient and modern, we find *ten* original or primitive words, which express the names of the numbers from *one to ten*. The numbers beyond these are expressed by combinations of these words; and when their combinations or forms of expression become too cumbersome for utterance or writing, new words are invariably found to be adopted, subject to similar combinations. In English, these names are as follows, with their combinations by addition, up to *twenty*:—

Primitives.	*Combinations by Addition.*		
One	Eleven	anomalous,	One and ten
Two	Twelve	meaning	Two and ten
Three	Thirteen		Three and ten
Four	Fourteen		Four and ten
Five	Fifteen	more	Five and ten
Six	Sixteen	regular,	Six and ten
Seven	Seventeen	meaning	Seven and ten
Eight	Eighteen		Eight and ten
Nine	Nineteen		Nine and ten

After the *tens*, or *combinations of ten* and the *first nine names*, a new series of combinations are formed *by multiplication*, from *twenty* up to *ninety*, in the following manner:—

Primitives.	*Combinations by Multiplication.*		
Two	Twenty		Two times ten
Three	Thirty		Three times ten
Four	Forty	nearly	Four times ten
Five	Fifty	regular,	Five times ten
Six	Sixty	meaning	Six times ten
Seven	Seventy		Seven times ten
Eight	Eighty		Eight times ten
Nine	Ninety		Nine times ten

After the *tys*, or *multiples of ten*, by the *first nine names*, which are again combined by addition with the *same names*, so as to reach from *twenty-one* up to *ninety-nine*, a new series commences by the adoption of a new name for *ten times ten*, or *tenty*—viz., *a hundred*. This enables us, by the help of previous combinations, to, reach from *one hundred and one* up to *nine hundred and ninety-nine*, when a new series commences by the adoption of the new name, *a thousand*, for *ten hundred*. After this, no new name occurs till we reach *a million*, or *a thousand times a thousand*. It is true, that we have adopted from the Greek the term *myriad*, which signifies *ten thousand*, and which might properly commence a new series; but it has not been admitted into the nomenclature of our system of numeration. If the same process of analogy had been followed out, a new name ought also to have been adopted for *a hundred thousand*; but this has not been done, evidently for the simple reason that such high numbers were seldom in use, either in speaking or in writing. Names, indeed, would have increased so fast, and their combinations would have become so laborious to remember and to apply, in any language, that the adoption of a conventional system of signs to denote numbers, was absolutely necessary to supply the wants of mankind. Accordingly, we find that at a very early period a variety of signs or characters were invented and employed to denote numbers, and to enable men not only to express very large numbers by a few of these characters, but to make calculations of various kinds, essential both for the purposes of commerce and science.

The system of *numeration* adopted in our language, and explained above, proceeds on the *decimal* scale of numbers, in which every new name or rank is *tenfold*, or ten times, greater than the preceding—a system which is evidently founded on the digital structure of the human hand. So natural, indeed, is the practice of counting by the fingers, that both learned and unlearned adopt it, whenever any calculation is to be made which does not require the pen. The names of the successive ranks of numbers in their *decimal* order, to a certain extent, are the following:—

Decimal System of Numeration.

Units (*ones*).
Tens of units.
Hundreds of units.
Thousands of units.
Tens of thousands of units.
Hundreds of thousands of units.
Millions (thousands of thousands).
Tens of millions.
Hundreds of millions.
Thousands of millions.
Tens of thousands of millions.
Hundreds of thousands of millions.
Billions (millions of millions).
Tens of billions.
Hundreds of billions.
Thousands of billions.
Tens of thousands of billions.
Hundreds of thousands of billions, *&c.*

In the preceding table, the *first six* ranks of names are called the *first period* of numbers; the next six, the *second period*; the six after this, the *third period*; and so on. It will be observed that after the first period of *units*, the same names are applied, in the same order, to the second period of *millions*; and then, to the third period of *billions*. This process is continued, in our system of *numeration*, and the table may be extended to any length required, by applying the same names to each successive period in order, the names of these periods being as follows:

The Higher Periods.

Trillions (millions of billions).
Quadrillions (millions of trillions).
Quintillions (millions of quadrillions).
Sextillions (millions of quintillions).
Septillions (millions of sextillions).
Octillions (millions of septillions).
Nonillions (millions of octillions), *&c.*

The preceding system of numeration is that adopted by all the oldest and best English writers on arithmetic; and, up to the last name in the higher periods above mentioned, is capable of expressing a number containing sixty figures in the common system of notation. In many of our recent works on arithmetic, the French system of numeration is adopted, which differs very considerably from ours, and which has the merit of greater simplicity to recommend it; but what it gains in simplicity, it loses in power. Instead of dividing numbers into periods of six ranks each, they divide them into periods of three ranks each, the *first period* being called *units*; the second, *thousands*; the third *millions*; and so on, as in the following table:

French System of Numeration.

Units (ones).
Tens of units.
Hundreds of units.
Thousands (in French, Mille).
Tens of thousands.
Hundreds of thousands.
Millions (thousands of thousands).
Tens of millions.
Hundreds of millions.
Billions (thousands of millions).
Tens of billions.
Hundreds of billions.
Trillions (millions of millions).
Tens of trillions.
Hundreds of trillions, &c.

This table, when compared with the table of the English system of numeration, will clearly show the difference between the two systems. For example, *trillions* in the preceding table signifies only *millions of millions*; whereas in the English table it signifies *millions of millions of millions*. This comes of the French using the word *mille* for a *thousand*, and the word *million* for a *thousand thousand*; hence, also, the confusion arising from the similarity of the names. In consequence of the French division of the numeration table into periods of three ranks instead of six, it is plain that with the exception of one period, viz., the thousands, their system is capable of expressing a number containing only half the quantity of figures which the English system can express; and is therefore so much inferior in power.

Questions on the preceding Lesson.

What is the origin of the term, Arithmetic, and to what science is it properly applied?

How many primitive words, as names of numbers, are to be found in almost all languages?

How are names obtained for the numbers beyond ten?

When is it necessary to invent new names for numbers?

State the combinations by addition of the primitive names of numbers in English.

State the combinations by multiplication of the same primitives.

Give an idea of the manner in which the names of numbers, up to one hundred, are filled up.

What is the meaning of the name myriad?

What is the name of the next rank after myriads, which, according to analogy, would have required a new name?

What method was necessary to denote numbers to prevent the increase of names?

What are the advantages of denoting numbers by characters or signs?

What scale of numbers, or system of numeration, is adopted in English?

What is the origin of this system?

State the different ranks of numbers in our system of numeration up to trillions.

Mention the names of the higher periods, and states how many ranks each period consists of.

Give some account of the French system of numeration.

State the difference between the French and English systems and the advantages of each.

LESSONS IN FRENCH.—No. I.

By Professor Louis Fasquelle, LL.D.

In commencing these French Lessons, we have thought it best to begin with a chapter exclusively devoted to the pronunciation of words, and the variations which are caused in the sounds of vowels and consonants by changes in their relative position. We shall then enter into the construction of the language, and endeavour in as plain a manner as sible to make our readers familiar with its various

and peculiarities. It will greatly facilitate their progress to have made themselves familiar with the instructions contained in the French Lessons, reprinted from the *Working Man's Friend*.* We also recommend careful attention in *applying the rules and exceptions* to the writing and reading of exercises. This is little more than a work of the memory, and an ordinary amount of diligence at the outset will soon enable any one not only to translate but to speak the French language with ease and comfort. First, then, as to the letters and their sounds.

The Letters.

The French alphabet contains twenty-five letters:—

		Old names.	New names.	Examples.
A	a	ah	ah	amas.
B	b	bay	be	barre.
C	c	say	ke ¶	cas, cil.
D	d	day	de ¶	dard.
E	e	a	a	effet.
F	f	eff	fe	frère.
G	g	jay †	ghe	grêle.
H	h	ash	he	haie.
I	i	e	e	idée
J	j	jee †	je	jais.
K	k	kah	ke	kali.
L	l	ell	le	lit.
M	m	emm	me	mât.
N	n	enn	ne	natte.
O	o	o	o	orge.
P	p	pay	pe	père.
Q	q	ku	ke	quadre.
R	r	err ‡	re	rat.
S	s	ess	se	soie.
T	t	tay	te	tort.
U	u	u ‖	u	urne.
V	v	vay	v	vase.
X	x	eeks	xe **	rixe.
Y	y	e grec	e grec	yeux.
Z	z	zed	ze ††	zèle.

W, called in French *double V*, might be added, as many foreign words which have that letter, have been adopted into the French language.

The Vowels.

Vowels are rendered long or short by certain marks placed over them. These marks, which are three in number, are called accents.

The *acute* accent (´) is placed over the *e* to give it a sharp or close sound. (See 4, *é*.)

The *grave* accent (`) is placed over *a*, *e*, *u*, to give to these vowels a grave or open sound. (See 5, *è*.)

The *circumflex* accent (^) is placed over *a*, *e*, *i*, *o*, *u*, to give to these letters a long and broad sound.‡‡

1. a like a in *mass*. Ex. face, *face*; bateau, *boat*; tableau, *picture*; patte, *paw*; malade, *sick*.
2. â like a in *bar*, *far*. Ex. âge, *age*; château, *castle*; pâte, *paste*; blâme, *blame*; crâne, *cranium*.
3. e nearly like u in *bud*, and frequently silent at the end of polysyllables. Ex. le, *the*; me, *me*; te, *thee*; que, *that*; meuble, *piece of furniture*; peuple, *people*; rime, *rime*.
4. é like a in *fate*. Ex. été, *summer*; amitié, *friendship*; élevé, *raised*; épée, *sword*.
5. è like *ai* in *pair*. Ex. père, *father*; frère, *brother*; mère, *mother*; elève, *pupil*.
6. ê nearly like e in *there*. Ex. rêve, *dream*; extrême, *extreme*; crême, *cream*; crêpe, *crape*; forêt, *forest*.
7. i nearly like i in *pin*. Ex. midi, *mid-day*; ici, *here*; fini, *finished*; credit, *credit*.
8. î like *ee* in *bee*. Ex. île, *island*; gîte, *lodging*; épître, *epistle*; dîme, *tithe*; abîme, *abyss*.
9. o nearly like *o* in *rob*. Ex. robe, *robe*; globe, *globe*; cachot, *dungeon*; haricot, *bean*.
10. ô like *o* in *bone*. Ex. dépôt, *deposit*; prévôt, *provost*; bientôt, *soon*; suppôt, *supporter*.
11. u. The exact French sound of this letter is not found in English. The position of the lips in *whistling*, is very nearly the position which they should have in emitting the French u. Ex. urne, *urn*; lune, *moon*; but, *aim*; tribu, *tribe*; tribut, *tribute*; élu, *elected*.
12. û is the u with a prolonged sound. Ex. mûre, *mulberry*; dû, *due*; crû, *growth*; brûler, *to burn*.
13. y. See 28, y.

The Diphthongs.

14. A vowel surmounted by an accent cannot form a diphthong with another vowel, it must be pronounced separately. Ex. obéir, *to obey*; déité, *deity*; réussite, *success*. Exceptions, où, *where*—pronounced *oo*; i and e accented (if e follow i) form a diphthong.
15. A vowel surmounted by a diæresis (¨) follows the above rule. Ex. haï, *hated*; païen, *pagan*; maïs, *maize*. Exceptions; u followed by ë at the end of a few words, as in ciguë, *hemlock*, is pronounced like û alone.
16. ai is like *e* in *fate*. Ex. j'ai, *I have*; je ferai, *I will make*; baie, *bay*; mai, *May*; balai, *broom*.
    When the diphthong *ai* is followed by *s*, *d*, or *t*, it assumes a broader sound, resembling the French è, or *ai* in the English word, *pair*. Ex. j'avais, *I had*; je ferais, *I should make*; lait, *milk*; laid, *ugly*.
17. au nearly like *oh!* in English. Ex. taux, *rate*; chaud, *warm*. *e* preceding *au* is blended with that diphthong without changing its sound. Ex. beau, *handsome*; château, *castle*; tableau, *picture*; eau, *water*.
18. ei nearly like *e* in *fate*. Ex. beige, *serge*; neige, *snow*; seigle, *rye*; reine, *queen*; peigne, *comb*.
19. eu approaches the sound of *u* in *tub*. Ex. jeu, *play*; lieu, *place*; peu, *little*; peur, *fear*; chaleur, *heat*. Exceptions, in *eu*, *had*: j'eus, &c., *I had*; j'eusse, &c., *I might have*; *eu* is pronounced like u alone.
20. ia nearly like *ia* in *medial*. Ex. il lia, *he bound*; il cria, *he cried*; dialogue, *dialogue*.
21. ie like *ee* in *bee*. Ex. il lie, *he binds*; il étudie, *he studies*; harpie, *harpy*; mie, *the soft part of bread*.
22. oi nearly like *wa* in *was*. Ex. croix, *cross*; il boit, *he drinks*; roi, *king*.
23. ou like *oo* in *cool*. Ex. doux, *soft*; coup, *blow*; nous, *we*; vous, *you*; cou, *neck*.
24. ua — no corresponding sound in English. Examples of the French sound. Il salua, *he saluted*; il remua, *he moved*; il contribua, *he contributed*.
25. ue — Il salue, *he salutes*; il remue, *he moves*; il contribue, *he contributes*.
26. ui — produit, *produce*; conduite, *conduct*; lui, *him*; bruit, *noise*; il réduit, *he reduces*.
27. uo — duo, *duet*.
28. y when initial, when coming between two consonants, or when forming a syllable of itself, has the sound of the French *i*. Ex. style, *style*; type, *type*; yeux, *eyes*; Ypres, *Ypres*; y, *there*; between two vowels *y* has the power of two *i's*, one of which forms a diphthong with the preceding, and the other with the following vowel; the syllabic division taking place between the *i's*. Ex. moyen, *means*; essayer, *to try*; nettoyer, *to clean*; citoyen, *citizen*; abbaye, *abbey*; these words are pronounced as if they were written *moi-ien*, *essai-ier*, *nettoi-ier*, *citoi-ien*, *abbai-ie*. The words, pays, *country*, paysage, *landscape*; paysan, *peasant*, are pronounced *pé-is*, *pé-isage*, *péi-san*.

The Nasal Sounds.

29. The combination of the vowels with the consonant *m* or *n*, produces what the French call *le son nasal*, the nasal sound.
30. When the consonant *m* or *n* is doubled, or is immediately followed by a vowel* the nasal sound does not

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* Published at the office of the "Popular Educator," price 6d.

† Like *s* in *pleasure*.
‡ Nearly like *arr* in *arrow*.
‖ No corresponding sound in English.
¶ Nearly like *ke* and *de* in *cake* and *grade*. The e of the other letters has the same sound.
** *ks*.
†† *ze* in *rose*.

‡‡ This accent indicates the suppression of the letter *s* after the vowel on which it is placed, thus: *fête*, *tête*, *bête*, were formerly written, *feste*, *teste*, *beste*, the *s* was not sounded, but gave to the preceding vowel that prolonged sound now represented by the circumflex accent.

* The words *ennui*, *ennuyer*, *emmener*, *enivrer*, *enorgueillir*, form exceptions to this rule. The first syllable of *ennui*, *ennuyer*, *emmener* is nasal *enivrer*, *enorgueillir* are pronounced *en-nivrer*, *en-orgueillir*.

take place. Ex. *in*nocent, *innocent*; *im*mobile, *immovable*; *inu*tile, *useless*; *inou*ï, *unheard of*. The syllables *in* and *im* in the words innocent and immobile, are pronounced as in English; the syllabic division of i-nu-ti-le and i-nou-ï will explain the reason of the absence of the nasal sound in those words.

31. am, an, em, en — pronounced *anh** nearly like an in *pant*.
Examples. *am*ple, *ample*; cham*b*re, *chamber*; lam*p*e, *lamp*.
an, *year*; ban*c*, *bench*; d*an*s, *in*; man*t*eau, *cloak*.
mem*b*re, *limb*; *en*porter, *to carry away*; trem*b*ler, *to tremble*.
en, *in*; d*en*t, *tooth*; p*r*endre, *to take*; r*en*dre, *to render*.

32. en final is sometimes pronounced like en in *then*. Ex. Ed*en*, *Eden*.

33. en in the third person plural of verbs is silent. Ex. ils lis*ent*, ils port*ent*, ils donn*ent*; pronounce ils *liz*, ils *port*, ils *don*.

34. im, in — somewhat like *an* in *crank*. tim*b*re, *stamp*; *im*possible, *impossible*; *im*portant, *important*.
l*in*, *flax*; p*in*, *pine*; cr*in*, *horse-hair*; v*in*, *wine*.

35. om, on — pronounced *onh*, nearly like *on* in *song*. tom*b*e, *tomb*; com*b*le, *height*; som*b*re, *dark*; tom*b*er, *to fall*.
m*on*, *my*; t*on*, *thy*; s*on*, *his*; bond, *bound*; pont, *bridge*.

36. um, un — somewhat like *un* in *hunting*. hum*b*le, *humble*; parf*u*m, *perfume*.
un, *one*; chac*un*, *each one*; import*un*, *importunate*.

THE CONSONANTS.

1. A final consonant is *generally* silent.
2. The letters c, f, l, r, however, when final, are *generally* pronounced.
3. The final consonant of a word is *generally* carried to the next word, when that word begins with a vowel or an h mute. (See 11, h.)
4. For illustrations and exceptions, see the several letters.
5. B initial is pronounced as in English. In the middle of words, and at the end of proper names, b is sounded. Ex. *ab*diquer, *to abdicate*, Job, Cale*b*, &c. B is also pronounced in radou*b*, *refilling of a vessel*, and rum*b*, (pronounced romb,) *point of the compass*. It is silent in plom*b*, *lead*; aplom*b*, *perpendicular*.
When b is doubled, only one of these letters is pronounced. Ex. *abbé*, *abbot*; sa*bb*at.
6. C has its proper sound (k) before a, o, u, l, n, r. Ex. cabane, *cottage*; cou, *neck*; écu, *crown*; enclin, *inclined*; Cnéius, *Cneius*; croire, *to believe*.
c before e and i, and with the cedilla (ç) before a, o, or u, has the sound of *s*; *ceci*, *this*; cendres, *ashes*; façade *front*; façon, *fashion*; reçu, *received*.
ch is pronounced like sh in *she*. Ex. *ch*ar, *car*; *ch*arbon, *coal*; *ch*angement, *change*.
c in the words *vermicelle* and *violoncelle*, is pronounced like *ch*.
ch is pronounced like k in a few words derived from the Greek. Ex. *ch*aos, anac*h*ronisme, c*h*ronique, patriarc*h*at, orc*h*estre, &c. In patriarc*h*e, arc*h*evêque, Ac*h*éron, ch is pronounced like *sh*. In Mic*h*el-Ange, *Michael-Angelo*, it sounds like *k*.
c final is sounded, except when preceded by n. Ex. avec, *with*; arc, *bow*; sac, *bag*; suc, *juice*; Turc, *Turk*.
Exceptions: it is silent in accroc, *rent*; broc, *jug*; clerc, *clerk*; estomac, *stomach*; lacs, *snares*; marc, *mark*; porc, *pork*; tabac, *tobacco*—ch is silent in almana*ch*.
c preceded by n is silent. Ex. ban*c* *bench*; flan*c*, *flank*.
c is pronounced like g in second, *second*, and fécond, *fruitful*.
c final is seldom pronounced upon the next word.
7. D has the same sound as in English. Ex. *d*ame, *lady*. D is pronounced in the middle of words. Ex. ad*v*erbe, *adverb*; ad*m*irer, *to admire*.
d is silent at the end of words, except in proper names as in Da*v*id, *David*; also in the word sud, *south*, and in a few foreign words, as le Cid, *the Cid*; le Talmud, *the Talmud*, &c.
d final, coming before a word commencing with a vowel or an h mute, assumes the sound of t—un grand homme is pronounced *grand tomme*; coud-il, *does he sew?* vend-il, *does he sell?* are pronounced cou-til, ven-til.
8. F is pronounced as in English. Ex. *f*ièvre, *fever*; *f*iacre, *hackney-coach*.
f final is generally sounded. Ex. soif, *thirst*; chef, *chief*; suif, *tallow*.
Exceptions: clef, *key*; chef-d'œuvre, *master-piece*; œuf-dur, *hard egg*; œuf-frais, *fresh egg*; bœuf-frais, *fresh beef*; bœuf-salé, *salt beef*. In the plural of the words œuf and bœuf, *f* is always silent.
The f of neuf, *nine*, is silent before a consonant, and sounds like v before a vowel or h mute; neuf livres, pronounce *neu livres*—neuf hommes, neuf enfants, pronounce *neu-vomme*, *neu-venfants*.
9. G is always hard (that is like g in game) before a, o, u. Ex. *g*arde, *guard*; *g*ond, *hinge*; *g*igu, *acute*.
g before e and i has always the soft sound, (that of s in pleasure). Ex. *g*erbe, *sheaf*; *g*endre, *son-in-law*; *g*ibier, *game*; *g*ilet, *vest*.
gua, guo, gue, gui, are pronounced *gha*, *gho*, *ghe*, *ghi*, i. e., the u is silent. Ex. il lé*gua*, *he bequeathed*; lé*guons*, *let us bequeath*; *gue*rre, *war*; *gui*tare, *guitar*.
Exceptions: In aiguille, *needle*; Guise, &c., the two vowels are sounded. The *ue* of *gue* final is mute, unless a diæresis is on the e, as in ciguë, *hemlock*.
10. gn is pronounced like ni in *union*. Ex. r*gn*e, *reign*; pei*gn*e, *comb*; dai*gn*er, *to deign*; sai*gn*er, *to bleed*.
Exceptions: *Gn*ide, Pro*gn*é, sta*gn*ant, i*gn*ée, &c.
g final takes the sound of k before a vowel or an h mute; san*g* humain, *human blood*, is pronounced *san humain*.
11. H is mute or aspirate—h mute (having of itself no sound) when preceded by a word subject to elision, is treated as a vowel—h aspirate is always initial, the breathing or aspiration is very slight, but not entirely absent as is advanced by some grammarians.
As it is important, on account of elision and of the pronunciation of the last consonant of a word preceding *h*, to know when it is aspirate or not, we will give a list of the words which commence with *h* aspirate, omitting however the derivatives and a few words seldom used.

Hableur	Haras	Havresac	Hors
Hache	Harasser	Héler	Hotte
Hagard	Harceler	Hennir	Hottentot
Haie	Hardes	Henri	Houblon
Haillons	Hardi	Have	Houille
Haine	Harem	Havre	Houlette
Hair	Hareng	Héraut	Houppe
Haire	Hargneux	Hérisson	Houri
Halage	Haricot	Hérisser	Houppelande
Hâle	Haridelle	Héron	Housse
Halle	Harnais	Héros*	Houx
Hallebarde	Harpe	Herse	Huche
Hallier	Harpie	Heurter	Hués
Halte	Harpon	Hibou	Huguenot
Hamac	Hasard	Hideux	Huit
Hameau	Hâter	Hiérarchie	Humer
Hanche	Hausser	Hollandet†	Huppe
Hangar	Haut	Homard	Hure
Hanneton	Haut-bois	Honte	Hurler
Hanter	Hautesse	Horde	Hussard
Harangue			

12. J is pronounced like s in pleasure. Ex. *j*our, *day*; *j*amais, *never*.
K sounds like k in English. Ex. *k*an, *khan*; *k*ilogramme, *a French weight*.

* This combination, it seems to us, renders the French nasal sound more accurately than *ang*, the *g* giving an unpleasant twang not existing in the French nasal syllables.

* The *h* of the other words having the same derivation, *Héroïne*, *héroïsme*, *heroïque*, &c. is not aspirated.

† We say, however, du fromage d'Hollande, *Dutch cheese*; de la toile d'Hollande, *Dutch linen*.

13. L in the combinations ll, ill, not initial, but in the middle or at the end of words, has the liquid sound found in the English word *brilliant*. Ex. paille, *straw*; fille, *daughter*; bail, *lease*; travail, *labour*.
Exceptions. fil, *thread*; Brésil, *Brazil*; Nil, *Nile*; mil, mille, *thousand*; civil, *civil*; profil, *profile*; ville, *town*; and its derivatives; tranquille, tranquillité, &c., *quiet, quietness, &c.*
l is silent in baril, *barrel*; chenil, *kennel*; coutil, *ticking*; fils, *son*; fournil, *bakehouse*; fusil, *gun*; gril, *gridiron*; outil, *tool*; persil, *parsley*.
ll in Sully has the liquid sound—l is silent in pouls, *pulse*; and gentilshommes, *noblemen*.
The l marked as silent in the words above, is never carried to the next word.

14. M } initial are pronounced as in English. For these letters
15 N } in combination with the vowels, see nasal sounds. Final consonants after m and n are generally silent. Ex. temps, *weather*; je rompe, je prends, *I break, I take*.
m is silent in condamner, *to condemn*; antomne, *autumn*.
n final, and not belonging to a noun, is carried to the next word, when this word begins with a vowel or an h mute, if the two words are closely connected. Ex. un bon enfant, *a good child*; mon ami, *my friend*; pronounced *bon nenfant, mon nami*.

16. P is generally sounded as in English. P is however silent in baptême, *baptism*: baptiser, *to baptise*; compte, *account*; dompter, *to subdue*; exempt, *exempt*; sept, *seven*; septième, *seventh*.
p final is silent. Ex. coup, *blow*; drap, *cloth*.
Exceptions: cap, *cape*; and proper names generally.
p final is not carried to the next word.

17. Q qu is pronounced like k. Ex. question, *question*; qui, *who*; qualité, *quality*;—ue final is silent after q. Ex. pratique, *practice*.
Exceptions: qu is pronounced as in English in aquatique, équateur, équestre, équitation, équation, in-quarto, liquéfier, quadragénaire, quadruple, quadrupède, Quinte-Curce, Quintilien, quintuple, quirinal.
q final is sounded. It is, however, mute in coq-d'Inde, *turkey*; and in cinq, *five*, when followed by a word commencing with a consonant.

18. R The French r is pronounced with greater force than the English.
rr is pronounced like r. Ex. arriver, *to arrive*; arranger *to arrange*.
Exceptions: in the future and conditional of acquérir, to *to acquire*; courir, *to run*, and mourir, *to die*, the two r's are distinctly sounded. Ex. je courrai, je mourrai, je courrais, je mourrais, j'acquerrais, &c.
r final is pronounced when preceded by a, i, o, u. Ex. car, *for*; finir, *to finish*; cor, *hunting horn*; pur, *pure*.
Exception: Monsieur, *Sir*.
r preceded by e is generally sounded in monosyllables. Ex. fer, *iron*; cher, *dear*.
r preceded by e is silent in words of more than one, syllable Ex. parler, *to speak*; manger, *to eat*; chercher, *to seek*.
Exceptions: r is sounded in amer, belvéder, cancer, cuiller, éther, enfer, hiver, Jupiter, Lucifer, magister.
The final r of an infinitive is not often carried to the next word in conversation. In serious reading it is generally carried to the next word.

19. S has generally the same sound as in English.
s between two vowels is pronounced as in the English words *rose, prose*. Ex. base, *base*; vase, *vase*; pause, *pause*; chose, *thing*.
Exceptions: s in words composed of a particle, or an adjective, and a word commencing with s, preserves the hissing sound. Ex. parasol, *parasol*; vraisemblable, *likely*; désuétude, *desuetude*; prescance, *precedence*, &c.
sc is pronounced as in English. Ex. scandale, *scandal*; science, *science*.
sch is pronounced like *sh* in the words schisme, schismatique, schiste, schérif, schéik, schelling—It is pronounced *sk* in schème.
s final is generally silent. Ex. pas, *step*; mais, *but*; jus, *juice*.
Exceptions: s is pronounced in aloès, *aloes*; atlas, *atlas*; blocus, *blockade*; cens, *census*; en sus, *besides*; gratis, *gratis*; lapis, *lapis*; iris, *iris*; maïs, *maize*; mœurs, *manners*; prospectus, *prospectus*; Rheims, *Rheims*; vis, *screw*; and in Latin and Greek names ending in s—Délos, Romulus, &c.
s is carried to the next word when the word commences with a vowel or an h mute; it has then the sound of z—bons amis, *good friends*, is pronounced *bon zamis*. In conversation the final s of verbs is not generally carried to the next word.

20. T is pronounced like t in table. Ex. tard, *late*; tort, *wrong*.
t has the sound of the English c in *cedar*, in the combinations *tial, tiel, tion*, final or in the middle of words. Ex. partial, *partial*; essentiel, *essential*; observation, *observation*. Words in which these terminations are preceded by s or x, are excepted; the t therefore in bastion, question, mixtion, &c. retains its proper sound.
t has the sound of c in cedar, in the words inepte, *absurdity*; minutie, *minutia*; prophetie, *prophecy*; and in words ending in *atie*, derived from the Greek, and having in English the termination *cy*, aristocratie, démocratie, &c.; also in initier, *to initiate*.
In other words ending in tie, and in those ending in tié and tier, the t has its proper sound. Ex. garantie, *guarantee*; moitié, *half*; amitié, *friendship*; chantier, *dock-yard*; métier, *trade*.
th sounds alway like t alone. Ex. thé, *tea*; thèse, *thesis*.
t final is generally silent. Ex. but, *aim*; mot, *word*; sort *fate*.
Exceptions: t is sounded in brut, chut, correct, dot, direct, déficit, fat, exact, net, prétérit, suspect, strict, &c.
t in sept, huit, vingt, is sounded except when it comes before a consonant.
t is seldom carried to the next word; t in *et* (and) is always silent.

21. V is a little softer than the English v. Ex. viande, *meat*; voille, *veil*.

22. W which is found only in foreign words, is pronounced like v. Ex. Wurtemberg, Westphalie. In a few other words it has the pronunciation of the English w. Ex. *whig, whist*.
initial, which in French is only found in a few words is pronounced like gz. Ex. xylon, *cotton-plant*; Xavier, Xénophon, Xante, Xantippe.
Xerxes is pronounced *gzercess*.
x following an initial e, and preceding a vowel or an h, is also sounded like gz. Ex. exil, *exile*; examiner, *to examine*; exhiber, *to exhibit*.
x not following an initial e, but coming between two vowels, sounds like ks. Ex. axe, *axis*; luxe, *luxury*; Alexandre, *Alexander*; maxime, *maxim*; sexe, *sex*.
x sounds like ss in the following words: six, *six*; dix, *ten*; soixante, *sixty*; Bruxelles, *Brussels*; Auxonne, Auxerre, *Aix*-en-Provence.
In sixième, dixième, deuxième, dix-sept, dix-huit, dix-neuf, it is pronounced like *z* in *zone*.
x final is generally silent. Ex. prix, *price*; croix, *cross*; voix, *voice*.
Exceptions: x is sounded like ks at the end of names of Greek and Latin origin. Ex. Ajax, Styx, &c. In Aix-la-Chapelle it has the same sound.
The x of deux, six, dix, coming before a consonant, is silent, except in the cases mentioned above; i.e., in dix-sept, dix-huit, dix-neuf.
x when carried to the next word, sounds like z.

24. Z sounds as in the English words zinc, zone. Ex. zèle, *zeal*; zenith, *zenith*.
z final is generally silent. Ex. nez, *nose*; chez, *with*, &c.; allez, *go*.
Exceptions: gaz, *gas*. In Metz, Suez, &c., it sounds like ss.
z final is generally carried to the next word when that word commences with a vowel, or an h mute.

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LESSONS IN MUSIC.—No. I.

By John Curwen.

We have a friend, who was long persuaded by his relatives, who were all "musical," that he had "no voice." Any innocent attempt of his to unite in the vocal pleasures of the family circle was instantly checked by some compassionate expression or imploring look. He humbly acquiesced in this judgment of his friends, but found it often difficult to resist the sympathy of song, and sometimes startled the singers by adding his honest voice to the closing strain. In public worship, too, no frowns or dissuasives could hinder him from "doing his best" to join in the praises of God. He often wondered how it was that he came to be born with "no voice," especially when he observed that the infants of the present day are so much more highly endowed, every one of them who attends an infant-school apparently taking for granted that he "has a voice," and using it accordingly. As a religious man, also, he could not help noticing that one whole book of the scriptures was written for the promotion of public vocal praise, and that it abounded in such expressions as this: "Let the People praise thee, O God, let ALL the people praise thee." The example of Christ and the precepts of his apostles seemed also to set forth the same duty. "It cannot be," he sometimes reflected, "that the Father of all should command us to '*sing*,' in addition to 'making melody with our hearts,' and yet give to so many of his children *no voice!*" Such thoughts as these led him to the conclusion, that it is "no practice" and "no cultivation," rather than "no voice" and "no ear," with which the majority of men are afflicted. In consequence of this, to the no small amusement of his musical acquaintance, our friend was soon found to have become an attentive and painstaking member of a singing class. He was soon deep in "thirds" and "fifths" and "sevenths," toiling at a series of the most unmusical exercises that could well be invented. But hope sweetens toil,—and the expectation of conquering at last gave to our friend courage and long patience. When sixty laborious lessons, relieved by an occasional song, were over, he made the discovery that he had learnt "a system," that he had gained also some confidence and much command of the organs of voice. But what did he know of *music?* Could he take the plainest Psalm tune (not in the key of C), unseen before, and sing it? Alas! no. His labour had not been lost, but it had produced small fruit. He could follow the "leader" more promptly and easily, but he could not go without him. There was still an indecision and uncertainty about his endeavours. He could seldom be sure whether he was right or not by half a tone. And many a choice song, and not a few tune-books, which he had purchased in his hopeful days, lay on his table unenjoyed because of this musical uncertainty in which he was left. Once more, however, our friend has "taken heart," and has promised to follow the course of effort which we shall prescribe,—we, on our part, undertaking that he shall in that case be enabled to sing at first sight by himself, and to make good use of the books on his table. We shall begin at the beginning, however, for your sake, gentle reader,—if you will join him in his efforts. We have no "Royal Road" to music. No worthy attainment is won without labour. But we have a *straight* and *clear* road, and that is a great advantage when the common road is very circuitous, and abounding with needless hindrances. We have only two things to ask of you: the first, that you will *be content to learn one thing at a time*, instead of being impatient for knowledge, not, at the moment, helpful, perhaps just then only confusing to you;—the second, that when something is set before you to be done, *you will really do it*, instead of *supposing* it to be done, and going on, for only "by doing we truly understand"

First Principles of Music.

You must allow us to lay before you certain fundamental principles of music itself—of music considered apart from any method of teaching or of writing it—principles which would be true of music, if Guido had never invented the "staff," and if "crotchet," and "quaver," "flat," and "sharp," had never been heard of.

You know what is the difference between "high" and "low" in music. The "squeak" is high, the "growl" is low. Recognise this difference to yourself now by singing first a high and then a low note. Between the highest and the lowest sounds which the human ear can appreciate, an indefinite number of other sounds may be produced. But how, out of this vast chaos of *possible sounds*, are the distinct and choice *notes* of a TUNE to start into life and power? The question is thus answered. Before a TUNE can be created, a certain sound, whether high or low in pitch, must be chosen and fixed as the KEY note (sometimes called the *governing* note, and in books of science the *tonic*) of the coming tune. Immediately, *according to those laws of nature by which God has tuned our ears and souls*, six other notes spring forth, at measured distances from the key-note, claiming the sole right of attendance upon it. Let this be clearly understood. *Any* sound may be taken for the KEY-NOTE; and that being fixed, the places of the six other notes are known.

The common human ear throughout the world is *pleased* when *these* sounds attend *that* key-note, and is *displeased* when other sounds, not holding the same relation to the key-note, and not standing at precisely the same relative pitch, are used in their stead; for even an uncultivated ear would promptly mark the difference between the accurate singer and the inaccurate, between the singer in tune and the singer out of tune.

This distinct arrangement of six sounds around a key-note, is called the musical "scale." It may be high in pitch in one tune, and low in another, but the *relative* position of its notes remains unchanged. These notes may be reproduced in replicates or "octaves" of higher or lower pitch, but they still retain the same relation. Transition, or "modulation" (which will be afterwards explained) may change the key-note in the course of a tune, but the new key-note governs its dependents exactly as the old one did. Every apparent exception only proves the rule. *This one scale is the foundation of all music.* Some speak of this scale as though it were of human invention; but if so, how is it that every newly-discovered nation is found either using it (if they are musical at all), or possessed of ears which readily approve it? How is it that the Chinese or Indians have not "invented" some other scale? The truth is, some of these nations do *omit* a note or two, but they do not *alter* the rest; and when the question is fairly examined, it is found the omissions were caused by their rude and incomplete instruments, rather than by defective ears. Again, let me ask, going back to the time of the ancient Greeks, of whose musical notation there is not a remnant from which we could have copied, how is it that we learn, from their philosophical

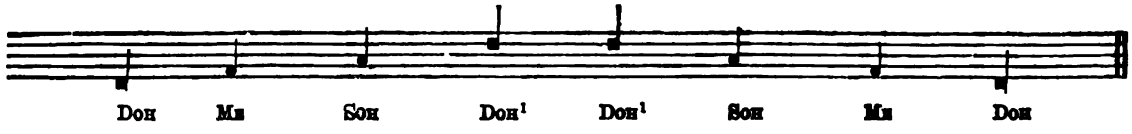
treatises, that the scale which the people used was *the same as ours?* Could not that refined people have "invented" something better? Are we not right, then, in calling it *the scale of all nations and of all times*, the scale to which the ear and soul of man are tuned by the all-wise Creator.

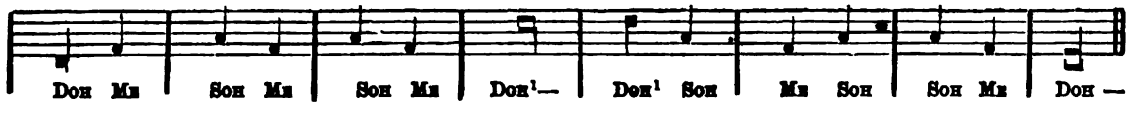
When we examine its structure more closely, we find other proofs that it comes from the hand of God. Like many of his works—the rainbow, for instance—it seems to the careless observer irregular, but discloses a beautiful harmony and purpose to him who is more thoughtful. The *distances in pitch* (that is, highness or lowness of sound); or, in other words, the *intervals* between the notes of this scale, are very delicately arranged. In another lesson we shall be able to describe its structure more minutely; but let it suffice for the present to say, that the simplest measurement of the scale in plain figures is that which divides it into fifty-three degrees. Such a division is only inaccurate to the extent of being a third of one of these degrees too large. If you will make use of the sol-fa syllables to represent the notes of this scale, DOH *standing for* THE KEY NOTE OF A TUNE, *at whatever pitch it is taken*, then the number of such degrees between each couple of notes may be set forth by the figures at the side. *Why* the scale of music, found most acceptble to human ears, should be thus curiously and delicately formed, and *why* it does not exhibit a greater apparent uniformity, we cannot tell. It is an "ultimate fact" of philosophy, like the structure of the rainbow. We must take it as it is, and reverently study the laws of its structure. Sir Isaac Newton's division of the spectrum into seven colours, bore some analogy to these seven notes; and Mr. Hay, of Edinburgh, has established, in a large work recently published, a clear relationship between the principles of beauty in the human form, and certain angles founded on the proportions of the musical scale. Doubtless there are in the various departments of nature certain uniting principles, certain secret affinities of things which shall prove them all to have sprung from one creating hand.

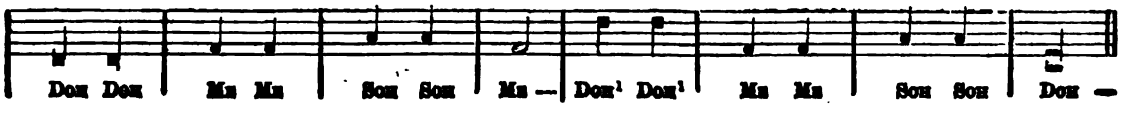
DOH^1	
	5
TE	
	9
LAH	
	8
SOH	
	9
FAH	
	5
ME	
	8
RAY	
	9
DOH	

It may, however, be noticed here, that every note of the scale sounds pleasantly, when heard at the same time with the key note, excepting only RAY and TE, and of these, the most difficult notes of the scale, more will be said when our lessons are further advanced.

For the present we wish your attention confined to the three notes, DOH, ME, and SOH, the first, the third, and the fifth. They are the *strong notes* of the scale, on which, as you will afterwards learn, the others lean. We may call them "the framework of the building." When sounded together they are commonly called the "chord of the tonic," tonic being the scientific name for key-note. Chiefly by these notes your voice must be *tuned*. Take, then, *some low sound* of your voice for the key note, or DOH, and try to sing the following exercises, *pointing to the notes on the scale given above*, as you sing. This pointing on the scale is more important than you would at first imagine. In no other way can you obtain so clear a notion of the relative position of notes. If previously uninstructed, you must ask some musical friend to sing these notes to you, or play them on an instrument *for a pattern*. Do not, on any account, however, sing with him or let him sing with you. Remember that you are learning to sing alone. Your friend will know what notes to play when you tell him D; F sharp; A; and upper D^1; or, if he prefers it, C; E; G; and upper C^1. You will notice that when a note is repeated in a higher pitch, we put a mark thus—DOH^1 above it. You need not trouble yourself with the "staff" of five lines at present except to notice that DOH is printed as a square note.

EXERCISE 1.

NOTE.—Sing these notes first slowly, then quickly, and again with a sound "long drawn out." Do not be disappointed if your friend pronounces you inaccurate in the first and second notes, though they are the easiest. Let him patiently set the "pattern" of those two notes again, and, if need be, many times again. Master one note at a time. Some pupils require several lessons, with much patient patterning of the teacher, and much careful *listening*, followed by vocal effort of the learner, before this exercise is perfectly done.

EXERCISE 2.

NOTE.—You observe the upright bars. Sing the note immediately after them with a stronger accent or force of voice than the others. You notice that two of the notes on the "staff" of five lines are open, and that the names beneath are followed by a stroke of "continuance." Sing those notes twice as long as the rest.

EXERCISE 3.

EXERCISE 4.

Sing all these exercises again, while some one else repeats the note DOH for every note you sing. This we call "tolling a bell."

LESSONS IN PHYSIOLOGY.—No. I.

MAN.

We are about to enter on a most delightful study; and we want you to sit down and go through the same lessons. We shall need no text-book but our own bodies; and our aim will be to find out of what elements these bodies are made, how they are nourished, how preserved, and how in being built up, each stands out as a living temple for the living soul, than which there is nothing greater or grander but God himself.

The world of nature is divided into three kingdoms—the animal, the vegetable, and the mineral. All within these three kingdoms is again divided into either living bodies or dead matter. A mineral has neither life nor fixed arrangement. A vegetable has both. So also has an animal, and in a still higher degree. This distinction between animal and vegetable structures, and mineral substances—between living bodies and mere masses of dead matter, is, in some cases, not very easy to trace, and yet it is most fixed and certain. For a long time CORAL was thought to be nothing more than a mineral; but when on examination it was found to be a growth, it was then taken from the mineral into the vegetable kingdom, and having still more recently been discovered to be a congeries of animals, it has been removed from the vegetable into the animal kingdom.

It is with this animal kingdom we have now to do. I have a body. This body is made up of hard or solid parts, such as the bones; of soft parts, such as the muscles, the bowels, the brain, and similar portions of the frame; and of fluids, such as the blood. Now, of what are these soft, and hard, and fluid parts composed? It is said, that "God formed man out of the dust of the ground;" and, wonderful to say, that the little minute atoms of the earth's surface most perfectly correspond with the materials of which my body is made up. In no living body has any element been yet found which does not also exist in the very matter on which we tread. The earth was created first, and gradually fitted up as a dwelling-place for man; and when the time came for the creation of man, God took the matter which already existed, and out of that dead, motionless, inactive matter, he reared the wondrous structure of the human frame.

All matter is either organic or inorganic. We call those organic bodies which are made up of parts,—these parts, however diversified in themselves, being mutually adapted and mutually dependent, and each of them capable of performing a certain function or action. A wax flower has its various parts mutually adapted and mutually dependent, but neither in their individual state nor in combination, can these parts perform any vital function. They have no principle of life, and without vitality there can be no organisation, since all organisation implies a living arrangement of inanimate elements. You may cut a block of marble into the form and fashion of a man; but when so fashioned, it is only inert matter in a more elegant form. In one word, wherever we find the living principle in connexion with matter, there we have organisation in vital arrangement. In the absence of this principle we have nothing but a dead and inert mass. To the question:—What is life? we can give back no answer. That there is such a thing as life or vital action, cannot be denied; and the only thing which we can say with certainty concerning it, is, that life is that which admits of development. We go into our garden with a pebble and a flower-seed in our hand. We commit them both to the soil, and thus subject them to the same agencies and influences. The seed will burst, and germinate, and develop itself in a beautiful and fragrant flower, while the pebble may lie there for years on years without undergoing the least change. This mysterious life-principle enters into all organised matter, and is found in its highest and most perfect form in the animal economy, and, among animals, first and pre-eminent in man.

The material structure which man possesses for the manifestation of this life, is made up of certain chemical compositions, and anatomical arrangements. There is no organic or animal substance in which hydrogen, nitrogen, and oxygen, are not essential to its very existence, while the addition of one or more of the fifty-five elements of which all known matter is composed, in whatever proportion, will determine incidentally in what that substance differs from any other form of organic matter. It must, however, be kept in mind, that since the elements which compose all animate and inanimate matter are the same, we must look for the difference between these two classes of substances to the mode in which the elements are combined. For example:—The combination of oxygen and nitrogen, of which the atmosphere is formed, or of oxygen and hydrogen, as they enter into the composition of water, does not render either the atmosphere or the water an organic substance. But if we take a plant, which exhibits the simplest form of animate or organic existence, we shall find the three elements of carbon, hydrogen, and oxygen, while in the animal economy, we shall discover that oxygen, hydrogen, nitrogen, carbon, and sulphur are united. Is life then the result of chemical combination? That cannot be. In water, which is without life, we find combined oxygen and hydrogen. In a plant with life, we find the same elements with the addition of carbon. Is the carbon the cause of life? Impossible. The true theory is, that life in the plant requires those three elements to sustain and preserve it, and that were it deprived of any one of the three, it would soon wither and die.

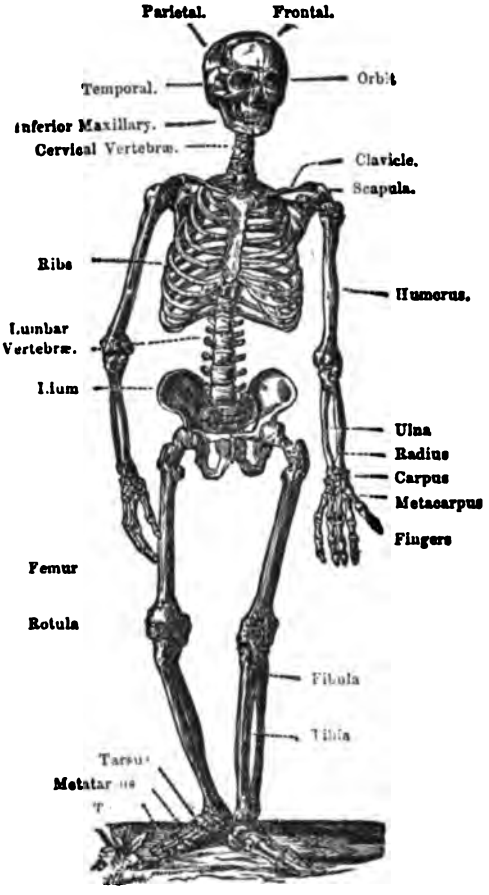
What, then, do we mean by human physiology? The term physiology is derived from two Greek words, PHYSIS—nature, character, or constitution; and LOGOS, a treatise or discourse; and when applied to man, includes those conditions, phenomena, and laws of life, which are common to the human body in a state of health. In fewer and simpler words, it is the science of healthy function. It is no common good to have a sound mind in a sound body; but if the play and force of the intellect depend more or less on the sound and healthy condition of the body, then no means should be slighted, by which it may be more effectually preserved from injury or disease. Nor must we forget that disease is present when any structure of the body is changed, or when any function becomes unnaturally active or torpid, or is altered in its character. It is the perfectness of every structure, and the harmonious play of every function, to which we give the name of health; and health is very much in our own keeping. Our everyday habits and pursuits will determine the condition of the body; and the particular state or condition in which our body is at any given time, is that to which we give the name of health or disease Every one, therefore, should make himself familiar with the science of physiology. He should study his own structure, and the laws by which that structure is governed, that he may know how to preserve the one, and obey the other, so as to prolong life, and render happy that life while prolonged.

Let us begin with the bones. The existence of bone is the result of organisation or vital arrangement. All animal substance springs from a germ. This germ is a minute particle or molecule, which cannot be seen without a microscope of high power, and may vary in size from a minuteness which cannot be measured to the ten-thousandth part of an inch in diameter. It is rather round in form. As it gradually enlarges, its outer wall becomes transparent, through which the colour of the inward substance can be seen. This germ or molecule is formed of fatty or oily matter; or perhaps of particles of oil coated over with a substance, which is called albumen—a substance which resembles the white of an egg—and which the molecule takes from the fluid in which it floats. By drawing to itself certain elements or particles from the fluid which surrounds it, this germ becomes a cell which may include a number of other germs or molecules. These little bodies being set free by the bursting of the parent cell, give existence to a new generation of cells, and so the mysterious yet beautiful process goes on from generation to generation.

As the cell gradually enlarges in size, it becomes an interesting inquiry, as to how its growth is promoted. Where does it obtain the materials for its increase? And how do these materials become assimilated, so as to be taken up into the substance of the cells? The source of supply must be sought in the elements by which every individual cell is surrounded. For example:—All that a vegetable requires for its growth, is a supply of water and carbonic acid; because the acid being the product of carbon and oxygen, and the water of oxygen and hydrogen; the water and the acid supply the three elements—oxygen, hydrogen, and carbon—which enter into the composition of the plant. Surrounded by these elements, the cell has the power, by virtue of the principle of life, of

converting them into a new compound, whose properties adapt it to become part of the growing organised substance.

So in animal structure. So in the human body. We have selected the bones with which to begin. All bone is developed from a substance called CARTILAGE, which is a species of gristle. In its simpler form, this cartilage is composed entirely of cells, with a jelly-like substance between, called GELATINE. These cells are found in little clusters of two, three, and four; but as they begin to take on the character of bone, instead of these smaller clusters, we have groups made up of a much larger number. These groups are still separated by the jelly-like substance which comes between, and it is in this substance that the bony matter is first deposited. Gradually assuming the form of deep narrow cups of bone, it receives the ends of the cartilage cells, as these become arranged in long rows. Then, these cartilage cells become consolidated, and take on the hardness of bone. When the temporary cartilage is converted into bone, the bone has still to be enlarged in conformity with the increasing size of the surrounding parts. How is this enlargement insured? In two ways. All the new cartilage at the edges and on the surface of the bone, becomes ossified, and it is known that the growth of a long bone takes place chiefly towards its extremities, while the bony matter on its surface contributes to increase its thickness. This is one method. The other is by having a cavity in the bone itself. You know that in mechanics, when we want to get the greatest strength with a limited amount of material, we choose a hollow cylinder. Just so in the human body. The bones are designed for strength and support; and instead of being a solid mass, they most of them are hollow. The matter first deposited on the inner surface of these tubes or hollow bones, is pushed



outwards by succeeding layers, and thus the bone gradually acquires an increased diameter.

Having thus learned how bone is formed, and how it acquires increased strength and size, let us now see whether we can find out the number of bones in the human body, how they are held together, and what purpose they serve. Here is a skeleton which will help us to trace the connexion of the different parts of this wondrous structure, and show us how beautifully fitted it is for the ends designed by the great Creator. It includes one hundred and ninety-eight bones. These are exclusive of the teeth, of which there are sixteen inserted in each jaw, and also exclusive of a few small bones, which serve to lengthen and give additional strength to some others. We shall now arrange these one hundred and ninety-eight bones in the form of a table, that you may see more clearly and remember more easily their connexion:—

In the cranium or head	8
In the spine, called the vertebræ, including the sacrum and the coccyx, which are called false vertebræ, because they adhere to each other and do not move	26
In the face	14
A little bone which lies at the root of the tongue, called Os-hyoides, of this shape ∪	1
The ribs—and the breast-bone to which they are in part attached	25
In each superior extremity, including the shoulder, arm, fore-arm, and hand 32	64
In each lower extremity, including the pelvis, thigh, leg, and foot 30	60
Total	198

If we examine the composition of bone, we shall find that it contains the three essential elements, hydrogen, nitrogen, and oxygen; with a certain proportion of lime and phosphorus, or phosphate of lime. It is by the excess of this earthy matter in the bones of old people, that they are so easily and so frequently broken. We seldom if ever hear of a child breaking a bone, and yet how often do children fall, how sadly are they sometimes bruised.

The purpose of bone in the animal economy is purely mechanical. Not only do the bones serve as points of attachment to the muscles in the midst of which they are situated, but afford support and protection to the softer textures, and form inflexible levers, on which the muscles may act, and give motion to the different parts of the great fabric. The brain is a soft and delicate texture, and to preserve which uninjured, is essential to the play and activity of the mind. Now see how admirably this is insured by incasing it within the hard and bony substance of the cranium. So the heart and the lungs are defended by the ribs, and the spinal marrow by the vertebræ which compose the back bone. In all this, we behold the wise and benevolent arrangement of the Creator. If the brain had not been so defended, it would have been liable to constant injury, and in the proportion of the injury must the intellect have been impaired.

Or, suppose we break a bone, how disabled do we become? If it be in the leg, we have no longer the power of locomotion, or of moving from one place to another. If it be in the hand, we are no longer qualified to perform the every-day duties of life. But here again we see the goodness of God. While the bones are subject to manifold diseases and external injuries, there is no other structure of the same complex nature, which is capable of being so thoroughly repaired. There have been cases of the re-formation of nearly an entire bone, when the original one had been lost by disease. So in a fracture. Any portion of the shattered bone that remains connected with the surrounding membrane, and the vessels with which it is supplied, becomes the centre of a new formation, and the injury is repaired in a few weeks.

You know that the bones exhibit a great many joints, and that it is by these joints we are enabled to move our bodies in such a variety of ways. But for such an arrangement in the fingers, for example, and we could neither close our hands, nor grasp any object on which we wished to lay hold. Now if there be so many joints, how is it that the bones are preserved each in its place? This is done by ligaments and cartilages. Cartilage is a white elastic substance next to bone in solidity; ligament is a strong, whitish, flexible,

fibrous substance; and both in some instances supply the place of bone; in other instances they fix the ends of the bones so as to confine the motions of the joint; sometimes they give origin to muscles, and sometimes they fix the bones almost immovably together. Between the joints there is a fluid called SYNOVIA, which is of a yellowish hue, like olive oil, and which like oil, serves to lubricate and render easy the motion of one bone upon another.

How beautiful and how gracious are these arrangements! How worthy of that wise and loving Creator, the purpose and end of all whose works is not less our happiness than his own glory! With what interest should we study His works, and how warm and grateful should be the praise of our hearts!

But we have gone far enough for one lesson. Let us now put the whole in the form of questions, and see how much you have learned, and how much you remember.

What are the three kingdoms into which the world of nature is divided?
Is the distinction between living bodies and dead matter to be always easily traced?
Give an example of this difficulty.
With which of these three kingdoms has human physiology to do?
Of what material is the human body made up?
Is there any difference between the particles of which the body is made up and the atoms of the earth's surface?
What do you mean by organised matter?
What are the essential elements in all organic or animal substance?
Does chemical combination produce life?
What do you mean by human physiology?
From what does all animal substance spring?
Of what is the germ formed?
Whence does it get materials for its nourishment and growth?
Give an example from the vegetable kingdom.
From what substance is bone developed?
How is cartilage formed?
In what substance does the bony matter first begin to form?
How is the growth of bone insured?
How many bones are there in the human skeleton?
Give the number in each part.
How many teeth are there in each jaw?
What purpose do the bones serve?
Give an example of the protection which they afford to some of the softer textures.
When a bone has suffered from disease, is it easily and ever thoroughly re-formed?
What holds the bones together?
What substance is found between the joints to make the bones move more easily the one upon the other?

LESSONS IN LATIN.—No. I.

By JOHN R. BEARD, D.D.

INTRODUCTORY.

BEING about to give you, reader, some lessons which may enable you to learn the Latin language, with no other resources than such as may be supplied by your own care and diligence, I take it for granted that you are desirous of acquiring the necessary skill, and am willing to bestow the necessary labour. If the study were not recommended as a good mental discipline; if it were not recommended as giving a key to some of the finest treasures of literature; if it were not recommended as a means of leading you into communion with such minds as those of Cicero, Virgil, Horace, Livy, and Tacitus, it would have a sufficient claim on your attention, as greatly conducing to a full and accurate aquaintance with your mother tongue—the English. The English language is, for the most part, made up of two elements: the Saxon element, the Latin element. Without a knowledge of both these elements, you cannot be said to know English. If you are familiar with both these elements, you possess means of knowing and writing English, superior to the means which are possessed by many who have received what is called a classical education, and have spent years in learned universities. In order to be in possession of both those elements, you must, for the Saxon element, study German, and for the Latin element, study the lessons which ensue.

In studying the ensuing lessons, you must implicitly follow my directions. I have been for many years engaged in teaching, and, from my experience, know that there is no obstacle to progress greater than that which scholars create for themselves, in giving preference to their own judgments and following their own fancies and opinions. In your practice, acknowledge and observe it as a first principle, that your instructor knows better than you. Take it for certain that he is right, until—should it so happen—you have proved that he is wrong. At the same time, scrupulously follow my directions. Do not attempt to get before me; take care not to fall behind me. Do *what* I bid, do it *when* I bid it, do it *as* I bid it. The more rigid you are with yourself, in obeying these injunctions, the more certain and the more rapid will your progress be. As having myself gone through every thing that I am about to teach you, and as having for more than a quarter of a century been engaged in teaching these things to others, I know what difficulties are in the way, and I have learned how to diminish or remove them. On these grounds I claim your confidence; and if you are not willing to give me your confidence, you had better not enter on the study of the Latin language.

In the instructions which I am to give you, I shall suppose myself addressing a friend, who besides some general acquaintance with his mother tongue, has acquired from the English Lessons in the POPULAR EDUCATOR, or from some other source, a knowledge of the ordinary terms of English Grammar, such as singular, plural, noun, adjective, verb, adverb, &c. The meaning of such words I shall not explain. But everything peculiar as between the English and the Latin I shall explain. I shall also explain any grammatical term, which though used sometimes in English Grammar, you possibly may not understand. In my explanations I think it safer to err on the side of superfluity rather than on the side of deficiency. I have said that I shall suppose you to possess a general acquaintance with the English language. But I advise you to suspect yourself as being probably acquainted with it, but in a very imperfect manner. And this advice I give you in the hope that it may lead you to the constant use of a good English Dictionary. In every case in which you have the least doubt whether or not you know the exact meaning of any word I use, look out the word in your dictionary, and put it down in a note-book to be kept for the purpose. Having written it in the note-book, add the meaning. When you have, say a score of words thus entered in your note book, look them over again and again until their signification is impressed on your memory. If you listen to this suggestion, and continue to make progress with me, you will soon find numerous exemplifications of the assertion I made but now, namely, that a large proportion of the words in the English language are of Latin origin. Take, for instance, the last sentence. In that sentence alone the following words are derived from the Latin: I mean *suggestion, continue, progress, numerous, exemplification, assertion, proportion, language, Latin, origin.* Of the two-and-forty words of which the sentence consists, ten are from the Latin. Should you ever possess an acquaintance with the science of philology, or the science of languages, you will know that in the sentence there are other words which are found in the Latin as well as in other ancient languages. Independently of this, you now learn that about one-fourth of our English words have come to us from the people who spoke Latin, that is the Romans and other nations of Italy. In reality, the proportion of Latin words in the English is much greater, as in time you may know. Observe, too, that these Latin words in the sentence are the long and the hard words, are what perhaps you may call "Dictionary words." These are the very words which give you trouble when you read an English classic, or first-rate author. But they give me no trouble. With me, they are as easy to be understood as any common Saxon term, such as *father, house, tree.* The reason why they have long ceased to give me trouble, is, that I am familiar with their roots, or the elements of which they each consist. Having this familiarity, I have no occasion to consult the dictionary. There are thousands of English words of Latin origin, the meaning of which I know, though I have never looked them out in a dictionary. I wish to assist you in putting yourself into a similar position; and although you may have no aid but such as these pages

afford you, I do not despair of success, if only you will strictly observe my requirements.

I shall, however, have little chance of carrying my wishes into effect, if you begin with a notion that the task is an easy one. Were it an easy task, it would not be worth your trouble. I tell you plainly that the task is hard; that it is a long task; that it will require on your part patience and diligence. If you commence the study under the delusion that it is mere play, you will do as very many have done before you,—in a short time you will grow weary, and give it up. But if, in a true manly spirit, you take up the task as a worthy task, as a useful though a difficult task, as a task in which whatever I may do for you, you must do far more for yourself, then you will not fail to make progress; your course will become easier as you go on; and you will have the delightful satisfaction that you are employing your time and your faculties so as to produce definite, important, and abiding results. If, however, it is not an easy thing to acquire an acquaintance with the principles of the Latin language, then you will at once see that it is not wise to be engaged at the same time in other difficult studies. Many persons, especially young persons, fail to give themselves a good education, because they attempt too much—because, indeed, they attempt what is impossible. I remember that when I began in earnest to study Latin, I was saved from this danger, by the judicious opinion of a learned and venerated friend, who advised me not to attempt more than one subject at a time. In part, my friend, I am like you, self-taught. In the ordinary phrase, indeed, I learnt Latin when a boy at school; but so wretched were the methods of teaching some forty years ago, that though I learnt Latin I knew nothing of Latin when I left school. Soon, however, I began the study in earnest; I began almost unaided. But an adviser came, and under his directions I for a time confined myself almost exclusively to my Latin studies. They were hard, very hard; much harder were they to me than they need be to you. But by giving my mind perseveringly to the task, I reaped success, and so in time became prepared for college. Let me be your adviser. Even in the treasures of the POPULAR EDUCATOR you may find a source of danger. If you engage in all the studies here offered, you will become proficient in none. Make a selection. If you wish to learn Latin, pursue the study wisely. But wisely you cannot pursue it, if you combine therewith several other subjects. For you, one language at a time is enough. Do not attempt more. If you want relief from this, which is a severe study, unite with it the Lessons in History which these pages supply. But do not attempt to learn French while you are learning Latin. When you know Latin, you will find French very easy. With a knowledge of Latin you would also have no difficulty at all in becoming, in a short time, acquainted with the Italian, the Spanish, and the Portuguese languages, which have Latin for their common parent. In the Latin, too, you would find a great assistance should you wish to learn Greek, and so acquire the power of reading the scriptures of the New Testament in their original tongue.

You may practically regard the Latin alphabet as the same as the English. The English letters may be traced to the Latin; the Latin letters are derived from the Greek; and the Greek are in substance identical with the Phenician; while the Phenician alphabet is the oldest, or one of the oldest, in the world.

In the pronunciation, too, you may in the main follow the best English usage. Every modern nation pronounces the Latin as it pronounces its own tongue. Thus there are divers methods of pronunciation. This diversity would be inconvenient, if the Latin were, like the French, a general medium of verbal intercourse. At one time it was so. And then there prevailed one recognised manner of pronunciation. Now, however, for the most part, Latin is read, not spoken. Consequently the pronunciation is not a matter of consequence. Even in our own country there are diversities. but such diversities are secondary matters. To one or two remarks, however, you should carefully attend. In Latin the vowels are what is called long or short. In other words, on some the accent or stress of the voice is thrown, on others it is not thrown. The vowel *a* for instance is mostly long, the vowel *i* is mostly short. A long vowel is said to be equal to two short vowels. We English people, however, have no other way of marking a long vowel, except by throwing on it, the accent or stress of the voice. It is also a fact, that the same vowel is sometimes short and sometimes long; in other words, the same vowel sometimes has, and sometimes has not the accent on it; thus the *i* in dominus, *a lord*, is without the accent, while the *i* in doctrina, *learning*, has the accent; the former, therefore is pronounced thus, dóminus, the latter thus, doctrína. Now observe that these words are trisyllables, as dom, i, nus. Of these three syllables the last, namely us, is called the ultimate; the second, i, is called the penult; the third, or dom, is called the antepenult. And the general rule for pronouncing Latin words is, that the accent is thrown on the penult, or if not on the penult, then on the antepenult. In doctrína the accent is on the penult, or last syllable but one. In dóminus, the accent is on the antepenult, or last syllable but two. In order that you may know where to lay the stress of your voice. I shall mark, as in dóminus and doctrína, on which syllable the accent lies. You will then understand that when I put a mark thus ' over a vowel, I mean thereby that you should let your voice rest, as it were on that vowel. For example, in the word incur, the accent you know is on the last syllable, for you throw the stress of the voice on the syllable cur. This is indicated thus, incúr. So in the Latin amicus, *a friend*, the accent is on the *i*, and the word is to be pronounced thus amícus, the accent being on the penult. There is another way of marking the same fact; it is by the use of a short strait line, as ˘, and a curve, as ⏑. The former denotes a long or accented syllable, for instance doctrína; the latter denotes a short or unaccented syllable, for instance, dominus. You thus see that doctrína and doctrína, dóminus and dominus point out the same thing, namely, that in pronouncing doctrína you must lay the stress of the voice on the *i*, and in pronouncing dóminus you must lay it on the *o*.

I must point out to you another practice. In Latin, as you will presently learn, the endings of words have a good deal to do with their meanings. It is, on that account, usual to pronounce them at least very distinctly. Indeed, I might say, that on every terminating syllable a sort of secondary accent is laid. Thus, dominus is pronounced dóminŭs. So in other forms of the word, thus, dómini, dómino, dóminum. The object is to mark the distinction between, say, dominus and domino, a distinction of great consequence. Another form of this word is dominos. For the same reason a stress is laid on the termination os, which accordingly is pronounced as if it were osse. Words, too, which end in *es* have a secondary accent on the *s*; as Vulpes, *a fox*, pronounced vulpees. In a few cases the vowel is what we call doubtful, that is, it is sometimes short and sometimes long. This peculiarity is marked thus, ⏑˘ as in tenębrae, *darkness*, when the accent may be on the penult, as tenębrae, or on the antepenult, as ténębrae. Observe, also, that a vowel at the end of a word is always pronounced in Latin. Take, as an example, docĕré, *to teach*, which is pronounced as it is marked, that is, with an accent on the last syllable no less than on the last syllable but one. The Latin language has no silent e, as we have: for instance, in wife. Practise yourself, according to these rules, in pronouncing thus the opening lines of that fine poem, Virgil's Æneid. As I am anxious that you should not pass anything without knowing its meaning, I subjoin the translation made by the English poet Dryden.

"Arma virúmque canó, Trójaé quí primus ab óris
Italiám, fátó profugús, Lávinia vénit
Littora; múltum ílle ét térris jactátus et álto,
Ví superúm, saévaé memorém Júnónis ob íram;
Múlta quoque ét béllo pássús dúm cónderet úrbem,
Inférrétque Deós Latió; genus únde Latínum,
Albánique patrés, átque áltaé móenia Rómae."

"Arms and the man I sing, who forc'd by fate,
And haughty Juno's unrelenting hate,
Expell'd and exil'd, left the Trojan shore,
Long labours, both by sea and land, he bore,
And in the doubtful war, before he won
The Latin realm, and built the destined town—
His banish'd gods restor'd to rites divine,
And settled sure succession in his line,
From whence the race of Alban fathers come,
And the long glories of majestic Rome."

In pronouncing the third line, you must cut off the um before the vowel i; and the e in ille before the e in et. Also in the fifth line drop the e in quoque before the e in el. In the last line, too, the e in atque is dropped or elided before the vowel a in altae; pronounced as if written qualtae. Accuracy of pronunciation, however, is not easily acquired from any written or printed directions. The living tongue is the only adequate teacher. And it will be well if you can get some grammar school-boy to read to you and hear you read the passage I have given above from Virgil, and the exercises, or some of them, which ensue. Although the pronunciation of Latin is of secondary importance, yet you must try to be as correct as you can, if only from the consideration that what is worth doing at all, is worth doing well. But should you, as you justifiably may, hope by these lessons to prepare yourself for becoming even a teacher of Latin—say in a school—you would in that capacity find the pronunciation considered as a matter of consequence; indeed a disproportionate value is, especially in the old grammar schools, attached to the established methods of pronunciation. After all, we cannot pronounce the Latin as it was pronounced by the Latins themselves, nor can the best trained lips pronounce their poetry so as to reproduce its music.

In regard to the exercises which I am about to give, you should first learn the vocabulary by heart. If yours is a mechanical trade, you may repeat the words over again and again while engaged in labour. Or you may make the words your own while walking to and from your employment. Among my personal friends, is a gentleman who acquired the greater part of the words of the French language, while rising and dressing in the morning. Thousands of words have I myself learnt while walking for recreation.

Having thoroughly mastered the vocabulary, take a slate and write down the Latin into English; then write the English into Latin. Look over what you have done carefully. Correct every mistake and error. If you look into the exercises you will find that the English will assist you in writing the Latin, and the Latin will assist you in writing the English. When you have got both the Latin and the English into as correct a state as you can, copy them neatly into a note-book. Having done so, read them carefully over, and compare each instance with the rule or the direction, and also the example. Leave nothing until you understand the reason. All the examples or illustrations that I give, as well as the chief rules, should be committed to memory. Before you proceed to a second lesson, ascertain that you are master of the first. It would be useful to write out the rules in one consecutive view, in order that, having them all at once under your eye, you may study them in their connexion and as a whole, so as to see their bearing one upon another, and the general results to which they lead. Such a practice would have a very beneficial effect on your mind, by habituating it to arrangement and order, and might be expected to afford you valuable aid, both in other studies and in your business pursuits. Carefully avoid haste and slovenliness. Do your best in all that you undertake. "Well" not "much" should be your watchword. Repeated reviews of the ground passed over are very desirable. Every Saturday you should go carefully over what you have done during the week. At the end of every month the work of the month should be reviewed. On arriving at a natural division of our subject, as for instance, when we have treated of the nouns, you should go over, and put together in your mind the substance of what has been said thereon. "Be not weary in well doing, for in due season you will reap, if you faint not. (Gal. vi. 9).

Vocabulary.

Curro, *I run*. The chief parts are curro, *I run*; currere, *to run*; cucurri, *I have run*; cursus, *run*. The English representative, or the element in English derived from the parts, is curr; also curs or cours. Con, from cum, means *with*; dis signifies *in different directions*; ex signifies *out of*.

Exercise—Latin-English.

Curro and its parts give rise to several English words, as *current*, ("the current coin of the realm;") *currency* ("the circulating medium.") Another example is found in the phrase "account current."

Exercise—English-Latin.

Find English words derived from some part of curro; find English words derived from curro, with in prefixed; also with con prefixed; also with dis prefixed; also with ex prefixed.

Remark.—In order to make my meaning quite clear, I will myself do this exercise in part. From cursus comes the English word *course*; from in and curs comes *incursion*; from ex and curs comes *excursion*. If the reader is acquainted with, or is learning French, he will do well as he passes on, to find out French words corresponding to, and derived from, Latin words; as in courir, French *to run*; cours, a course. By comparison he may occasionally find that the same sound or word has a different meaning in French from what it has in Latin or in English. Thus, concursus in Latin means a coming together, as to a meeting, a *concourse* of people; but the corresponding French, concours, signifies *co-operation*. So concurrence in English is *agreement*, but in French *competition*. By practising comparisons such as this, you will not only meet with many curious facts, but be assisted to understand the nature of language itself, as well as receive good mental discipline. If it seems strange to you that the same letters curr or curs should bear dissimilar meanings, a little reflection will take away your surprise. Go to the primary meaning of curr. Its primary meaning is *to run*. Now, men may run into, or run out of, or run together, or run about, for different purposes. For instance, they may run together in harmony, and then they concur; or they may run together in rivalry, and then they are in what the French call concurrence, that is, competition.

I have thus, my fellow student, opened out before you an immense field. It is only a hint or two that I can give; but if you follow these intimations, you will in time become not only a Latin scholar, but a good linguist.

LESSONS IN GEOMETRY.—No. I.

The term *Geometry*, which comes from the Greek word *Geometria*, literally signifies *land-measuring*, and was originally applied to the practical purpose which its name signifies, in the land of Egypt, the cradle of the arts and sciences. Herodotus, the oldest historian, with the exception of Moses, whose works have reached us, gives the following account of its origin: "I was informed by the priests at Thebes, that king Sesostris made a distribution of the territory of Egypt among all his subjects, assigning to each an equal portion of land, in the form of a quadrangle, and that from these allotments he used to derive his revenue, by exacting every year a certain tax. In cases, however, where a part of the land was washed away by the annual inundations of the Nile, the proprietor was permitted to present himself before the king, and signify what had happened. The king then used to send proper officers to examine and ascertain, by admeasurement, how much of the land had been washed away, in order that the amount of the tax to be paid for the future might be proportional to the land which remained. From this circumstance, I am of opinion, that geometry derived its origin; and from hence it was transmitted into Greece." The existence of the pyramids, the ruins of the temples, and the other architectural remains of ancient Egypt, supply evidence that they possessed some knowledge of geometry, even in the higher sense in which we now use the term; although it is possible that the geometrical properties of figures, necessary for the construction of such works, might have been known only in the form of *practical rules*, without any scientific arrangement of geometrical truths, such as are presented to us in the Elements of Euclid.

The word geometry, used in its highest and most extensive meaning, signifies the *science of space*; or that science which investigates and treats of the properties of, and relations existing among, definite portions of space, under the abstract division of lines, angles, surfaces, and volumes, without any regard to the physical properties of the bodies to which they belong. In this sense, it appears to be very doubtful whether the Egyptians or Chaldeans knew anything of the science. It is to the Greeks, therefore, that we must look for the real origin of geometry, as an abstract science. Thales, the Greek philosopher, born 640 B.C., is reported, by ancient historians

to have astonished even the Egyptians by his knowledge of this science. The founder of scientific geometry in Greece, however, appears to have been Pythagoras, who was born about 568 B.C. He discovered the celebrated 47th proposition of the first book of Euclid's Elements, and various other valuable and important theorems. He was great also in astronomy, having anticipated the Copernican system of the world. Of Plato, another great geometrician, and founder of the academy at Athens, we have already spoken in our first number. He was the first who made some advances into what is called the higher geometry. The next name, super-eminent in the science of geometry, is that of Euclid, whose Elements have been the *principal text-book* for learners, during a period of more than 2000 years. He flourished at Alexandria, in Egypt, about B.C. 300, during the reign of Ptolemy Lagus, who was one of his pupils, and to whom he made the celebrated reply, when asked if there was a shorter way to geometry than by studying his Elements:—"No, sire, there is no *royal road* to geometry."

The prince of ancient mathematicians, however, was the celebrated Archimedes, born at Syracuse, B.C. 287, about the period of the death of Euclid. His discoveries in geometry, mechanics and hydrostatics, form a remarkable era in the history of the mathematical sciences; and even the remains of his works which are still extant, constitute the most valuable part of the ancient Greek geometry. He was the first who attempted to solve the celebrated problem of the *rectification of the circle*; that is, finding a *straight line exactly equal* to the circumference. He found out the beautiful ratios of the cylinder to its inscribed sphere and cone, and the quadrature of one of the conic sections. We have, in our second lesson on arithmetic, alluded to his discoveries in that science. His discoveries in physics or natural philosophy are simple, true, and beautiful. The story of the determination of the specific gravity of the golden crown of his cousin, Hiero king of Syracuse, is well known; and the very natural shout of "*Heureka, heureka!*"—*I have found it, I have found it!* on coming out of the bath, has become a "household word." Scarcely less celebrated was the famous Apollonius of Perga, in Pamphylia, who flourished at Alexandria in the reign of Ptolemy Euergetes, (from B.C. 247 to 222) another king of the same Ptolomean dynasty, and who was called by his cotemporaries the "Great Geometer." He wrote several books, full of discoveries, on the higher geometry, and greatly extended the domains of the plane geometry. Other geometricians of eminence arose in the school of Alexandria, and bequeathed the precious remains of their genius to happier times. Claudius Ptolemæus, the author of the great work on astronomy called *Megale Syntaxis*, the *Great Construction*, or Almagest; Pappus, the author of the *Mathematical Collections*; and others, including Theon and his daughter Hypatia, bring us down to the period when the Alexandrian library was burnt by command of the Mohammedan barbarian Caliph Omar, and the labour and learning of ages were irrevocably destroyed. The dark ages supervened, and little was done in the advancement of science until the glorious invention of printing, and the general revival of literature about the middle of the fifteenth century.

The ancient Greek geometry was speedily made known to the moderns through the medium of translations of, and commentaries upon, the writings of the great masters. The Elements of Euclid, indeed, were reckoned so perfect, that no attempt was made to supersede them; and the only object of writers on geometry in general was to explain his works, and to make what additions they could to the science, in the same masterly style of composition. A host of names of eminent authors might be mentioned, who succeeded in establishing the *Greek geometry*, and in extending its domains. The principal of these, however, was Dr. Robert Simson, professor of mathematics in the University of Glasgow, who flourished in the middle of the last century. His grand endeavour was to present to modern Europe the Elements of Euclid, as they originally appeared in ancient Greece. In this he succeeded to admiration, and his edition of this great work maintains its reputation to the present moment. He was also an original writer of great eminence; and but for the eclat of the *new geometry*, invented by Leibnitz and Newton, he would have shone as a star of the first magnitude. On this interesting subject, and others connected with it, we cannot now enter; but we trust to be able, in future numbers of this work, to bring before our readers both its history and its application, as one of the greatest of our modern engines in the discovery of scientific truth, and in the development of the philosophy of nature.

In giving our first lessons on geometry, we think it advisable to follow what seems to have been the natural course of events in the history of this science. The present advanced state of our geometrical knowledge was preceded in early times by a species of practical geometry gathered from experience, and suited to the wants of those who required its application, before any attempt was made to enter very deeply into the study of the theory. The latter was left to the schools of the philosophers and the academy of Plato. Accordingly, we shall precede our disquisitions on the Elements of Euclid and other geometers, both ancient and modern, by a short system of practical rules and easy explanations in this important science; and we shall endeavour to make the subject both simple and clear by plain definitions, suitable diagrams, and palpable demonstrations, after the manner of the French writers on this subject, who have even in their more elaborate treatises to a great extent abandoned the system of Euclid.

DEFINITIONS.

Extension, or the space which anybody in nature occupies, has three dimensions, viz., length, breadth, and thickness. This is Euclid's definition of a *geometrical solid*.

A *point* is the beginning of extension, but no part of it; hence it is said to have position in space, but no magnitude.

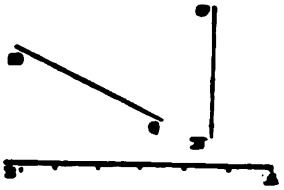
A *line* is extension in one direction only; hence, it is said to have length without breadth. Hence, also, the extremities of a line are points; and lines intersect or cross each other only in points.

A *straight line* is said, by Euclid, to be that which lies *evenly* between its extreme points; and, by Archimedes, to be the *shortest distance* between any two points. Both of these definitions are defective; the defect is supplied thus: A straight line is such, that if any two points be taken in it, the part which they intercept (or which lies between them), is the shortest line that can be drawn between those points.

A *crooked line* is one composed of straight lines joined at their extremities in any manner whatever, except that of uniform direction. A *curved line*, or *curve*, is a line whose direction varies at every point.

Straight lines, or curve lines, are generally denoted, in speaking and writing, by two letters placed commonly at their extremities; but, they may be placed anywhere on the lines at a distance from each other. Thus, in fig. 1, the letters A, B, denote one straight line; the letters C, D, another; and the letters E, F, a third; and these straight lines are respectively called the straight lines A B, C D, and E F. A straight line, as A B, may be divided into any number of equal parts, to serve as a standard for measuring other straight lines.

Fig. 1.



A combination of straight, crooked, and curved lines is represented in fig. 2; A B, B C, C D, and D A, are each straight lines; the combination A D C B, beginning at A, and terminating at B, is a crooked line; and the line A M B, beginning at A, and ending at B, is a *curved line*.

Fig. 2.

A *surface*, or, as it is sometimes called, a *superficies*, is extension in two directions; hence, it is said to have only length and breadth. Hence, also, the extremities or boundaries of a surface are lines; and surfaces intersect or cross each other in lines.

A *plane surface*, or *plane*, is a surface in which any two points being taken, the *straight line* between them lies wholly in that surface; or, it is that surface with which a *straight line* wholly coincides, when applied to it in every direction. Any other surface, not composed of plane surfaces, is called a *curved* surface.

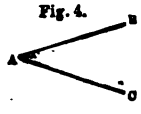
Parallel straight lines are such as lie in the same plane, and which though produced ever so far both ways, do not meet (fig. 3).

Fig. 3.

An *angle* is the inclination of two straight lines to each other, which meet in a point, and are not in the same direction. The point in which they meet is called their *vertex*, and each of them is called a *side* or *leg* of the angle. The angle itself is generally called a *plane rectilineal angle*, because it necessarily lies in a plane, and is formed of *straight lines*. *Curvilineal angles* are such as are formed on the surface of a sphere or globe; but the consideration of such angles belongs to the higher geometry. The magnitudes of angles do not depend on the lengths of their legs or sides, but on the degree or amount of aperture between them, taken at the same distance from the vertex.

An angle is generally represented by three letters, one of which is *always placed* at the *vertex*, to distinguish it particularly from every other angle in a given figure, and the other two are placed somewhere on the legs of the angle, but generally at their extremities; and in reading or in speaking of the angle, the letter at the vertex is always placed between the other two, and uttered or written accordingly. Thus, in fig. 4, which represents an angle, the name of the angle is either B A C or C A B: the point A is called its vertex; and the straight lines B A, C A, its sides or legs.

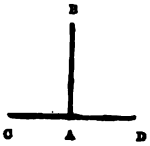
Fig. 4.



Angles are divided into two kinds, *right* and *oblique*, and oblique angles are divided into two species, *acute* and *obtuse*.

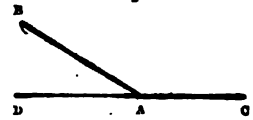
When one straight line meets another, at any point between its extremities, and makes the adjacent or contiguous angles equal to each other, each of them is called a *right angle*, and the legs of each of these angles are said to be *perpendicular* to one another. Thus, in fig. 5, the straight line A B meets the straight line C D in the point A, and makes the adjacent angles C A B, D A B, equal to each other; each of these angles is therefore called a *right angle;* and the straight line A B is said to be *perpendicular* to the straight line A C, or D A, and consequently A C or A D is perpendicular to A B.

Fig. 5.



When one straight line meets another, at any point between its extremities, and makes the adjacent angles unequal to each other, each of them is called an *oblique* angle; that which is greater than a right angle is called an *obtuse angle:* and that which is less than a right angle is called an *acute* angle. Thus, in fig. 6, the straight line A B meets the straight line C D, in the point A, and makes the adjacent angles unequal to each other; each of these angles is therefore called an *obtuse angle;* the angle C A B, which is greater than a right angle, is called *obtuse:* and the angle D A B, which is less than a right angle, is called *acute*.

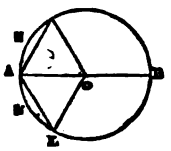
Fig. 6.



A *plane figure* in geometry, is a portion of a plane surface, inclosed by one or more lines, or boundaries. The sum of all the boundaries is called the *perimeter* of the figure, and the portion of surface contained within, is called its *area*.

A circle is a plane figure contained or bounded by a *curve* line, called the *circumference* or *periphery*, which is such that all straight lines drawn from a *certain point* within the figure to the circumference are equal to each other. This point is called the *centre of the circle*, and each of the straight lines is called the *radius*. The straight line drawn through the centre and terminated at both ends in the circumference, is called the *diameter of the circle*. It is plain, from the definition that all the radii must be equal to each other; that all the diameters must be equal to each other, and that the diameter is always double the radius. In speaking or writing, the circle is usually denoted by three letters placed, at any distance from each other, around the circumference; thus, in fig. 7, the circle is denoted by the letters A C B, or A E B; or, by any three of the other letters on the circumference. The point O is the centre, either of the straight lines O A, O E, O C, O B, is a radius, and the straight line A B is a diameter.

Fig. 7.



An *arc* of a circle is any part of its circumference; the *chord of an arc* is the straight line which joins its extremities. A *segment* of a circle is the surface inclosed by an arc and its chord. A *sector* of a circle is the surface inclosed by an arc, and the two radii drawn from its extremities. Thus, in fig. 7 the portion of the circumference A M C, whose extremities are A and C, is an arc; and the remaining portion A B C, having the same extremities is also an arc; the straight line A C is the chord of either of these arcs. The surface included between the arc A M C and its chord A C, is the segment A M C; there is also the segment A B C. The surface included between the radii O C, O B, and the arc C B, is called the sector C O B; the remaining portion of the circle is also a sector.

A *semicircle* is the segment whose chord is a diameter. Thus in fig. 7. A C B, or A E B is a semicircle. The term semicircle, which literally means half-a-circle, is restricted in geometry to the segment thus described; but there are many other ways of obtaining half a circle.

Plane *rectilineal* figures are described under various heads; as trilateral or triangular; quadrilateral or quadrangular; and multilateral or polygonal.

A triangle (fig. 8) is a plane rectilineal figure contained by three straight lines, which are called its sides. No figure can be formed of two straight lines; hence, an angle is not a figure, its legs being unlimited as to length. Triangles are divided into various kinds, according to the relation of their sides or of their angles; as equilateral, isosceles, and scalene; right-angled, obtuse-angled, and acute-angled.

Fig. 8.

Fig. 9.

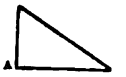
An *equilateral* (equal sided) triangle, is that which has *three* equal straight lines or sides (fig. 9).

Fig. 10.

An *isosceles* (equal-legged) triangle, is that which has only *two* equal sides (fig. 10).

A *scalene* (unequal) triangle, is that which has all its sides unequal (fig. 11).

Fig. 11.



A *right-angled* triangle is that which has one of its angles a right angle (fig. 11), in which the angle at A is the right angle. The side opposite to the right angle is called the *hypotenuse* (the subtense, or line stretched under the right angle) and the other two sides are called the *base* and the *perpendicular;* the two latter being interchangeable according to the position of the triangle.

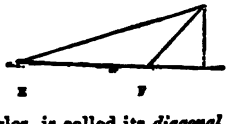
An *obtuse-angled* triangle is that which has one of its angles an obtuse angle (fig. 8).

An *acute-angled* triangle is that which has all its angles acute; figs. 9 and 10 are examples as to the angles, but there is no restriction as to the sides.

In any triangle, a straight line drawn from the vertex of one of its angles perpendicular to the opposite side, or to that side produced (that is extended beyond either of its extremites in a continued straight line), is called the perpendicular of the triangle; as in fig. 12, where the dotted line is the perpendicular of the triangle; and in fig. 13, where the dotted line drawn from the point G to the dotted part of the base produced is the perpendicular of the triangle.

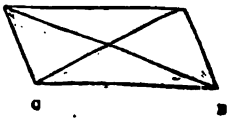
Fig. 12.

Fig. 13.



A *quadrilateral figure*, or quadrangle, is a plane rectilineal figure contained by four straight lines, called its sides. The straight line which joins the vertices of any two of its opposite angles, is called its *diagonal*. Quadrangles are divided into various kinds, according to the relation of their sides and angles; as parallelograms, including the rectangle, the square, the rhombus, and the rhomboid; and trapeziums, including the trapezoid.

Fig. 14.



A *parallelogram* is a plane quadrilateral figure, whose opposite sides are parallel; thus, fig. 14, A C B D, is a parallelogram, and A B, C D, are its diagonals.

Fig. 15.

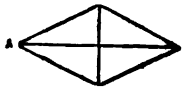
A *rectangle* is a parallelogram, whose angles are right angles (fig. 15).

Fig. 16.

A *square* is a rectangle, whose sides are all equal (fig. 16).

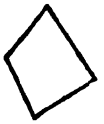
A *rhomboid* is a parallelogram, whose angles are oblique (fig. 14).

Fig. 17.



A *rhombus*, or lozenge, is a rhomboid, whose sides are all equal (fig. 17).

Fig. 18.



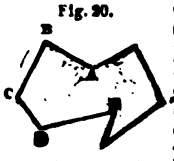
A *trapezium* is a plane quadrilateral figure, whose opposite sides are not parallel (fig. 18).

A *trapezoid* is a plane quadrilateral figure, which has two of its sides parallel (fig. 19).

Fig. 19.

A *multilateral* figure or *polygon*, is a plane rectilineal figure, of any number of sides. The term is generally applied to any figure whose sides exceed *four* in number. Polygons are divided into *regular* and *irregular*; the former having all their sides and angles equal to each other; and the latter having any variation whatever in these respects. The sum of all the sides of a polygon is called its *perimeter*, and when viewed in position its *contour*. Irregular polygons are also divided into *convex* and *non-convex*; or, those whose angles are all *salient*, and those of which one or more are *re-entrant*. The irregular polygon (fig. 20), has its angles at B, C, and D, salient; and its angles at A and E, re-entrant.

Fig. 20.



Polygons are also divided into classes, according to the number of their sides; as, the *pentagon* (fig. 21), having five sides; the *hexagon* (fig. 22), having six sides; the *heptagon* having seven sides; the *octagon* having eight sides; and so on. According to this nomenclature, the triangle is called a *trigon*, and the quadrangle a *tetragon*.

Fig. 21.

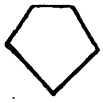


Fig. 22.

Questions on the preceding Lesson.

What is a geometrical solid? what is a point? a line? a straight line? a crooked line? a curve?

How are lines denoted? what is a surface? a plane? an angle?

What are parallel straight lines? how are angles denoted? how are they divided? what is a right angle? an oblique angle? an acute angle? an obtuse angle?

What is a plane figure? its perimeter? its area? a circle? its circumference? its centre? its radius? its diameter?

How is a circle denoted? what is an arc? a chord? a segment? a sector? a semicircle?

How are plane rectilineal figures divided? what is a triangle? an equilateral triangle? an isosceles? a scalene? a right-angled triangle? an obtuse-angled? an acute-angled? the perpendicular of a triangle?

In a right-angled triangle, what are the hypotenuse, the base, and the perpendicular?

What is a quadrilateral figure? how are quadrangles divided? what is a diagonal? a parallelogram? a rectangle? a square? a rhombus? a rhomboid? a trapezium? a trapezoid? a polygon?

How are polygons divided? what is the difference between regular and irregular polygons? what is perimeter? contour? salient? re-entrant? pentagon? hexagon? heptagon? trigon? tetragon?

LESSONS IN ENGLISH GRAMMAR.—No. II.

ETYMOLOGY.

Supposing that you have acquired a pretty good knowledge of the *sounds* of the different letters in the alphabet, you should next apply yourself to the study of the most correct way of putting them together, so as to form words rightly spelled, and sentences properly constructed. To do this you must find out how words have been formed—how many different sorts of words there are—what is their exact meaning—and the way in which they may be changed or altered, according to the ideas which the writer or speaker may wish to express. This is the *second* part of English Grammar, and it is called Etymology.

Words may be divided into two classes; first, those which are *primitive*: secondly, those which are *derived*.

Primitives, or original words, are words which have been purposely formed to express one idea; they are words which have not been taken from any other word, and which cannot be reduced so as to be more simple. Thus, the words *man*, *book*, *child*, *house*, &c., express a complete sense, and nothing can be taken from them.

Derivatives are words which are drawn out of others, or which take part or parts of others, or which are formed by joining two words together, so as to make a new word meaning something different from the others; as *mankind*, *bookbinder*, *childlike*, *housekeeper*, &c. All these words you will see may be reduced; *mankind* may be reduced to *man*, and still express a complete sense; and so may the other words.

There are *ten* sorts of words in the English language: these are commonly called Parts of Speech, and the names given to them are as follow:—Article, Noun, Pronoun, Adjective, Verb, Participle, Adverb, Conjunction, Preposition, Interjection. Each of these must be studied separately. That you may have a general view of the whole subject, a brief mention of them will be made here, though each will afterwards be explained more fully. It is supposed that in the English language there are about *sixty thousand* words; of course, each of these words belongs to one or other of the following ten *parts of speech*.

1. The Article is placed before a noun, to point it out, and to fix its exact meaning.
2. The Noun is the name of anything.
3. The Pronoun is used for, or instead of a noun, to prevent its being repeated too often.
4. The Adjective expresses the particular quality or property of the noun.
5. The Verb expresses action, being, or suffering.
6. The Participle is a word derived from a verb, and partakes of the nature both of a verb and an adjective.
7. The Adverb describes the quality, or circumstance, or peculiar meaning of other words, and is joined either to a verb, an adjective, a participle, or another adverb.
8. The Conjunction joins the several words or parts of sentences together.
9. The Preposition is commonly set before words to connect them, or to show their relation.

The Interjection expresses some sudden emotion of mind.

I. The Article.

The Article is a part of speech set before nouns, to point them out, and to fix their exact meaning. There are in the English language two articles, *a* or *an*, and *the*. The *a* and *an* are reckoned but as one, because *a* becomes *an* when it is placed before a vowel; that is, before *a*, *e*, *i*, *o*, and *u* short, as *an* urn; also before a mute, or an *h* that is not sounded, as *an* hour; if the *h* be sounded, the article *a* only is used, as, *a* haven. The article *a* is used before all words beginning with a consonant, as, *a* shoe, *a* boot; also before *u* long, that is, when it has the sound of *you*, as in, *a* useful book, not *an* useful book, or, *a* union, not *an* union.

Articles are divided into two classes, definite and indefinite. An *indefinite* article is one which does not define the particular meaning or application of the word before which it is placed; or which speaks of things in general, things which are common, or of which there are many of the same sort. *A* and *an* are indefinite for this reason; as if you were to say, *a* book, *a* man, *an* apple, you would not be understood as meaning any particular book, or man, or apple.

The is called the *definite* article, because it defines your meaning, and fixes it to one particular thing; as, *the* book, *the* man, *the* apple; that is, some particular book, or man, or apple. If you were to enter a coffee-room, and say to the waiter, "Lend me *a* paper," he would bring you the first that came to hand; but if you saw the *Times* in his hand, and said, lend me *the* paper," he would understand you as asking for that particular paper. For this reason the definite article is sometimes called the *demonstrative* article, as, when pointing to an individual, we say, "That is *the* man I wish to employ;" or "This is *the* book I want you to lend me."

The article *the* may be set before nouns both of the singular and plural number, because we can speak definitely of many as well as of one; as, *the* men, *the* books, *the* apples.

The articles are sometimes placed before an adjective, when it precedes a noun, as, *an* admirable painting, or, *The* better day *the* better deed.

The definite article *the* is sometimes set before adverbs in the comparative and superlative degrees, as, *The* more *the* merrier; or, *The* oftener I look at Raffaelle's paintings, *the* more I admire them.

Articles are sometimes found joined to proper names, for the purpose of giving them distinction or eminence; thus we say of some large town, it is quite *a* London, that is, a place as busy or as bustling as London; or, *the* Howards, that is, the family of the Howards; or, he is *a* Wellington, that is, a man as distinguished for skill and bravery as the Duke of Wellington; or, *the* Cæsars, that is, the Roman emperors of the name of Cæsar.

Some nouns are used without articles; such as proper names, *Andrew, London, Paris*; or names of attributed or mental qualities, as, *beauty, goodnature, virtue, charity*, &c.; or words in which nothing is implied but the mere existence of the thing, as, This is not silk, but cotton; or, This is not gold, but silver gilt. There are also nouns which will not admit the use of the article, as when words are to be taken in their largest and most general sense; thus we say, *Man* is a rational, an accountable creature; that is, *all men*, without exception, are rational and accountable.

(Questions on the foregoing Lesson will be given in our next.)

LESSONS IN ARITHMETIC.—No. II.

The difficulty of inventing names for all numbers even to a limited extent, and of remembering them after they were invented, evidently led to the classification and arrangement exhibited in our system of numeration, which was explained in the first lesson. The next difficulty would be that of performing calculations by the help of the mere names—a process which, in such a case, must either be done mentally, or with the assistance of the ten fingers. The use of small stones or pebbles (in Latin, *calculi*), for the purpose of making *calculations*, is indicated by the origin of the word itself. The necessity of inventing signs or characters to represent numbers, and to facilitate the process of computation, would become more and more obvious as society advanced in civilisation. At first, men would most naturally employ the letters of the alphabet, in every language, as the readiest marks for numbers. Hence, we find that this practice was adopted by the Hebrews, the Greeks, the Romans, and various other nations of antiquity. In the two oldest collections of writings in the world, the *Bible*, and the works of *Homer*—the one written in Hebrew and the other in Greek—the letters of the alphabets of these languages are respectively used to denote the whole or parts of these books, in their proper numerical order. The letters of the alphabet in any language, however, would go but a little way in expressing numbers by signs, unless some system of classification and arrangement were adopted, or some method of increasing their value, according to a fixed scale, introduced.

For the purpose of expressing large numbers by signs, the Hebrews divided the letters of their alphabet into three classes of nine characters each, to denote *units*, *tens*, and *hundreds*, respectively; and as this alphabet contained only 22 letters, they adopted *five* of its letters, which had a *final form* (that is, a peculiar form when they terminated a word), to complete the class of hundreds. The whole collection of signs was then arranged, as in the following table:—

Hebrew System of Notation.

Signs.	Names.	Values.	Signs.	Names.	Values.	Signs.	Names.	Values.
א	Aleph	1	י	Yodh	10	ק	Qoph	100
ב	Beth	2	כ	Kaph	20	ר	Resh	200
ג	Gimel	3	ל	Lamedh	30	ש	Shin	300
ד	Daleth	4	מ	Mem	40	ת	Tav	400
ה	He	5	נ	Nun	50	ך	Kaph	500
ו	Vav	6	ס	Samekh	60	ם	Mem	600
ז	Zayin	7	ע	Ayin	70	ן	Nun	700
ח	Cheth	8	פ	Pe	80	ף	Pe	800
ט	Teth	9	צ	Tsadhe	90	ץ	Tsadhe	900

In combining different numbers, the greater is put first, according to the Hebrew mode of writing; thus, יא, 11; and קכא, 121. The number 15 is marked by the letters יה, instead of the letters יד, because the latter commence the name of God in Hebrew. The *thousands* are denoted by the *units with two dots* above—thus, א̈, 1,000. *Gesenius*, in his grammar, says that this numeral use of the letters did not occur in the text of the Old Testament, but was first found on the coins of the Maccabees in the middle of the second century before the Christian era.

The Greeks, in the same manner as the Hebrews, divided the letters of their alphabet into three classes of nine characters each, to denote *units*, *tens*, and *hundreds*, respectively; and as this alphabet contained only 24 letters, they adopted three marks which were formerly used as letters in the more ancient Greek alphabet, introducing one into the class of *units*, one into that of *tens*, and one into that of *hundreds*. The whole of the characters thus arranged are shown in the following table:—

Greek System of Notation.

Signs.	Names.	Values.	Signs.	Names.	Values.	Signs.	Names.	Values.
α	Alpha	1	ι	Iota	10	ρ	Rho	100
β	Beta	2	κ	Kappa	20	σ	Sigma	200
γ	Gamma	3	λ	Lambda	30	τ	Tau	300
δ	Delta	4	μ	Mu	40	υ	Upsilon	400
ε	Epsilon	5	ν	Nu	50	φ	Phi	500
ϛ	Bau	6	ξ	Xi	60	χ	Chi	600
ζ	Zeta	7	ο	Omicron	70	ψ	Pai	700
η	Eta	8	π	Pi	80	ω	Omega	800
θ	Theta	9	ϟ	Koppa	90	ϡ	Sampi	900

The *thousands* in the Greek system of notation were denoted by the same letters as the *units*, *with a dash*, or accentual mark under; thus, $\alpha_{,}$, 1,000. Myriads, or *tens of thousands*, were denoted by the same letters with the letter M under—as $\overset{\alpha}{M}$ 10,000. Instead of placing the letter M under, sometimes the letters Mυ were placed to the right of the number of myriads, and sometimes only a point, instead of either, was placed in the same position, to indicate the same thing. Archimedes extended this notation, by taking the square of the myriad as a new unit or period, and forming a series of periods containing eight figures in each; so that he was enabled to express a number sufficient to denote all the sands of the sea. This system of notation, in some respects, anticipated the modern systems; and in others, surpassed them; but, unfortunately, it was confined to the knowledge of the learned. The same mathematician, one of the mightiest geniuses of antiquity, anticipated the discovery of logarithms, by a few happy thoughts, which were allowed to lie dormant for 2,000 years, until Napier *promulgated* his immortal invention, in 1614, and in his turn forestalled the discoveries of later times.

The origin of the notable improvement in notation, by which the *nine* characters for *units* only were employed, and the *eighteen* for *tens* and *hundreds*, thrown aside, is still a doubtful question, although it has generally been attributed to the Arabs or Moors of Spain, and examples of a similar notation are to be found in India. This improvement consists in giving to these nine characters a *relative value*—that is, a value depending on their positions, as well as an *absolute value* depending on their names. Thus denoting the place of *units* by a certain fixed mark or character, and placing each of the nine primary characters to the left of it, their values are increased tenfold, so that no new characters are necessary to denote the *tens*; again, denoting the place of *tens* and *units* by two of the same fixed marks or characters, and placing each of the nine primary characters to the left of these, their values are increased a hundred-fold, so that no new characters are necessary to denote the *hundreds*. It is evident that this process may be extended indefinitely, and applied so as to denote not only all the numbers whose names are expressed or indicated in our system of numeration, but all numbers whatsoever, although far beyond the reach of our numerical nomenclature. The first nine letters of any alphabet would, of course, answer the purpose of denoting the *units*, and a dot or any new letter might be employed to denote the vacant places of units, tens, &c., as they occur. The nine characters, and the cipher

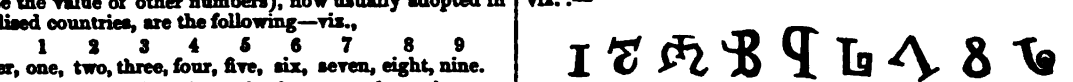
(which stands for nothing by itself, and is only employed to increase the value of other numbers), now usually adopted in all civilised countries, are the following—viz.,

0 1 2 3 4 5 6 7 8 9

cipher, one, two, three, four, five, six, seven, eight, nine.

M. Chasles, a French writer who has recently made some curious researches in the history of the mathematics, maintains that these characters have descended to us from the Greeks and the Romans, with the whole system of decimal notation. He asserts that a very obscure passage in the writings of Boethius, a Roman philosopher and senator, who flourished at the end of the fifth century, has a direct reference to our decimal system of notation; that various manuscript treatises written between the tenth and twelfth centuries relate to the same subject; that the celebrated Gerbert (afterwards Pope Sylvester II.) had greatly contributed to introduce and extend the knowledge of the decimal system, in the east, towards the end of the tenth century; and that the apparatus employed to facilitate operations in this system, which was unquestionably constructed on the decimal scale, was universally denominated the *abacus Pythagoricus*, or *Pythagoras's board*, until the beginning of the twelfth century. In the early part of this century, the *cipher*, which had been preceded in the Greek notation by a *dot* or *period*, was known at first by the names of *rota*, *rotula*, *sipos*, and afterwards by those of *circulus* and *cifra*, or *ciphra*. The term *cipher*, however, is applicable to all the characters used in our system of notation; and the art of arithmetic itself is hence called *ciphering*. This word is evidently derived from the Hebrew verb *sapher*, *to number*; and it is not improbable that even the art of numbering itself, as well as the symbols employed in it, may have spread over the east from the people who originally spake this language.

At the revival of literature, the invention of the arithmetical characters was ascribed to the Indians, from whom it was pretended they came to us, through the Arabians; and the characters themselves were denominated *figuræ Indorum*. In this way all trace of the ancient system of notation, preserved in the *abacus Pythagoricus*, was insensibly lost in the writings of the moderns, while some ideas, no doubt taken from the Arabic literature, were introduced. Hence, at the present time, all remembrance of the abacus, and of the real origin of our system of notation, has disappeared, and their origin is referred to the Arabians and the Hindoos. Many passages, however, in the works of writers on the subject, even so late as the sixteenth century, show that the Greek and Latin origin of our decimal system was not then completely forgotten. It is also important to observe, that those who ascribe its origin to the Arabians, or the Asiatics, do not assert that we have preserved the characters employed by the inventors; and it may, indeed, be shown that the characters we now use are extremely analogous to those of Boethius, as well as to those which were employed in the treatises on the *abacus* written during the middle ages. The following are the characters which M. Chasles has discovered in a manuscript of the twelfth century, which treats of the *abacus Pythagoricus*, viz.:—



1 2 3 4 5 6 7 8 9

From the preceding observations, it is evident that the Romans, especially those who were initiated into the doctrines of Pythagoras, employed in their mathematical calculations a system of notation and a set of characters very similar to our own, and very different from those which they used in their ordinary writings, and which are denominated *Roman figures*. As these are, to this day, very often used for various common purposes among ourselves, such as paging certain portions of a book, marking dates, numbering chapters, &c., it will be useful to give the following table of their values:—

VULGAR SYSTEM OF ROMAN NOTATION.

Signs.	Values.	Signs.	Values.	Signs.	Values.
I	1	X	10	C	100
II	2	XX	20	CC	200
III	3	XXX	30	CCC	300
IV or IIII	4	XL	40	CCCC or CD	400
V	5	L	50	D or IↃ	500
VI	6	LX	60	DC	600
VII	7	LXX	70	DCC	700
VIII	8	LXXX	80	DCCC	800
IX	9	XC	90	DCCCC	900

Combinations of these numbers are formed by placing those of highest value first in order; thus XI, 11; XII, 12; CXXI, 121, &c. The *thousands* are denoted by the letter M or the combination CIↃ; the *tens of thousands* by CCIↃↃ; and so on. In this system, there is very considerable regularity and ingenuity, although it is not adapted for the purposes of calculation. The letter I, repeated any number of times denotes so many *units*; when placed to the right of another character, it adds a *unit* to the number represented by that character; when placed to the left, it takes away a *unit*. The letter X repeated any number of times, denotes so many *tens*; when placed to the right of a character of greater value, it adds *ten* to the number represented by that character; when placed to the left, it takes away *ten*. The letter C repeated any number of times, denotes so many *hundreds*; when placed to the right of a character of greater value, it adds a *hundred*; and when placed to the left, it takes away a *hundred*; and so on, with M &c. The letter C placed right and left, in the former case inverted, increases the value of CIↃ *tenfold*. A bar placed over any character or number increases its value a *thousand fold*. In some few cases, it has been ascertained that the Romans employed these literal characters even with values depending on their position; thus, in Pliny, we find XVI.XX.DCCC.XXIX used for the number 1,620,829.

The following tables, especially the first, which combines the system of numeration with that of notation, will be found of the greatest utility.

TABLE I.—ENGLISH SYSTEM OF NUMERATION AND NOTATION.

SEXTILLIONS.						QUINTILLIONS.						QUADRILLIONS.						TRILLIONS.						BILLIONS.						MILLIONS.						UNITS.		
Hundreds of thousands of..	Tens of thousands of	Thousands of.....	Hundreds of.....	Tens of	SEXTILLIONS.	Hundreds of thousands of..	Tens of thousands of	Thousands of	Hundreds of	Tens of	QUINTILLIONS.	Hundreds of thousands of..	Tens of thousands of	Thousands of	Hundreds of	Tens of	QUADRILLIONS.	Hundreds of thousands of..	Tens of thousands of	Thousands of	Hundreds of.....	Tens of	TRILLIONS.	Hundreds of thousands of..	Tens of thousands of	Thousands of	Hundreds of.....	Tens of	BILLIONS.	Hundreds of thousands of..	Tens of thousands of	Thousands of.....	Hundreds of.....	Tens of	MILLIONS.	Hundreds of thousands of..	Tens of thousands of	Thousands of.....	Hundreds of	Tens of	UNITS.
1;	0	0	0,	0	0	0;	0	0	0,	0	0	0;	0	0	0,	0	0	0;	0	0	0,	0	0	0;	0	0	0,	0	0	0;	0	0	0,	0	0	0;	0	0	0,	0	0	0.

TABLE II.—FRENCH SYSTEM OF NUMERATION AND NOTATION.

Septillions.	Hundreds of	} Sextillions.
	Tens of	
Sextillions.		
Hundreds of		} Quintillions.
Tens of		
Quintillions.		
Hundreds of		} Quadrillions.
Tens of		
Quadrillions.		
Hundreds of		} Trillions.
Tens of		
Trillions.		
Hundreds of		} Billions.
Tens of		
Billions.		
Hundreds of		} Millions.
Tens of		
Millions.		
Hundreds of		} Thousands.
Tens of		
Thousands.		
Hundreds of		} Units.
Tens of		
Units.		
1,	0 0 0,	0 0 0, 0 0 0, 0 0 0, 0 0 0, 0 0 0, 0 0 0.

The use of these tables is to enable the learner to read any number that may be placed before him, or that may occur in calculation, or to write any number that may be proposed in words, with ease and certainty, according to the particular system he chooses to adopt, or that may be recommended to him. As we are partial to the English system, on account of its greater ability to grasp large numbers, we add the following rules, which have special reference to Table I., and which must be committed to memory :—

PROBLEM 1.—*To read or express in words any proposed number expressed in figures.*—Rule: Point the proposed number off by commas into periods of six figures each, from right to left, and then into half periods of three figures each. Apply to the number thus divided the names which belong to the respective figures and places of figures in each period, reading them from left to right—that is, from the highest name to the lowest—taking care to avoid repetitions of the same word, and observing that wherever a cipher occurs, the name which belongs to that place must be omitted.

It will be of importance to remember, that in the application of this table, the name *hundred* is applied to that of every *third* figure, and the *additional* name *thousand* to that of every sixth figure, reckoned from right to left. After the name *hundred*, in reading from left to right, the name *ten* immediately follows; and after the name *hundred thousand*, that of *ten thousand*, in the same order. After the name *ten*, in reading from left to right, the name of the period in which it occurs is applied; and after the name *ten thousand*, that of *thousand* is applied.

The following examples will show the application of this rule.

EXAMPLE 1.—Read, or express in words, the number

146385297831276543

Here, the number pointed according to the rule will stand thus:

146,385;297,831;276,543.

In this number there are three complete periods, and six half periods. By referring to the table, we see that the name of the first period, reckoning from left to right, is *billions*, the next *millions*, and the next *units*. Hence, remembering the above rule, it is read or expressed in words, thus:

One hundred and forty-six thousand three hundred and eighty-five billions, two hundred and ninety-seven thousand eight hundred and thirty-one millions, two hundred and seventy-six thousand five hundred and forty-three.

The name *units* is generally omitted at the end of a number when read in the preceding manner. The number in the table itself is read thus : *one septillion.*

EXAMPLE 2.—Read or express in words the number

101000230200001.

This number, pointed according to the rule, will stand thus:

101;000,230;200,001.

In this number there are two periods and a half; hence, it is read or expressed in words as follows :

One hundred and one billions, two hundred and thirty millions, two hundred thousand and one.

PROBLEM 2.—*To write or express in figures any proposed number expressed in words.*—Rule: Write in one line as many ciphers, from right to left, as will extend from units to the highest name in the proposed number, and point them off according to the table, as before. Write below these ciphers the figures which express the names that are applied to each place in the given number, according as they stand in the table, and fill up the blank places in this line of figures with ciphers; then the proposed number will be properly expressed in figures.

EXAMPLE 1.—Write or express in figures the number; *Three hundred and forty-five thousand six hundred and seventy-two billions, one hundred and thirty-eight thousand seven hundred and ninety-two millions, five hundred and eighty-three thousand six hundred and forty-one.*

Here, the highest name in the proposed number being *hundreds of thousands of billions*, we write eighteen ciphers, as follows; and then write below them the figures which express the names belonging to each place, according to rule; thus:

000,000;000,000;000,000.
345,672;138,792;583,641.

EXAMPLE 2.—Write or express in figures, the number; *One hundred billions, two thousand and thirty-two millions, one hundred and one.*

Here, as before, the highest name being *hundreds of billions*, we write fifteen ciphers as follows; and then write below them the figures which express the names belonging to each place, according to rule, filling up the blank places with ciphers; thus:—

000;000,000;000,000.
100;002,032;000,101.

QUESTIONS ON THE PRECEDING LESSON.

1. Write out the names of all the numbers from one to a hundred, and express them in figures.

2. Write out the names of the numbers which immediately follow one hundred; one hundred and ninety-nine; four hundred and ninety-nine; nine thousand nine hundred and ninety-nine; and a million.

3. Express, in figures, the numbers named in the preceding example, and those which immediately follow them.

4. Write the names of the numbers which are next to the following numbers, and express both sets in figures: one million and ninety-nine; one million five thousand nine hundred and ninety-nine; and nine millions nine hundred and ninety-nine thousand nine hundred and ninety-nine.

5. Read or express the following numbers in words:—

202	20030208	100010001000
1001	1010101	3000000000000
15608	9999999	777666555444
306042	347125783	123456789123
5678914	202021010	48484848484848
26312478	9090909090	10210230430400

6. Write or express the following numbers in figures :—

Four hundred and four.
Three thousand and thirty-two.
Twenty-four thousand and eighty-six.
Six hundred and five thousand, and nineteen.
Eleven thousand, eleven hundred and eleven.
Three hundred and forty-one thousand, seven hundred and eighty-two.
Eighty millions, two hundred and three thousand and two.
Two hundred and two millions, twenty thousand two hundred and two.
Nine thousand nine hundred and ninety-nine millions, nine hundred and ninety-nine thousand, nine hundred and ninety-nine.
Write also the number which follows this last one in order
Twenty thousand millions.
Two hundred thousand and twenty millions, two thousand.
One trillion.
The next number to thirty thousand billions, nine hundred and ninety-nine thousand.

LESSONS IN FRENCH.—No. II.

By Professor LOUIS FASQUELLE, LL.D.

THE following reading and pronouncing exercises belong to Lesson I., given in our last number, and must be carefully performed in connexion with that lesson, which should have been headed SECTION I. for the sake of reference.

EXERCISE 1.—THE VOWELS.

(a) Table, *table;* fable, *fable;* chat, *cat;* éclat, *splendour;* arbre, *tree;* tard, *late;* balle, *ball.*

(â) âme, *soul;* blâme, *blame;* bâtir, *to build;* pâte, *paste;* âge, *age;* mât, *mast.*

(e) me, *me;* de, *of;* que, *that;* elle, *she;* malle, *mail;* parle, *speak;* fourchette, *fork;* salle, *hall.*

(é) pré, *meadow*; allé, *gone*; donné, *given*; passé, passée, *past*; élevé, *raised*; armée, *army*.

(è) très, *very*; après, *after*; achète, *buy*; mère, *mother*; espère, *hope*; lève, *raise*; chère, *fare*; chèvre, *goat*.

(ê) même, *same*; carême, *Lent*; arrêt, *arrest*; tempête, *tempest*; tête, head; bête, *beast*.

(i) lit, *bed*; dit, *said*; dire, *to say*; lire, *to read*; lime, *file*; cire, *wax*; rite, *rite*.

(î) dîner, *to dine*; île, *isle*; dîme, *tithe*; abîme, *abyss*; épître, *epistle*; gîte, *lodging*.

(o) mot, *word*; cachot, *dungeon*; repos, *rest*; trot, *trot*; globe, *globe*; carrosse, *coach*.

(ô) tôt, *soon*; plutôt, *rather*; rôti, *roast meat*; dépôt, *deposit*; prévôt, provost.

(u) bu, *drank*; cru, *believed*; du, *of the*; élu, *elected*; menu, *minute*; prévu, *foreseen*; ecu, *crown*.

(û) châte, *fall*; brûlot, *fireship*; mûr, *ripe*; dûment, *duly*; il fût, *he might be*; nous fûmes, *we were*.

THE DIPHTHONGS.

(ai) je donnai, *I gave*; je parlerai, *I will speak*; j'allai, *I went*; je cherchai, *I sought*; je menai, *I led*; j'irai, *I will go*.

(ais) je donnais, *I was giving*; je parlerais, *I would speak*; j'allais, *I was going*; je cherchais, *I was seeking*; je menais, *I was leading*; j'irais, *I would go*.

(au, eau) maux, *evils*; chameau, *camel*; chevaux, *horses*; beau, *handsome*; nouveau, *new*; troupeau, *flock*.

(ei) neige, *snow*; veine, *vein*; reine, *queen*; Seine, *Seine*; je peigne, *I comb*; sein, *bosom*.

(eu) peu, *little*; peur, *fear*; leur, *their*; il meurt, *he dies*; sœur, *sister*; œuf, *egg*; lueur, *light*.

(eu) like u. J'eus, *I had*; tu eus, *thou hadst*; il eut, *he had*; eu, *had*.

(ia) liant, *binding*; il lia, *he bound*; partial, *partial*; il cria, *he cried*; il nia, *he denied*; il pria, *he prayed*.

(ie) garantie, *guarantee*; il prie, *he prays*; il lie, *he binds*; il rie, *he may laugh*; il nie, *he denies*.

(oi) loi, *law*; moi, *me*; il voit, *he sees*; il boit, *he drinks*; roi, *king*; droit, *right*; il croit, *he believes*.

(ou) bout, *end*; il coud, *he sews*; il moud, *he grinds*; loup, *wolf*; coup, *blow*; croute, *crust*.

(ua) nuage, *cloud*; nuance, *shade*; il salua, *he saluted*; il remua, *he moved*; il contribua, *he contributed*.

(ue) nue, *naked*; lue, f. *read*; reçue, f. *received*; il salue, *he salutes*; il remue, *he moves*.

(ui) lui, *him*; luisant, *shining*; cuire, *to bake*; cuit, *baked*; nuire, *to injure*; produire, *to produce*.

(y) thyrse, *thyrsus*; type, *type*; style, *style*; yeux, *eyes*; Yvetot, *Yvetot*; payer, *to pay*; envoyer, *to send*; abbaye, *abbey*; essayer, *to try*; pays, *country*; paysage, *landscape*; paysan, *peasant*.

EXERCISE 2.—THE NASAL SOUNDS.

Ex.
30. Innocent, *innocent*; inutile, *useless*; dîner, *dinner*; immortel, *immortal*; une, *one*; lune, *moon*; dunes, *downs*.

31. am ambre, *amber*; chambre, *chamber*; Adam, *Adam*: ramper, *to creep*; ample, *ample*; lampe, *lamp*.
an tante, *aunt*; manteau, *cloak*; plan, *plan*; plancher, *floor*; rang, *rank*; sang, *blood*; enfant, *child*.
em remplir, *to fill*; temple, *temple*; temps, *weather*; assemblée, *assembly*; trembler, *to tremble*; membre, *limb*.
en sentir, *to feel*; tente, *tent*; pente, *declivity*; je rends, *render*; je prends, *I take*; je sens, *I feel*.

32. en amen, *amen*; specimen, *specimen*; examen, *examination*.

33. en ils donnent, *they give*; ils parlent, *they speak*; ils écrivent, *they write*; ils cherchent, *they seek*.

34. im simple, *simple*; timbre, *stamp*; daim, *deer*; faim, *hunger*; imposteur, *impostor*; important, *important*.
in fin, *fine*; pain, *bread*; demain, *to-morrow*; crin, *horse-hair*; vin, *wine*; bain, *bath*; teindre, *to dye*; peindre, *to paint*.

35. om sombre, *dark*; nom, *name*; ombre, *shadow*; tombe, *tomb*; nombre, *number*; comble, *height*.
on pont, *bridge*; honte, *shame*; montre, *watch*; raison, *reason*; maison, *house*; fondre, *to melt*; non, no.

36. um humble, *humble*; parfum, *perfume*; humblement, *humbly*.

Ex.
36. un lundi, *Monday*; brun, *brown*; alun, *alum*; emprunter, *to borrow*; importun, *importunate*; un, *one*.

EXERCISE 3.—THE CONSONANTS.

(b) baum, *balsam*; blessure, *wound*; brun, *brown*; absolution, *absolution*; abstrait, *abstract*; abbaye, *abbey*; Jacob, *Jacob*.

(c) cacher, *to conceal*; coin, *corner*; décuple, *decuple*; cire, *wax*; cinq, *five*; chercher, *to seek*; je cache, *I conceal*; patriarche, *patriarch*; patriarchat, *patriarchate*; chambre, *chamber*; arche, *arch*; changer, *to change*; orchestre, *orchestra*; charbon, *coal*; sac, *bag*; sue, *juice*; clerc, *clerk*; banc, *bench*; flanc, *flank*; second, *second*; fécund, *fruitful*; façon, *fashion*; reçu, *received*.

(d) daim, *deer*; don, *gift*; admirer, *to admire*; bord, *border*; nord, *north*; sud, *south*; Obed, *Obed*; Talmud, *Talmud*; grand âge, *advanced age*; rend-il, *does he render?* prend-il, *does he take?*

(f) foin, *hay*; faim, *hunger*; froid, *cold*; bref, *short*; soif, *thirst*; suif, *tallow*; clef, *key*; chef, *chief*; chef-d'œuvre, *master-piece*; œuf, *egg*; œufs, *eggs*; œuf frais, *fresh egg*; bœuf, *ox, beef*; bœufs, *oxen*; neuf maisons, *nine houses*; neuf chevaux, *nine horses*; neuf amis, *nine friends*.

(g) gager, *to bet*; gosier, *throat*; gibier, *game*; guide, *guide*; ligue, *league*; il ligua, *he leagued*; nous liguons, *we league*; aiguille, *needle*; aguillon, *goad*; ciguë, *hemlock*; digne, *worthy*; règne, *reign*; Espagne, *Spain*; Pologne, *Poland*; brugnon, *nectarine*; soignant, *taking care*; joignant, *joining*; stagnant, *stagnant*; rang honourable, *honourable rank*.

(h) hâte, *haste*; honte, *shame*; haut, *high*; herbe, *herbage*; almanach, *almanac*.

(j) jujube, *jujube*; jeune, *young*; juger, *to judge*; jurer, *to swear*; joindre, *to join*; jone, *rush*; déjeûner, *to breakfast*; Juif, *Jew*; jeu, *play*.

(l) lame, *blade*; loi, *law*; illégal, *illegal*; illicite, *unlawful*; paille, *straw*; soleil, *sun*; pareil, *similar*; bail, *lease*; railler, *to rail*; souiller, *to soil*; caille, *quail*; canaille, *rabble*; ville, *town*; village, *village*; mille, *mile, thousand*; péril, *peril*; pointilleux, *punctilious*; baril, *barrel*; fusil, *gun*; gentilhomme, *nobleman*; gentilshommes, *noblemen*; bouteille, *bottle*.

EXERCISE 4.—THE CONSONANTS CONTINUED.

(mn) mon, *my*; marge, *margin*; nom, *name*; champ, *field*; moine, *monk*; prompt, *quick*; condamner, *to condemn*; faim, *hunger*; son argent, *his money*; bon appétit, *good appetite*; lien étroit, *close connexion*.

(p) partir, *to go away*; coup, *blow*; tempe, *weather*; drap, *cloth*; sept, *seven*; baptême, *baptism*; cap, *cape*; Alep, *Aleppo*.

(q) quérir, *to fetch*; quitter, *to leave*; musique, *music*; logique, *logic*; quarante, *forty*; quoi, *what*; aquatique, *aquatic*, Quintilién, *Quintilian*; cinq, *five*; cinq livres, *five books*.

(r) ranger, *to arrange*; errer, *to err*; arriver, *to arrive*, verser, *to pour*; je courrai, *I will run*; je courais, *I was running*; jouir, *to enjoy*; car, *for*; plaisir, *pleasure*; amer, *bitter*; parler, *to speak*; changer, *to change*; fer, *iron*; hiver, *winter*.

(s) silence, *silence*; soin, *care*; sans, *without*; base, *base*; rose, *rose*; chose, *thing*; observer, *to observe*; rasoir, *razor*; parasol, *parasol*; science, *science*; schisme, *schism*; scie, *saw*; schème, *scheme*; gras, *fat*; pas, *step*; lambris, *wainscot*; Barras, *Barras*; Romulus; Samos; vous avez, *you have*; nous aimons, *we love*.

(t) tiers, *third*; tiare, *tiara*; tort, *wrong*; portion,* *portion*; sanction, *sanction*; essentiel, *essential*; partialité, *partiality*; section, *section*; question, *question*; bastion, *bastion*; observation, *observation*; minutie, *minutia*; démocratie, *democracy*; amitié, *friendship*; initiation, *initiation*; mot, *word*; lot, *lot*; sept, *seven*; sept livres, *seven books*; et, *and*; vingt livres, *twenty books*.

(v) voir, *to see*; va, *go*; lève, *raise*; lever, *to raise*; visage, *face*; vive, f. *lively*.

(w) Westphalie, Wiemar, Worms, Wurtemberg.

* T, in the English words corresponding to the French words, in which this letter is pronounced like s in cedar, has generally the sound of sh, as in motion, partial, &c.

(x) xylon, *cotton plant;* Xénophon; exiler, *to exile;* excuser, *to excuse;* luxe, *luxury;* Alexandre, *Alexander;* maxime, *maxim;* soixantième, *sixtieth;* six, *six;* sixième, *sixth;* six livres, *six books;* Bruxelles, *Brussels;* Aix-la-Chapelle; dix, *ten;* Phénix; Ajax; deux hommes, *two men;* dix amis, *ten friends.*

(z) zèle, *zeal;* zone, *zone;* zoologie, *zoology;* vous lisez, *you read;* nez, *nose;* Metz; allez-y, *go there;* venez ici, *come here.*

Section II.

1. In French the article [§ 13, (2).]* has, in the singular, a distinct form for each gender. Ex.

Le fils, *the son.*	La fille, *the daughter, the girl.*
Le frère, *the brother.*	La sœur, *the sister.*

2. Before a word commencing with a vowel or an h mute [Section I., 11 h], the article is the same for both genders [§ 13, (7)]. Ex.

L'aïeul, *the grandfather.*	L'aïeule, *the grandmother.*
L'hôte, *the landlord.*	L'hôtesse, *the landlady.*

3. There are in French only two genders, the masculine and the feminine [§ 4]. Every noun, whether denoting an animate or inanimate object, belongs to one of these two genders.

Masc.	L'homme, *the man.*	Le lion, *the lion.*
	Le livre, *the book.*	Le papier, *the paper.*
	L'arbre, *the tree.*	Le bois, *the wood.*
Fem.	La femme, *the woman.*	La lionne, *the lioness.*
	La table, *the table.*	La feuille, *the leaf.*
	La plume, *the pen.*	La porte, *the door.*

4. Avoir, to have, in the Present of the Indicative.

	Affirmatively.	*Interrogatively.*	
J'ai,	*I have.*	Ai-je?	*Have I?*
Tu as [§ 33 (1)(2)]	*Thou hast.*	As-tu?	*Hast thou?*
Il a,	*He has.*	A-t-il?	*Has he?*
Elle a,	*She has.*	A-t-elle?	*Has she?*
Nous avons,	*We have.*	Avons nous?	*Have we?*
Vous avez,	*You have.*	Avez vous?	*Have you?*
Ils ont, m.	*They have.*	Ont ils? m.	*Have they?*
Elles ont, f.	*They have.*	Ont elles? f.	*Have they?*

5. The *e* of the pronoun *je* is elided when that pronoun comes before a vowel or an *h* mute [§ 146].

6. In interrogative sentences, when the third person singular of a verb ends with a vowel, and is immediately followed by a pronoun, a *t, called euphonic,* must be placed between the verb and the pronoun.

A-t-il?	*Has he?*	A-t-elle?	*Has she?*

Résumé of Examples.

Le père a la viande, vous avez le café, et j'ai l'eau.	*The father has the meat, you have the coffee, and I have the water.*
L'homme a le pain, l'enfant a le sel, et nous avons le poivre.	*The man has the bread, the child has the salt, and we have the pepper.*

Exercise 5.

Avoine, f. *oats.*	Madame, *Madam.*	Qui, *who.*
Blé, m. *wheat.*	Mademoiselle, *Miss.*	Sel, m. *salt.*
Boucher, m. *butcher.*	Meunier, m. *miller.*	Seulement, *only.*
Boulanger, m. *baker.*	Monsieur, *Mr., Sir.*	Table, f. *table.*
Cheval, m. *horse.*	Non, *no.*	Thé, m. *tea.*
Et, *and.*	Oui, *yes.*	Viande, f. *meat.*
Farine, f. *flour.*	Pain, m. *bread.*	Vin, m. *wine.*
Frère, m. *brother.*	Plume, f. *pen.*	Vinaigre, m. *vinegar.*
Livre, m. *book.*		

TO BE TRANSLATED INTO ENGLISH.

1. Qui a le pain? Le boulanger a le pain. 3. A-t-il la farine? 4. Oui, Monsieur, il a la farine. 5. Avons nous la viande? 6. Oui, Monsieur, vous avez la viande et le pain. 7. Le meunier a la farine. 8. Le boulanger a la farine et le blé. 9. Avons nous le livre et la plume? 10. Oui, Mademoiselle, vous avez le livre et la plume. 11. Le boucher a la viande. 12. Le meunier a la viande et j'ai le café. 13. Avez vous l'eau et le sel? 14. Oui, Monsieur, nous avons l'eau, le sel, et l'avoine. 15. Avons nous le thé? 16. Non, Monsieur, la fille a le thé, le vinaigre, et le sel. 17. Ai-je le vin? 18. Non, Madame, vous avez seulement le vinaigre et la viande. 19. Avez vous la table? 20. Oui, Madame, j'ai la table.

Exercise 6.

TO BE TRANSLATED INTO FRENCH.

1. Have you the wheat? 2. Yes, Sir, I have the wheat. 3. Who has the meat? 4. The butcher has the meat and the salt. 5. Has he the oats? 6. No, Madam, the horse has the oats. 7. Have we the wheat? 8. You have the wheat and the flour. 9. Who has the salt? 10. I have the salt and the meat. 11. Have we the vinegar, the tea, and the coffee? 12. No, Sir, the brother has the vinegar. 13. Who has the horse? 14. The baker has the horse. 15. Have we the book and the pen? 16. No, Miss, the girl has the pen, and the miller has the book. 17. Have you the table, Sir? 18. No, Sir, I have only the book. 19. Who has the table? 20. We have the table, the pen, and the book.

Section III.

1. The article *le*, with the preposition *de* preceding, must be contracted into *du*, when it comes before a word in the *masculine* singular, commencing with a consonant or an *h* aspirated [Sect. I. 11 h, § 13, (8) (9)].

Du frère, *of the brother.*	Du château, *of the castle.*
Du héros, *of the hero.*	Du chemin, *of the way.*

2. Before *feminine* words, and before masculine words commencing with a vowel, or an *h* mute, the article is not blended with the preposition.

De la dame, f. *of the lady.*	De l'amie, f. *of the female friend.*
De l'argent, m. *of the money.*	De l'honneur, m. *of the honour.*

3. In French, the name of the possessor follows the name of the object possessed [§ 76, (10)].

La maison du médecin,	*The physician's house.*
L'arbre du jardin,	*The tree of the garden.*
La lettre de la sœur,	*The sister's letter.*

4. The name of the material of which an object is composed follows always the name of the object; the two words being connected by the preposition *de* [§ 76, (11)].

L'habit de drap,	*The cloth coat.*
La robe de soie,	*The silk dress.*
La montre d'or,	*The gold watch.*

Résumé of Examples.

Le tailleur a l'habit de drap du médecin.	*The tailor has the physician's cloth coat.*
Vous avez la lettre de la sœur du boulanger.	*You have the baker's sister's letter. (the letter of the sister of the baker).*
A-t-il le livre de la dame.	*Has he the lady's book.*

Exercise 7.

Argent, m. *silver, money.*	Couteau, m. *knife.*	Porte-crayon, m. *pencil-case.*
Bas, m. *stocking.*	Cuir, m. *leather.*	Robe, f. *dress.*
Bois, m. *wood.*	Dame, f. *lady.*	Satin, m. *satin.*
Chapeau, m. *hat.*	Drap, m. *cloth.*	Sœur, f. *sister.*
Charpentier, m. *carpenter.*	Foin, m. *hay.*	Soie, f. *silk.*
	Habit, m. *coat.*	Soulier, m. *shoe.*
Cordonnier, m. *shoemaker.*	Laine, f. *wool.*	Table, f. *table.*
	Médecin, m. *physician.*	Tailleur, m. *tailor.*
Coton, m. *cotton.*	Montre, f. *watch.*	
	Or, m. *gold.*	

TO BE TRANSLATED INTO ENGLISH.

1. Avez vous la montre d'or? 2. Oui, Madame, j'ai la montre d'or et le chapeau de soie. 3. Monsieur, avez vous le livre du tailleur? 4. Non, Monsieur, j'ai le livre du médecin. 5. Ont ils le pain du boulanger? 6. Ils ont le pain du boulanger et la farine du meunier. 7. Avez vous le porte-crayon d'argent? 8. Oui, Monsieur, nous avons le porte-crayon d'argent. 9. Avons nous l'avoine du cheval? 10. Vous avez l'avoine et le foin du cheval. 11. Qui a l'habit de drap du charpentier? 12. Le cordonnier a le chapeau de soie du tailleur. 13. Le tailleur a le soulier de cuir du cordonnier. 14. Avez vous la table de bois? 15. Oui, Monsieur, j'ai la table de bois du charpentier. 16. Ont ils le couteau d'argent? 17. Ils ont le couteau d'argent. 18. Le frère du médecin a la montre d'argent. 19. La sœur du cordonnier a la robe de soie. 20. A-t-elle le soulier de cuir? 21. Non, Madame, elle a le soulier de satin. 22. Avons nous le bas de laine? 23. Non, Monsieur, vous avez le bas de soie du tailleur. 24. Qui

* Once for all, *references of this kind* are made to the Second Part of this Course, of the commencement of which due intimation shall be given.

a le bas de coton? 25. Le médecin a le bas de coton. 26. La dame a le soulier de satin de la sœur du boulanger.

Exercise 8.

TO BE TRANSLATED INTO FRENCH.

1. Have you the tailor's book? 2. No, Sir, I have the physician's watch. 3. Who has the gold watch? 4. The lady has the gold watch and the silver pencil-case. 5. Have you the tailor's shoe? 6. I have the tailor's cloth shoe. 7. Have we the wooden table? 8. Yes, Sir, you have the wooden table. 9. Have they the silver knife? 10. They have the silver knife. 11. The lady has the silver knife and the gold pencil-case. 12. Has she the satin dress? 13. The physician's sister has the satin dress. 14. Who has the wood? 15. The carpenter's brother has the wood. 16. Have you the woollen stockings? 17. No, Sir, but I have the cotton stockings. 18. Who has the baker's bread? 19. We have the baker's bread and the miller's flour. 20. Have we the horse's hay? 21. You have the horse's oats. 22. Have we the tailor's silk hat? 23. Yes, Sir, you have the tailor's silk hat and the shoemaker's leather shoe. 24. Have you the cloth shoe of the physician's sister? 25. No, Madam, I have the lady's silk dress.

Section IV.

1. The article, preceded by or contracted with the preposition *de*, according to rules 1 and 2 of Section III., is placed in French before words used in a partitive sense. Such words may generally be known in English when *some* or *any* is or may be prefixed to them [§13, (10), § 78, (1)].

Du pain,	*Bread, or some bread.*
De la viande,	*Meat, or some meat.*
De l'argent,	*Money, or some money.*

2. The French numeral adjective. un, *m.*, une, *f.*, answers to the English indefinite article, a or an [§ 13, (4), (11)].

Un homme,	*A man.*
Une femme,	*A woman.*

3. The *e* of the preposition *de* is elided before *un* and *une* [§146].

D'un livre, m.	*Of or from a book.*
D'une maison, f.	*Of or from a house.*

4. When the nominative or subject of an interrogative sentence is a noun, it should be placed before the verb; and immediately after the verb in simple tenses, and after the auxiliary in compound tenses, a pronoun must be placed, agreeing with the nominative in gender, number, and person [§ 76, (4) (5)].

Le médecin a-t-il de l'argent?	*Has the physician money?*
Le boucher a-t-il de la viande?	*Has the butcher meat?*
Le libraire a-t-il du papier;	*Has the bookseller paper?*
La dame a-t-elle de la soie?	*Has the lady silk?*

Résumé of Examples.

Avez vous du pain?	*Have you bread?*
Vous avez du pain, du beurre, et du fromage.	*You have bread, butter, and cheese.*
Votre frère a-t-il une livre de beurre?	*Has your brother a pound of butter?*
Avez vous le livre d'un libraire?	*Have you a bookseller's book?*
Non, j'ai le livre d'une dame.	*No, I have a lady's book.*
La sœur du médecin a-t-elle du papier et de l'encre.	*Has the physician's sister paper and ink?*

5. It will be seen, by some of the above examples, that the article must be repeated before every noun used in a partitive sense.

Exercise 9.

Acajou, m. *mahogany.*	Encre, f. *ink.*	Livre, f. *pound.*
Acier, m. *steel.*	Epicier, m. *grocer.*	Morceau, m. *piece.*
Aujourd'hui, *to-day.*	Fils, m. *son.*	Papier, m. *paper.*
Beurre, m. *butter.*	Fourchette, f. *fork.*	Plume, f. *pen.*
Bière, f. *beer.*	Fromage, m. *cheese.*	Sucre, m. *sugar.*
Bœuf, m. *beef.*	Gant, m. *glove.*	Vin, m. wine.
Café, m. *coffee.*	Libraire, m. *bookseller.*	Votre, *your.*
Cuillier, f. *spoon.*	Livre, m. *book.*	Thé, m. *tea.*
Dé, m. *thimble.*		

1. Avez vous de la viande? 2. Oui, Monsieur, j'ai une livre de viande. 3. Votre fils a-t-il un morceau de pain? 4. Oui, Madame, il a un morceau de pain. 5. Le libraire a-t-il un livre? 6. Il a de l'encre et du papier. 7. Votre sœur a-t-elle une montre d'or? 8. Elle a une montre d'or et un de d'argent. 9. Le boulanger a-t-il du vin ou de la bière? 10. Le boulanger a du thé et du café. 11. Votre frère a-t-il du fromage? 12. Il a du fromage et du beurre. 13. La dame a-t-elle une cuillier d'argent? 14. La dame a une cuillier et une fourchette d'argent. 12. Le boucher a-t-il de la viande aujourd'hui? 16. Oui, Monsieur, il a un morceau de bœuf. 17. Le charpentier a-t-il une table? 18. Oui, Monsieur, il a une table d'acajou. 19. Avez vous le livre du médecin? 20. Non, Madame, mais j'ai le livre de votre sœur. 21. Qui a du café et du sucre? 22. L'épicier a du café et du sucre. 23. La sœur du libraire a-t-elle un gant? 24. Non, Monsieur, mais elle a un livre. 25. A-t-elle une plume d'acier? 26. Non, Monsieur, elle a une plume d'or. 27. Vous avez le porte-crayon du médecin.

Exercise 10.

1. Have you any tea? 2. Yes, Madam, I have a pound of tea. 3. Who has bread? 4. The baker has bread, butter, and cheese. 5. Has the tailor cloth? 6. The tailor has a piece of cloth. 7. Has the physician gold? 8. Yes, Sir, the physician has gold and silver. 9. Has the lady a silver watch? 10. Yes, Miss, the lady has a silver watch and a gold pen. 11. Has your sister silk? 12. Yes, Sir, she has silk and cotton. 13. Have you a knife? 14. Yes, Sir, I have a steel knife and a silver fork. 15. Have you meat to-day, Sir? 16. Yes, Sir, I have a piece of beef. 17. Has your carpenter a mahogany table? 18. Yes, Sir, he has a mahogany table. 19. Has your sister a glove? 20. Yes, Sir, my sister has a silk glove. 21. Has the bookseller's son a gold pencil-case? 22. Yes, Sir, he has a gold pencil-case and a steel pen. 23. Who has your sister's watch? 24. Your brother has the gold watch and the silk hat. 25. We have gold, silver, and steel (See Rule 5).

PROBLEMS AND QUERIES.

As some of our young readers may be already acquainted with arithmetic and geometry, we propose the following problems and queries for exercise:—

1. How could the first nine letters of any alphabet be made to represent numbers to any extent, say millions, without making their values dependent on their position?

2. In such a system of notation as we have supposed in the preceding question, what would be the use of the cipher?

3. How is it that a number expressed by six figures must be greater than one expressed by five figures, although the latter is composed of large digits, and the former of small ones?

N.B. The nine characters or figures employed in arithmetic are called *digits*, because men were, and still are, accustomed to count by the *digiti* or fingers. Of course, 9 is the largest digit, and 1 is the smallest.

4. Express by figures the number twelve thousand twelve hundred and twelve.

5. Arrange three points, so that they shall be equally distant from each other.

6. Arrange four points so that they shall be equally distant from each other.

7. Construct an isosceles triangle such, that each of its legs shall be double the base or third side.

8. The celebrated theorem of Pythagoras, which now forms the 47th proposition of the 1st book of Euclid's Elements of Geometry is, that "in any right-angled triangle the square described on the hypotenuse (see fig. 11, Lessons in Geometry, No. I.) is equal to the sum of the squares described on the other sides." In one of the latest and best editions of Euclid, it is asserted that "it is not indifferent on which sides of the lines which form the sides of the triangle the squares are described. If they were described upon the inner instead of the outer sides of the lines, the construction would be found to fail." Is this true?

ANSWERS TO CORRESPONDENTS.

G. P.—We are greatly obliged by his kind offer.

R. W. L.—We do not belong to the school he supposes.

M. N.—We inform him that the "Series of Lessons in French," reprinted from the *Working Man's Friend*, will, "by special permission of her Majesty's Postmaster-General," be transmitted free to any person's address on the receipt of *Seven Penny Stamps*, at this office.

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THE INFLUENCE OF MORALITY OR IMMORALITY ON THE COUNTENANCE.

We have taken the above engraving from a popular French publication, as it exhibits to the life what it was meant to illustrate. But what need have we to go to a literary institution or a French faubourg,* to become acquainted with the growth and development of humanity? We have only to look around us to discover that everywhere man is the same. Much has been said of the science of phrenology; but without depreciating the facts on which it is professedly based, we confess that we have a more profound faith in the doctrine of physiognomy. No one can deny that the "human face divine" has in it something expressive of that which enters into and constitutes the character of the man. It may come out in the eye, or the lip, or the nose, or the general contour of the countenance; but there it is, and no one can give himself to the closer and deeper study of this subject without being able, more or less correctly, to read the mysterious symbols of human character and destiny.

Carefully examine the above engraving. Look at the head and face of the child represented in the first figure. Who can divine what that young intelligence will become in the future of his life? Is there anything in his features to indicate that he will act a conspicuous part on the great wide stage of this world? Or is he to sink in the scale of intelligent being, till he takes on the mere animal nature, or, what is still worse, till he become the very personification of vice and sin? Even in the outlines of the infant countenance there may be the index of the future man. These outlines will become more marked and definite in the boy amid the studies and pursuits of the school. The period of boyhood is one of wondrous development; and if this were but carefully watched, the foundation might in many cases be laid for the erection of a true manly nobility; and that undermined, on which moral evil would otherwise rear her temple of darkness and impurity. Look at the eye, nose, and mouth of the boy as he is at school, or as he is located in one of the faubourgs of Paris, and who does not perceive, from the very contour of the countenance, that his destiny will very much depend on the influences by which he may be surrounded? In the one case, you see him pass into the higher and more polite circles of the educated classes, yielding himself to all the softening, subduing, refining elements of pure female society; and in the other, you see him trained and educated in a rebellious and revolutionary faubourg, rushing into the scenes of dissipation, and surrendering himself to all the worst agencies of a wicked world. In the one instance, you see him choosing his profession, and contemplating a settlement in life:—wedding himself to a virtuous, loving, and devoted woman, and in course of time becoming surrounded by a lovely and growing family, over which his presence sheds a warm and sunny cheerfulness;—in the other instance, you see the man emerging from the scenes of brutal intoxication to plunge into deeper, darker vices, till his conscience is burdened with guilt and misery, and life becomes a burden, from which he perhaps seeks relief in suicide; or it may be, that his conduct renders him obnoxious to law, and he comes to a premature death. If he be spared this tremendous fate, he comes to beggary, and goes down to the grave unlamented and unwept. How different this from the career of the man whose happiest days are spent in the bosom of his loving family, and who grows old amid the most genial influences, honoured, revered, beloved:—who sees his children's children under the third or the fourth generation, and who goes down to his last resting-place amid the prayers and tears of those he loved, and whose dying moments are cheered by the prospect of a happy reunion in a world where life is perfect, and joy complete.

* The low suburbs of a city, such as Paris.

LESSONS IN LATIN.—No. II.

By JOHN R. BEARD, D.D.

PRELIMINARY INSTRUCTIONS IN THE VERBS.

In the former lesson I had to employ the word *curro*, and in doing so I used particularly the form *curr*. This form is called the stem of the word. The stem of a word is that which contains its essential letters, or the letters which are necessary to make it what it is. Thus, *curr* is found in every form into which the verb *curro* passes. Observe that the second *r* is added merely to strengthen the word, or give force in pronunciation. You find this stem, *cur* or *curs*, for instance, in the English words *current*, *incur*, *concourse*, *concurrence*, *discourse*. Observe again, that many of our Latin words have come to us through the French. They have, therefore, entered the English in the form which they had received in the French. This is exemplified in *concourse* and *discourse*, where an *o* has been introduced by the French pronunciation, as these words come to us immediately from the French *concours* and *discours*.

The stem of a word is found generally by cutting off the final vowel or syllable. In *curro* you obtain the stem *curr* by taking away the *o*. The in reality is the sign of the first person singular, or *I*. The word for *I* is not prefixed in Latin, except when it is required for emphasis, because the terminations of the verb show clearly what person is meant—that is, whether it is the first person, *I*, or the second person, *thou*, or the third person, *he*. In the English there is a necessity for the constant use of the personal pronoun, because the endings of the verb are not so different from each other as in the Latin. Thus, in English, we say, *I* run, *thou* runnest, *he* runs, *we* run, *you* run, *they* run. Here, out of *six* persons, the verb has the same termination for *four*, namely, *I* run, *we* run, *you* run, *they* run. But for the pronouns *I*, *we*, *you*, *they*, the reader or auditor would not be aware from the use of the verb which person was intended. In the Latin, however, the verb has a peculiar ending for every person. After this explanation, we will call these terminations person-endings. These person-endings vary with the tense and the voice. That is, they are different in the past tense from what they are in the present tense; and they are different in the passive voice from what they are in the active voice. At present we will confine ourselves to the present tense and the active voice. In *curro*, the person-endings of the present tense, indicative mood, active voice, are as follow:—

PERSON-ENDINGS.

Singular.			*Plural.*	
1st person	*-o*,	I	1st person *-imus*,	we
2nd „	*-is*,	thou	2nd „ *-itis*,	ye
3rd „	*-it*,	he	3rd „ *-unt*,	they

Adding the person-endings to the stem, we have the following example:—

ACTIVE VOICE.—INDICATIVE MOOD.

PRESENT TENSE of the verb *curro*, I run.

1st person	curro, *I run*	1st person	curr*imus*,	*we run*
2nd „	curr*is*, *thou runnest*	2nd „	curr*itis*,	*you run*
3rd „	curr*it*, *he runs*	3rd „	curr*unt*,	*they run*

These person-endings vary also in another way, which I proceed to explain. Latin verbs are commonly divided into four classes, which bear the technical name of conjugations. This division may not be the best, but it is that which is customary, and therefore I retain it. These four classes or conjugations are determined or characterised by the vowel which precedes the termination *re* in the infinitive mood; thus:—

The first conjugation ends in ăre, as amāre, *to love*.
The second conjugation „ ēre, as docēre, *to teach*.
The third conjugation „ ĕre, as regĕre, *to rule*,
The fourth conjugation „ īre, as audīre, *to hear*.

We say then that the first conjugation is known by having *a* long before *re* of the infinitive; the second by having *e* long; the third by having *e* short; the fourth by having *i* long. The same fact may be put before you in a different way; thus, *a* long is characteristic of the first conjugation; *e* long, of the second; *e* short, of the third; *i* long, of the fourth. In general it may be remarked, that in the first conjugation *a* long prevails; in the second, *e* long prevails; in the third, *e* short prevails; and in the fourth, *i* long prevails.

Now *curro*, of which I have spoken before, is of the third conjugation. The person-endings in it will not therefore be the same as they are in the verb *amo*, I love. The person-endings in *amo* are *o*, *as*, *at*; *amus*, *atis*, *ant*. In the tables or paradigms (patterns), which I am about to give, the person-endings are printed in italics, as amo, am*as*, am*at*; you will therefore easily recognise them, and ought in all cases to repeat them until you have imprinted them on your memory.

FIRST CONJUGATION.

ACTIVE VOICE. PRESENT INDICATIVE. PERSON-ENDINGS.				PASSIVE VOICE. PRESENT INDICATIVE. PERSON-ENDINGS.			
Singular.		*Plural.*		*Singular.*		*Plural.*	
-o,	I	*-amus*,	we	*-or*,	I	*-amur*,	we
-as,	thou	*-atis*,	ye	*-aris*,	thou	*-amini*,	ye
-at,	he	*-ant*,	they	*-atur*,	he	*-antur*,	they

EXAMPLE.—Amare, *to love*; stem, *am*.

PRESENT ACTIVE INDICATIVE.		PRESENT PASSIVE INDICTATIVE.	
Singular.		*Singular.*	
1st per. Amo,	*I love.*	1st per. Amor,	*I am loved*
2nd „ Amas,	*thou lovest*	2nd „ Amāris,	*thou art loved*
3rd „ Amat,	*he loves*	3rd „ Amātur,	*he is loved*
Plural.		*Plural.*	
1st per. Amāmus,	*we love*	1st per. Amāmur,	*we are loved*
2nd „ Amātis,	*you love*	2nd „ Amāmini,	*you are loved*
3rd „ Amant,	*they love*	3rd „ Amantur,	*they are loved*

Observe then that in order to form any person, you must first get the stem, by cutting off the last syllable. Then to the stem thus obtained, add the proper person-ending. Suppose you have to deal with the verb *laudo*, *I praise*; and suppose you want to express in Latin, the English *they praise*; the way to proceed is—throw away the *o* in *laudo*; by so doing, you get *laud*; now, *they praise* is in the third person plural; the person-ending of the third person plural is *ant*, as shown above; subjoin *ant* to *laud*, and you have *laudant*, which means *they praise*. Or if you have to put *laudas* into English, by looking at the table you find that its termination, namely, *as*, is the person-ending of the second person singular, and consequently *laudas* means *thou praisest*. I have entered into this full and minute explanation once for all. If you take pains to make yourself master of it, you will not require its repetition. But take care not merely to consult the tables I give; you must commit them to memory; and never pass on until you have made them in each case your own. Having learnt the form or example, learn the vocabulary, and then put the Latin exercise into English, and the English exercise into Latin. Do this also from memory; but after you have done it, compare your translation with the table or example, and correct it accordingly.

Discover and write down the English representatives of the Latin words here used; that is to say, the English words derived from these Latin words. For instance, from *delecto*, *I delight*, we have *delight*, *delightful*, *delightfully*; from *orno*, *I adorn*, we have *ornament*, *ornamentally*, *adorn*, *adornment*; from *educo* (which properly means *I draw out*), we have *to educate*, *educator*, *education*. Do the same after every separate exercise.

What I have called "the characteristic" of the verb, may be called the *sign* of the conjugations. Thus, of the first conjugation *a* long is the sign, and *ĕ* is the sign of the third. These are *Latin* signs. Of the corresponding part of the English verb, *to* is the sign; that is, the preposition *to* is in general the English sign of the infinitive mood.

VOCABULARY.

Dēlecto, 1	*I delight*	Orno, 1	*I adorn*	Vexo, 1	*I grieve*
Ēdūco, 1	*I educate*	Salto, 1	*I dance*	Vītupĕro, 1	*I blame*
Laudo, 1	*I praise*	Tento, 1	*I try*	Vŭlnĕro, 1	*I wound*

EXERCISES—LATIN-ENGLISH.

Laudo; vītuperas; ornat; educāmus; vexātis; vŭlnerant; tentat; tentat saltāre; vulnerāris; vexātur; laudāmur; ornas educántur; vexāris; vulnerámini; delecto; delectas; delectat; delectámus; delectāris; delectant; delector; delectāris; delectātur; delectámur; delectámini; delectántur.

ENGLISH-LATIN.

I praise; thou praisest; he praises; we praise; you praise; they praise; I am praised; thou art praised; he is praised; we are praised; you are praised; they are praised; they delight; thou adornest; you are grieved; they are educated; he dances;

you are blamed; we try; you are tried; he is wounded; I am educated.

Now, before you go forward in this exercise, and in every other, ask yourself, and ascertain that you give the right answers to the following or similar questions; namely, of what conjugation is the verb *amo?* of what tense is *amo?* of what person is *amo?* of what number is *amo?* of what mood is *amo?* of what voice is *amo?* Do the same with all the rest.

Second Conjugation.

Active Voice. Present Indicative. Person-endings.				Passive Voice. Present Indicative. Person-endings.			
Singular.		*Plural.*		*Singular.*		*Plural.*	
-eo,	I	*-emus,*	we	*-eor,*	I	*-emur,*	we
-es,	thou	*-etis,*	ye	*-eris,*	thou	*-emini,*	ye
-et,	he	*-ent,*	they	*-etur,*	he	*-entur,*	they

Example.—Monére, *to remind;* stem, *mon.*

Present Active Indicative.				Present Passive Indicative.			
	Singular.				*Singular.*		
1st per.	Moneo,	*I remind*		1st per.	Moneor,	*I am reminded*	
2nd ,,	Mones,	*thou remindest*		2nd ,,	Moneris,	*thou art reminded*	
3rd ,,	Monet,	*he reminds*		3rd ,,	Monetur,	*he is reminded*	
	Plural.				*Plural.*		
1st per.	Monemus,	*we remind*		1st per.	Monemur,	*we are reminded*	
2nd ,,	Monetis,	*you remind*		2nd ,,	Monemini,	*you are reminded*	
3rd ,,	Monent,	*they remind*		3rd ,,	Monentur,	*they are reminded*	

Vocabulary.

Debĕo, 2	*I owe*	Mordĕo, 2	*I bite*	Timĕo, 2	*I fear*
Docĕo, 2	*I teach*	Movĕo, 2	*I move*		
Exercĕo, 2	*I exercise*	Parĕo, 2	*I obey*	Et means	*and*
Florĕo, 2	*I flourish*	Tacĕo, 2	*I am silent*		
Gaudĕo, 2	*I rejoice*	Terrĕo, 2	*I frighten*	Si means	*if*

Exercises—Latin-English.

Debes; docet; exercétur; florémur; gaudémini; mordentur; movémus; movétis; movent; tímes; timet; terrétur; terrémini; debeo; parére; si paretis laudámini; si tacemus laudámur; docéris et docéris; tacent et laudántur; mordeor et vulneror; si vulneras vituperáris.

English-Latin.

Thou fearest and art frightened: if I am silent I am blamed; he rejoices; we rejoice; they rejoice; he tries to bite; we try to educate; thou obeyest and art praised; we bite; if we bite we are blamed; they exercise; you are moved; he dances; they are delighted; you are adorned.

N.B. In this exercise, and in those which follow, words and forms previously given are repeated for the sake of practice.

Third Conjugation.

Active Voice. Present Indicative. Person-endings.				Passive Voice. Present Indicative. Person-endings.			
Singular.		*Plural.*		*Singular.*		*Plural.*	
-o,	I	*-imus,*	we	*-or,*	I	*-imur,*	we
-is,	thou	*-itis,*	ye	*-eris,*	thou	*-imini,*	ye
-it,	he	*-unt,*	they	*-itur,*	he	*-untur,*	they

Example.—Règĕre, *to rule* or *guide;* stem, *reg.*

Present Active Indicative.				Present Passive Indicative.			
	Singular.				*Singular.*		
1st per.	Rego,	*I rule*		1st per.	Regor,	*I am ruled*	
2nd ,,	Regis,	*thou rulest*		2nd ,,	Regĕris,	*thou art ruled*	
3rd ,,	Regit,	*he rules*		3rd ,,	Regitur,	*he is ruled*	
	Plural.				*Plural.*		
1st per.	Regimus,	*we rule*		1st per.	Regimur,	*we are ruled*	
2nd ,,	Regitis,	*you rule*		2nd ,,	Regimini,	*you are ruled*	
3rd ,,	Regunt,	*they rule*		3rd ,,	Reguntur,	*they are ruled*	

Vocabulary.

Cedo, 3	*I yield*	Lego, 3	*I read*	Scribo, 3	*I write*
Defendo, 3	*I defend*	Occido, 3	*I slay*	Vinco, 3	*I conquer*
Diligo, 3	*I love*	Decido, 3	*I fall*	Bene means	*Well*
Fallo, 3	*I deceive*	Pingo, 3	*I paint*	Male ,,	*Ill*
Laedo, 3	*I injure*	Pungo, 3	*I prick*	Valde ,,	*Much*

Exercises.—Latin-English.

Fallis; fallĭtur; fallimur; fallo et vituperor; cedit; legis; scribit; bene legit; valde fallis; si diligitur gaudet; pungimur; vincis; vincímur; vincuntur; decídit; occídis; si occídis vituperáris; bene monet; male educáris; movémur valde; saltámus et gaudémus; laeditur; laedimini; defenditis; defenduntur; diligor.

English-Latin.

I obey; if I obey; I am loved; he is loved much, he writes well; they paint ill; they dance well; I rejoice if he reads much; thou paintest; they obey and are praised; if you rule well you are loved; they defend; you are defended; he is deceived; they are pricked.

Fourth Conjugation.

Active Voice. Present Indicative. Person-endings.				Passive Voice. Present Indicative. Person-endings.			
Singular.		*Plural.*		*Singular.*		*Plural.*	
-io,	I	*-imus,*	we	*-ior,*	I	*-imur,*	we
-is,	thou	*-itis,*	ye	*-iris,*	thou	*-imini,*	ye
-it,	he	*-unt,*	they	*-itur,*	he	*-iuntur,*	they

Example.—Audire, *to hear;* stem, *aud.*

Present Active Indicative.				Present Passive Indicative.			
	Singular.				*Singular.*		
1st per.	Audio,	*I hear*		1st per.	Audior,	*I am heard*	
2nd ,,	Audis,	*thou hearest*		2nd ,,	Audiris,	*thou art heard*	
3rd ,,	Audit,	*he hears*		3rd ,,	Auditur,	*he is heard*	
	Plural.				*Plural.*		
1st per.	Audimus,	*we hear*		1st per.	Audimur,	*we are heard*	
2nd ,,	Auditis,	*you hear*		2nd ,,	Audimini,	*you are heard*	
3rd ,,	Audiunt,	*they hear*		3rd ,,	Audiuntur,	*they are heard*	

Vocabulary.

Custodio, 4	*I guard*	Fulcio, 4	*I support*	Venio, 4	*I come*
Dormio, 4	*I sleep*	Nutrio, 4	*I nourish*	Vestio, 4	*I clothe*
Erudio, 4	*I instruct*	Punio, 4	*I punish*	Vincio, 4	*I conquer*
Ferio, 4	*I strike*	Reperio, 4	*I find*	Cur, means	*Why?*

Exercises.—Latin-English.

Custódis; fulcítur; venit; cur dormis? bene dormit; eruditur; pungis; occídit; valde fallis; auditur; si valde dormis puníris; repĕrit; si bene erudis laudáris; vincítur; cur taces? tacet et punítur; reperiuntur; vestíris; bene vestiuntur; si bene vestímini delectamini; male eruditur; si vincéris vincíris.

English-Latin.

Why do you slay? he is guarded; they guard; if you are guarded you are conquered; he blames and punishes; he hears and is instructed; you are well educated; thou sleepest much; they read; if you dance you are delighted; he is supported; why are they punished? they are heard; I am clothed ill; they are struck and reminded.

Recapitulation—Terminations or Person-endings of the Four Conjugations.

Indicative Mood, Present Tense.

	Active Voice. *Singular.*				Passive Voice. *Singular.*			
	1.	2.	3.	4.	1.	2.	3.	4.
1st per.	-o	-eo	-o	-io	1st per. -or	-eor	-or	-ior
2nd ,,	-as	-es	-is	-is	2nd ,, -ris	-ris	-ris	-iris
3rd ,,	-at	-et	-it	-it	3rd ,, -tur	-tur	-itur	-itur
	Plural.				*Plural.*			
1st per.	-imus	-emus	-imus	-imus	1st per. -mur	-mur	-imur	-imur
2nd ,,	-itis	-etis	-itis	-itis	2nd ,, -mini	-mini	-imini	-imini
3rd ,,	-ant	-ent	-unt	-iunt	3rd ,, -ntur	-ntur	-untur	-iuntur

Recapitulatory Exercises—Latin-English.

Cedo; legis; movémus; exercéris; mordent; florent fallor; legĕre tentat; cur male legis? dormit male; valde diligĕris; vincímini; bene scribunt; si bene pingítis laudámini; defendímur; ferímus; cur punítis? vestímur; vincímus; vincímur; vincímur; vincítis; custodíris; ornátur; laudantur; timémur; valde times; mordémini; educámus; male saltant.

English-Latin.

They yield; if you yield you are conquered; if you are conquered you are bound; I am supported; they sleep; why do they punish? why are they punished? you are clothed ill; thou conquerest; thou art conquered; thou bindest; thou art bound; they prick; they are pricked; why dost thou move?

As in the exercises which are immediately to follow, we shall have occasion for parts of the verb esse *to be*, I shall here lay before you so much of that verb as may be necessary for my purpose.

The Verb Esse, *to be.*

Indicative Mood—Present Tense.

	Singular.			*Plural.*		
1st per.	Sum,	*I am*	1st per.	Sumus,	*we are*
2nd ,,	Es,	*thou art*	2nd ,,	Estis,	*you are*
3rd ,,	Est,	*he is*	3rd ,,	Sunt,	*they are*

[illegible]

LESSONS IN ARITHMETIC.—No. III.

DEFINITIONS AND SIGNS.

In arithmetic. There are four different methods of performing calculations with numbers, and these are usually called the *four common rules*, namely, *Addition*, *Subtraction*, *Multiplication*, and *Division*.

Addition is the process by which we collect several numbers into one, which is called their sum.

In order to shorten the language of arithmetic, a character has been invented which is called the *sign of addition*; it is in the form of an upright cross, thus +; and its name is *plus* or *more*, signifying *added to*. It is placed between two or more numbers to denote that their sum is to be found: thus, 6 + 7 make 13; 4 + 6 + 10 make 20; and so on. In these examples, the number 13 is the sum of the numbers 6 and 7; and the number 20 the sum of the numbers 4, 6, and 10.

Another character has been invented, which is called the *sign of equality*; it is in the form of two small parallel strokes, thus =; and its name is *equation*, signifying *that which is*, or *is made*, *equal to*. It is placed between numbers, or combinations of numbers, to denote that the expressions or numbers on each side of it are equal: thus, 6 + 7 = 13, means 6 added to 7 is equal to 13; and 4 + 6 + 10 = 20, means 4 added to 6 added to 10 is equal to 20; and so on.

Subtraction is the process by which we find the *difference* between any two numbers; the *difference* signifies the number which must be added to the smaller of two numbers to make the *sum* equal to the other number.

A character has also been invented, which is called the *sign of subtraction*; it is in the form of a small horizontal line, thus —; and its name is *minus* or *less*, signifying *made less by*. It is placed between two numbers, of which the greater stands on the left, to denote that their difference is to be found: thus, 14 − 6 = 8, means 14 made less by 6 is equal to 8. In this example, the number 8 is the *difference* between the numbers 14 and 6.

Multiplication is the process by which we find the sum of one number repeated *as many times* as there are units in another number; the two numbers are called *factors*, the former being called the *multiplicand*, and the latter the *multiplier*; and the sum *thus* obtained is called the *product* of both numbers, or the *multiple* of either.

A character has been invented, which is called the *sign of multiplication*; it is in the form of an oblique cross, thus ×; and its name is *into*, or *times*, signifying *multiplied by*. It is placed between two or more numbers to denote that their product is to be found: thus, 6 × 7 = 42, means that 6 times 7 is equal to 42; and 4 × 6 × 10 = 240, means that 4 times 6 times 10 is equal to 240; and so on. In these examples, the number 42 is the product of the factors 6 and 7, or a multiple of 6 or 7; and the number 240, the product of the factors 4, 6, and 10, or a multiple of 4, 6, or 10. In the former example, the number 6 may be the multiplicand, and the number 7 the multiplier; or, conversely, the number 7 the multiplicand, and the number 6 the multiplier.

Division is the process by which we find *how many times* one number is contained in another; the former number being called the *divisor*, the latter the *dividend*, and the number of times the *quotient*.

A character has been invented, which is called the *sign of division*; it is like the sign of subtraction, with this difference, that when the dividend stands on the left, and the divisor on the right of it, the horizontal line has a dot above it and a dot below it, thus ÷; and its name is *upon* or *by*, signifying *divided by*. It is placed between two numbers to denote that their quotient is to be found: thus, 12 ÷ 4 = 3, means that 12 divided by 4 is equal to 3. In this example, the number 12 is the dividend, the number 4 the divisor, and the number 3 the quotient. In the use of this sign, the greater number is always placed on the left.

In the use of the sign of division, the dots may be dispensed with, if we write the divisor above and the dividend below the horizontal line, thus $\frac{12}{4} = 3$. This mode of representing division is very useful in the doctrine of fractions; also in the theory of proportion, where the quotient 3 is called the ratio of 12 to 4.

Another very common method of representing the operation of division, is that of omitting the horizontal line, and using only the dots: thus, 12 : 4 = 3, which also means 12 divided by 4 is equal to 3. This method is very generally used in the theory and practice of proportion. Hence, when the *ratio* of two numbers is equal to that of other two numbers, the equality of the *ratios* is represented thus, 12 : 4 = 15 : 5, and is read thus, the ratio of 12 to 4 is equal to the ratio of 15 to 5. Such an expression as this constitutes what is called an *analogy* or *proportion* in arithmetic, the equality of the quotients or ratios being the test of the proportionality of the four numbers. A proportion, however, is more frequently written thus, 12 : 4 :: 15 : 5; where the four points in the middle signify nothing more than *equality*, being a substitute for the sign called by us *equation*. Indeed, the four points may be considered as the four extremities of the two parallel lines which form the *sign of equality*. This expression is commonly read thus: as 12 is to 4, so is 15 to 5; or thus, 12 is to 4, as 15 is to 5.

In performing the process of addition of numbers, it is plain that until we have gained some experience by practice, we must be content to use pebbles, stroke-marks, or our fingers, if we wish to know the sum of two or more numbers. Nor is this method to be despised, although school-boys have been foolishly punished for it. Every one is not born to be a genius or a *calculating boy*; and yet every one requires to count; every one has occasion to use the process of *simple addition*. In order to render pebbles, marks, or fingers unnecessary, we request our young readers to learn the following table by heart:—

ADDITION TABLE.

	1	2	3	4	5	6	7	8	9
1	2	3	4	5	6	7	8	9	10
2	3	4	5	6	7	8	9	10	11
3	4	5	6	7	8	9	10	11	12
4	5	6	7	8	9	10	11	12	13
5	6	7	8	9	10	11	12	13	14
6	7	8	9	10	11	12	13	14	15
7	8	9	10	11	12	13	14	15	16
8	9	10	11	12	13	14	15	16	17
9	10	11	12	13	14	15	16	17	18

This table is to be read and learned thus: keeping the top or upper horizontal line (which begins with 1 and ends with 9) constantly before the eye, take any figure in the *left hand vertical* or *upright column* (which also begins with 1 and ends with 9), *say* 3, and adding it in succession to the figures in the top line, you will find the *sum* in the same horizontal line *with* 3, immediately under the figure to which it is added: thus, 3 and 1 make 4, 3 and 2 make 5, 3 and 3 make 6, 3 and 4 make 7, &c. In like manner, if you *take* 9, and add it in succession, you will have 9 and 1 make 10, 9 and 2 make 11, 9 and 3 make 12, and so on, till you come to 9 and 9 make 18, which is the last *sum* in the table

To render this table useful in the addition of higher numbers than it contains, certain considerations will be necessary. If we suppose each of the figures in the *left hand upright column* to be increased by 10—that is, to have the figure 1 placed on its left, as the place of tens—then the sum of each number so increased, when added to the figures in the top line, will be found in the same manner as before,—provided every figure denoting only *units* in the table of *sums* be increased by 10, or have the figure 1 placed to the left of it, and every number with 1 placed to the left of it, have the figure 2 placed to the left of it instead of the figure 1, and be read accordingly. For example if the figure 4, *in the left hand vertical column*, is supposed to be 14, then the numbers in the same line with it will become 15, 16, 17, 18, 19, 20, 21, 22, and 23; and, accordingly, we read this line of the table in connexion with the top line, thus: 14 and 1 make 15, 14 and 2 make 16, 14 and 3 make 17, and so on, till we come to 14 and 9 make 23. The same may be done with any other number as far as 19; so that the last sum obtained in this way will be that of 19 and 9, which make 28. This plan may be extended to all numbers from 20 to 30, from 30 to 40, &c., by making the corresponding changes on the sums in the table: thus, to find the sum of 27 and 9; we have in the table 7 and 9 make 16; now increasing the latter by 20—that is, putting the figure 3 in the place of the figure 1, we have 27 and 9 make 36, and so on.

The *addition table* may also be employed as a *subtraction table*, in the following way. Suppose we wish to know the *difference* between a given digit and any number greater than itself, but less than the sum of itself and the number 10. Look for the given digit in the *left hand vertical column*, and in the same horizontal line with it for the proposed number; then, immediately above this number in the same vertical column with it, at the top, you will find the required *difference*. Thus, the difference between 7 and 13 is found to be 6; for 13 is in the same horizontal line with 7, and above 13 stands 6 in the same vertical column at the top. For finding the *differences* between any digit and numbers greater than the sum of that digit and the number 10, an arrangement might be made similar to that which is done for finding the *sums* of numbers beyond the limits of the table; but in the practice of arithmetic this arrangement is not required, and therefore we do not recommend its adoption.

In performing the process of multiplication of numbers, it is evident that unless we have some method of shortening the process, it will be necessary to put down the *multiplicand* as many times as the *multiplier* denotes, and find the *product* by addition. Thus, if you wish to know what is the product of 6 and 7; by making 6 the multiplicand, and 7 the multiplier, repeating the former as many times as the latter denotes, and performing the addition indicated by the following expression, 6 + 6 + 6 + 6 + 6 + 6 + 6 = 42, you will obtain the product; for 6 and 6, make 12; 12 and 6, make 18; 18 and 6, make 24; and so on, until 36 and 6, make 42. Or, by making 7 the multiplicand, and 6 the multiplier, repeating the former as often as there are units in the latter, and performing the addition indicated by the following expression, 7 + 7 + 7 + 7 + 7 + 7 = 42, you will obtain the product. But this process, even in small numbers, were it performed every time a product was required, would be too laborious and irksome. In order, therefore, to render this process unnecessary, the following *multiplication table* has been invented; and we most earnestly request our readers who are not acquainted with it, to commit it to memory. On a knowledge and complete command of this table, depends all future progress in arithmetic and mathematics, and to some, perhaps, in the business of life.

MULTIPLICATION TABLE.

	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9
2	2	4	6	8	10	12	14	16	18
3	3	6	9	12	15	18	21	24	27
4	4	8	12	16	20	24	28	32	36
5	5	10	15	20	25	30	35	40	45
6	6	12	18	24	30	36	42	48	54
7	7	14	21	28	35	42	49	56	63
8	8	16	24	32	40	48	56	64	72
9	9	18	27	36	45	54	63	72	81

This table is to be read and learned thus: keeping the top or upper horizontal line (which begins with 1 and ends with 9) constantly before the eye, take any figure in *the left* hand upright column, (which also begins with 1 and ends with 9),

say 3, and multiplying it in succession by the figures in the top line, you will find the *product* in the same horizontal line *with* 3, immediately under the figure by which it is multiplied; thus, 3 times 1, make 3; 3 times 2, make 6; 3 times 3, make 9; 3 times 4, make 12, &c. In like manner, if you *take* 9, and multiply it in succession, you will have 9 times 1, make 9; 9 times 2, make 18; 9 times 3, make 27; and so on, till you come to 9 times 9, make 81, which is the last *product* in the table.

To render this table useful in the multiplication of higher numbers than it contains, the rules of multiplication must be learned; but we may extend its power to the multiplication of digits by tens, digits by hundreds, &c. If we suppose each of the figures in *the left hand vertical column* to be tens, that is, to have a cipher placed on its right, then the product of each number so increased in value, when multiplied by the figures in the top line, will be found in the same manner as before—provided every number in the table of *products* be increased ten times, or have one cipher placed to the right of it, and be read accordingly. For example, if the figure 4, in the left hand vertical column, is supposed to be 40, then the numbers in the same line with it will become 40, 80, 120, 160, 200, 240, 280, 320, and 360; and accordingly, we read this line of the table in connexion with the top line, thus: 40 times 1, make 40; 40 times 2, make 80; 40 times 3, make 120; and so on, till we come to 40 times 9, make 360. The same may be done with any other number as far as 90; so that the last product obtained in this way will be that of 90 times 9, which makes 810. This plan may be extended to all numbers from 100 to 1000; from 1000 to 10,000, &c., by making the corresponding changes on the products in the table; thus, to find the product of 700 and 9; we have in the table 7 times 9, make 63; now, multiplying the latter by 100, that is annexing two ciphers, we have 700 times 9, make 6300, and so on.

The Multiplication Table may be also employed as a *Division Table* in the following way. Suppose we wish to know the *quotient* of any number divided by a given digit, the number being a multiple of that digit, and less than its product by the number 10. Look for the given digit in *the left hand upright column*, and in the same horizontal line with it, for the proposed number; then, immediately above this number in the same vertical column with it, at the top, you will find the required *quotient*. Thus, the quotient of 42 divided by 7 is found to be 6; for 42 is in the same horizontal line with 7, and above 42 stands 6, in the same vertical column at the top.

To render this table useful in the division of higher numbers than it contains, the rules of Division must be learned; but we may extend its power to the division of decimal multiples of the digits. If we suppose each of the numbers or products in the table, to have one or more ciphers placed on its right hand, then the *quotient* of each number so increased in value, when divided by the digits in the left hand column, will still be found in the same vertical column at the top as before—provided this *quotient* has the same number of ciphers placed on its right hand, as are found in the proposed number. For example, if the number 1500 is to be divided by 5; then, looking for 15 in the same horizontal line with 5, we find 3 in the same vertical column at the top; hence, annexing two ciphers to the number 3, we have 300 for the quotient of 1500 divided by 5; and so on.

Questions on the preceding Lesson.

What are called the four common rules in arithmetic? What is addition? What is the sign of addition, and its name? Give an example of its application?

What is the sign of equality, and its name? Give an example of its application? What is the result of addition called?

What is subtraction? What is the sign of subtraction, and its name? What is the result of subtraction called? Give an example of the application of the sign.

What is multiplication? What is the sign of multiplication, and its name? What are the numbers to be multiplied together called, individually and conjointly? What is the result of multiplication called? What is the meaning of multiple? Give an example of the application of the sign?

What is division? What is the sign of division, and its name? How is the sign varied in its application? Give examples of each application?

What is the meaning of ratio? of quotient? What is the test of proportionality?

What is the use of the addition table? What is the use of the multiplication table? What is 80 times 7? what 700 times 6? What is the quotient of 450 by 9? of 3600 by 6?

LESSONS IN BOTANY.—No. I.

The term *Botany* is derived from the Greek word *Botane*, which literally signifies *pasture or grass*; hence it may properly be defined as *the science of plants*.

Plants appear to have been profusely scattered over the globe, like the stars in the firmament, to invite us by the united attraction of curiosity and pleasure to their contemplation. But the radiant orbs of heaven are placed at an immense distance from us; to study them aright requires much and varied knowledge; and optical instruments of great power and value are needed to bring them within our scope. Plants, on the contrary, grow under our feet; they are easily gathered by the hand, and a needle, a magnifying-glass, or at most a pocket-microscope, is all the apparatus required for their ordinary examination.

Hill and dale, the broad expanse of waters, luxuriant verdure, and the variety of seasons with their successive productions, form a diversified drama, a continually shifting scene, which never cloys, and always delights the intelligent observer.

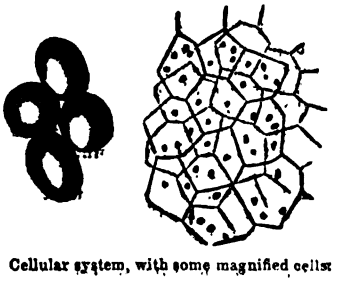
The botanist, in his walks, pleasantly glides from object to object; every flower he observes excites in him curiosity and interest; and as soon as he comprehends the manner of its structure and the rank it holds in the system of nature, he enjoys an unalloyed pleasure, not less vivid because it costs him neither expense nor trouble. For the botanist, indeed, there is no solitude; wherever he wanders he finds plants which will amply reward his most attentive examination. Often will he be charmed with beauty and regaled by fragrance; but even where these are not, gratification and knowledge await his researches.

> "——— Not a tree,
> A plant, a leaf, a blossom, but contains
> A folio volume. We may read and read,
> And read again; but still find something new;
> Something to please, and something to instruct,
> E'en in the noisome weed."

In short, every part of the vegetable kingdom may exalt his conception of the Supreme Being, of whose wisdom, power, and goodness it presents most striking exemplifications.

In plants we discover, on attentive examination, a beautiful arrangement of tissues. If, for instance, we take a thin transverse slice of the stem of any plant, and then put it in a drop of water, and place it under a microscope, we shall see it chiefly consists of cells, more or less regular, resembling those of a honey-comb, or, to suggest the idea of a still more delicate fabric, a network of cobweb (see fig. 1). Their size varies in different plants, and in different parts of the same plant; and they are sometimes so minute as to require a million of cells to cover a single square inch of surface. This singular and beautiful structure, besides containing water, fluid, and air, is the store-house of the plant's various secretions; by its means the sap is diffused, and by it many changes occur in the juices it holds.

Fig. 1.



Cellular system, with some magnified cells.

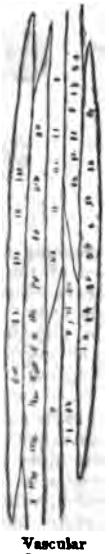
The vascular system consists of another set of small vessels. If a branch be cut transversely, early in the spring, the sap will ooze out from numerous points over the whole of the cut surface, except that part which the pith and the bark occupy (see fig. 2). And if a twig, on which the leaves are already unfolded, be cut from the tree, and placed with its cut end in a watery solution of Brazil wood, the colouring

matter will ascend into the leaves and to the top of the twig. In both cases, a close examination with a powerful microscope, will show that the sap perspires from the divided portion of the stem, and that the colouring matter rises to the top of the twig through real tubes. These are the sap, or conducting vessels of the plant.

But if we examine a transverse section of the vine, or of any other tree at a later period of the season, we find that the wood is comparatively dry, whilst the bark, particularly that part next the wood, is swollen with fluid. This is contained in vessels of a different description from those in which the sap rises; they are found only in the bark, in trees, and may be called returning vessels, from their carrying the sap downwards, after its preparation in the leaf. The passage of the sap has been thought to take place, like that of the blood in the human frame, from the regular expansion and contraction of the vessels; but their extreme minuteness seems to render certainty impossible. Their diameter seldom exceeds a 290th part of a line, or a 3000th part of an inch. Leuwenhoeck reckoned 20,000 vessels in a particle of an oak about one-nineteenth of an inch square.

Other vessels of a plant are called tracheæ; they are formed of membraneous tubes, tapering at each end, and either

Fig. 2.



Vascular System.

Fig. 3.

The Tracheæ.

Fig. 4.

Spiral Vessels.

Fig. 5.

The seed.

having a fibre coiled up spirally in their interior, or having the membrane marked with rings, bars, or dots, arranged in a more or less spiral form (see fig. 3). The fibre is generally single, but sometimes numerous fibres, varying from two to more than twenty, are united together, assuming the appearance of a broad riband. The fibre is elastic, and can be unrolled. If, for example, a leaf of a pelargonium be taken, and after a superficial cut is made round the stalk, the parts be pulled gently asunder, the fibres will appear like the threads of a cobweb.

Spiral vessels occur principally in the higher classes of plants, and are well seen in annual shoots, as in asparagus; in the stems of bananas and plantains, where the fibres may be pulled out in handfuls, and used as tinder; and in many aquatic plants (see fig. 4). In hard woody stems, they are principally found in the sheath surrounding the pith, and they are traced from it into the leaves. They are rarely found in the wood, bark, or pith. Spiral vessels occasionally have a branched appearance.

Every perfect plant, whether an annual, a biennial, or a perennial, whether an herb, a shrub, or a tree, is raised from seed. A seed is composed of several parts, of which one is the germ of the future plant (see fig. 5). As folded up in the seed the germ is exceedingly delicate and brittle; to touch it, is to break it; yet, so carefully is it protected that seeds are often rudely handled, thrown on the ground, tossed into sacks, and shovelled into heaps, without the germ suffering the slightest injury.

If a garden-bean be selected for examination, and the covering be removed, the substance of the seed may be easily divided into the two seed-lobes (see fig. 6). These lobes are united by a small point, like the tongue of a buckle: this is the germ. And then, it should be particularly remarked, that it is placed in a soft or fleshy substance, to yield it nutriment, before support can be derived from the surrounding soil. Of this, the cocoa-nut, the seed of the future tree—rising to the height of seventy or eighty feet, while from its summit shoot forth from twenty to thirty vast leaves, some of which are six or seven yards in length, hanging in a graceful tuft all round the trunk—may be taken as an example. The milk it contains is the nutriment of the young plant, just as the yolk of the egg is the early food of the chicken till it is fully developed, and provision can be readily picked up by its mother and itself.

Fig. 6.

The Garden Bean.

The germ consists of two parts; the plume, which rises and forms the future stem: and the radicle which descends, and becomes the root. Astonishing, indeed, is the ascent of the one and the descent of the other. It is, in fact, an effort of the plume to get into the air, and of the radicle to enter the earth. These results would even occur were the germ placed on the roof of a cave, or in an inverted flower-pot (see fig. 7).

Fig. 7.

The Root.

The root is not only designed to fix the plant in the soil, but to become a channel for the conveyance of nourishment. It is therefore provided with pores or spongioles as they are called, from their resemblance to a small sponge, that they may suck up whatever comes within their reach, just as a lump of sugar absorbs the liquid in which it is placed. Roots are various in their form, and consequently adapted to a great variety of soils and circumstances. A curious fact is observable in the history of the orchis. One of its two lobes perishes annually, and the other shoots up on the opposite side; as therefore, the stem rises every spring from between the two, the plant moves a little onward every year.

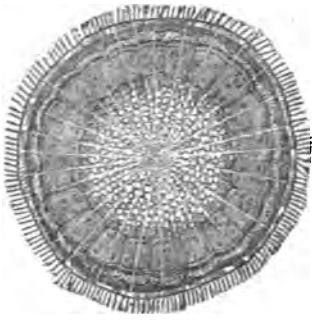
From the ground, the root draws forth the necessary aliment of the plant, namely, carbonic acid, ammonia, and alkaline salt contained in water. The elements of carbonic acid (oxygen and carbon), of ammonia (hydrogen and azote), of water (oxygen and hydrogen), uniting with the atmospheric influence, produce the plant. Carbonic acid and water form the cellular system, the wood, the saccharine matter, the gum, &c. An excess of oxygen produces all acid vegetables; an excess of hydrogen the oily and resinous plants. The azote of ammonia, together with water and carbonic acid, give birth to the alkaline vegetables.

One large class of the vegetable kingdom is formed of those products where the growth of the plant takes place by additions from without; or by external increase, and they are termed *Exogenous*, from two Greek words which describe their so doing. A stem of this kind characterises the trees of this country. It consists of a cellular and vascular system; the former including the bark, medullary rays, and pith; the latter, the inner bark, woody layers, and medullary sheath. In the early stage of growth the young stem of this kind is entirely cellular; but before long, tubes appear, forming

bundles having the appearance of wedges, arranged in a circle round a central cellular mass of pith, which is connected with the bark by means of the medullary rays.

To explain this more fully, if we cut horizontally the branch of a tree, the pith will be observed in the centre (see fig. 8). This part of trees and plants during their early development, is circular; so also are cotton and rice paper. The pith is developed in an upward direction, the cells diminishing in size towards the circumference, and being often hexagonal. In the young plant it occupies a larger portion of the stem, and sends cellular processes outwards at regular intervals to join the medullary rays. The pith has at first a greenish hue, and is full of fluid, but in course of time it becomes pale-coloured, dry, and full of air. The extent of pith varies in different plants, and in different parts of the same plant. Immediately surrounding the pith is a layer of a greenish hue, the medullary sheath, from which the medullary rays proceed towards the circumference, dividing the vascular circle into numerous compact segments, which consist of woody vessels, and of others which are porous. These are surrounded by a moist layer of greenish cellular tissue, called the cambium layer, which is covered by three layers of bark, the whole being inclosed by the epidermis.

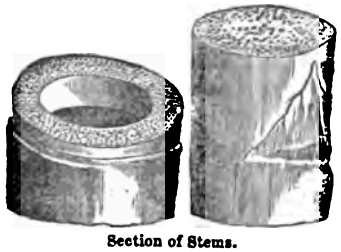
Fig. 8.



Section of a Branch.

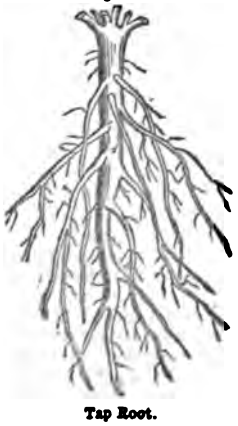
Another large primary class into which the vegetable kingdom is divided, is called *Endogenous*, in consequence of its new woody matter being constantly developed in the first instance towards the interior of the trunk, only curving outwards in its subsequent course downwards. To this class belong palms, grasses, rushes, and liliaceous plants. In such instances the vascular bundles are scattered through the cellular tissue, and there is no distinction of pith, wood, bark, and medullary rays. In the young state, the centre of the stem is occupied entirely by cells, which may be said to represent pith, and around this the vessels are seen increasing in number towards the circumference (see fig. 9). The central cellular mass has no medullary sheath. In some instances its cells are ruptured, and disappear during the process of growth, leaving a hollow cavity, as seen in the engraving; but in general it remains permanent, and is gradually encroached upon by the development of the vascular system.

Fig. 9.



Section of Stems.

Fig. 10.



Tap Root.

Externally, roots have a cellular covering of a delicate texture. Internally, they consist partly of cells, and partly of vascular bunches, in which there are no vessels with fibres which can be unrolled. The axis of the root gives off branches which divide into radicles or fibrils, the extremities of which are called spongioles, or spongelets. When the central axis goes deep into the ground in a tapering manner, without dividing, a *tap root* is produced, of which there is an engraving, and of which the carrrot will afford a familiar examp'e (see fig. 10).

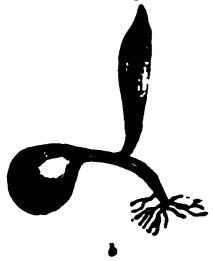
When the descending axis is very short, and at once divides into thin, nearly equal, fibres, the root is called fibrous, as in many grasses. When the fibrils become short and succulent, the root, as in fig. 11, is said to be *fasciculated* and when some of the fibrils are developed in the form of tubercles, containing starchy matter, as in the orchis, it is described as *tubercular* (see fig. 12).

Fig. 11.

Fasciculated Root.

Fig. 12.

Tubercular Root.



b

c

The term *cotyledon*, from a Greek word meaning a hollow or cavity, is applied to the perishable lobe of the seed of plants, which encloses and nourishes the embryo. Some seeds have two lobes; others one only, and others none. On this fact is founded the tripartite division of the vegetable kingdom into *dicotyledonous* (*a*), plants with seeds having *two* lobes; *monocotyledonous* (*b*), plants with seeds having *one* lobe; and *acotyledonous*, plants (*c*) with seeds without lobes (see fig. 13).

If a leaf be examined by a powerful glass, in its early state, there will appear what all the art of man can never produce. Springing from the inner bark are short and thick vessels to form the mid-rib of the leaves, while others of a delicate texture issue from either side. A juice flowing from the vessels of the bark appears on them in little bladders; these are covered by fibres and another row of bladders; and so the process goes on, till a fine cuticle or skin covers the whole. When the leaf is nearly complete, the edges, on being opened, show a double row of bright bubbles; these generally divide, and when no longer wanted, dry up, and leave horny points. A leaf, in general, consists of a flat, expanded portion, called the *blade*, of a narrower portion called the *petiole*, or stalk, and sometimes of a portion at its base, called the sheath (see fig. 14).

Fig. 14.

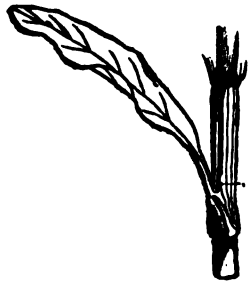
Section of a Leaf.

Compound leaves are those in which the divisions extend to the mid-rib, or petiole, and receive the name of leaflets. The mid-rib or petiole has thus the appearance of a branch, with separate leaves attached to it; but it is considered properly as one leaf, because in its early stage it arises from the axis as a single piece, and its subsequent

divisions, in the form of leaflets, are all in one plane. When a compound leaf dies, it usually separates as one piece.

Leaf-buds contain the rudiments of branches, and are found in the *axil* of previously formed leaves; that is, in the angle formed between the stem and the leaves (see fig. 15.) According to the nature of the stems, leaf-buds are either aerial or subterranean; the former occurring in plants which have the stems above ground, the latter in those in which the stems are covered. In the case of asparagus and other plants which have a perennial stem below ground, subterranean buds are annually produced, which appear above ground as shoots, or branches covered with scales at first, and ultimately with new leaves. A good example of a subterranean bud occurs in the bulb, as seen in the hyacinth, lily, and onion.

Fig. 15.



Leaf-bud.

Flower-buds, like leaf-buds, are produced in the axil of leaves, which are called floral leaves or bracts. In ordinary circumstances a flower-bud has not any power of extension by the development of its central cellular portion, and in this respect it differs from the leaf-bud. Sometimes the expansion of the flowers takes place from the base to the apex, or from the circumference to the centre. When this kind of inflorescence produces many flowers, it is simple, and proceeds from the development of the flower-buds of a single branch.

Fig. 16.

Raceme.

Fig. 17.

Corymb.

Fig. 18.

Thyrsus.

Fig. 19.

Spike.

Fig. 20.

Catkin.

In other instances a *raceme*, or cluster (fig. 16) is produced, as in the hyacinth, currant, and barbery. If the secondary floral axis gives rise to tertiary ones, the raceme is branching, and forms a *panicle*. If the peduncles in the middle of a dense panicle are longer than those at the extremities, a *thyrsus* is produced, as in the lilac (see fig. 18). If in a raceme the lower flower-stalks are elongated, and come to nearly a level with the upper, a *corymb* is formed, which may be either simple or compound (see fig. 17). If the flowers thus disposed are sessile, or not stalked, they have an ear. The *spike* (see fig. 19), sometimes bears unisexual flowers, the whole falling off by an articulation, as in willow or hazel, and then it is called a *catkin* (see fig. 20). At other times it becomes succulent, bearing numerous flowers, surrounded by a sheathing bract, and then it constitutes a *spadix* (see fig. 21), which may be simple, as in *arum maculatum*, or branching, as in palms.

Fig. 21.

Spadix.

Fig. 22.

Umbel.

If the peduncles issue from the same part of the stem, and rise to the same height, like a parasol, they form an *umbel* (see fig. 22). Sometimes the whole inflorescence is the product of one branch, the lower flowers having expanded first, and bearing fruit (fig. 19), while the upper are in bud, and the middle in full bloom. In the figure this kind of inflorescence is shown on a shortened axis, the outer flowers expanding first, and those in the centre last. If there are numerous flowers on a flattened convex, or slightly concave receptacle, having either very short pedicels, or none, a *capitulum* or *calathium* (see figs. 23 and 24), is formed, as in dandelion, daisy, and other composite plants.

Fig. 23.

Capitulum.

Fig. 24.

Calathium.

Questions on the preceding Lesson.

What is the meaning of the term Botany? What is the nature of the cellular system? the vascular system? the tracheæ? the spiral vessels? the seed? What are the seed-lobes? the germ? the plume? the radicle? the root?

What is the aliment of a plant? What is the difference between Exogenous and Endogenous growth? What between fasciculated and tuberculated roots? What between monocotyledonous and acotyledonous plants?

Describe the nature of a leaf; a leaf-bud; and a flower-bud. What is a raceme? a panicle? a thyrsus? a corymb? a spike? a catkin? a spadix? an umbel? a capitulum? a calathium?

LESSONS IN ENGLISH GRAMMAR.—No. III.

NOUNS, OR SUBSTANTIVES.

Before entering upon this lesson, allow us to remind our pupils, that they must endeavour to recollect what has been said in former lessons, as we are not willing to be repeating it every time we meet. Yet we should be obliged to do so, if our pupils forgot what we had before endeavoured to teach them. For this reason it will be well for them to go briefly through the former lessons before entering upon the study of a new one; they will then better understand the connexion and beauty of the whole system. We wish these remarks to be borne in mind, not only in reference to these lessons in grammar, but also as to *all* the lessons contained in the Popular Educator. *We* shall thus be saved a world of trouble, and *our pupils* gain considerably.

We have just begun to explain the different parts of speech. Our last lesson, relating to the *article*, was short; the present subject will require more than one lesson, as it comprehends an almost incalculable number of words, and as there are many particulars necessary to be known and well understood. We are about to speak of *nouns*, or *substantives*, most commonly called *nouns*. The word noun is derived from the Latin word *nomen*, which means *a name*. Hence we describe a noun as signifying the name, whether of person, place, thing, or quality; the name of anything which can be seen, heard, smelt, tasted, felt, or understood; any thing which we can think of or speak about. We will give some examples:—

Nouns are the *names*

- Of *Persons*, as, John, Eliza, Thomas, Mary; Mr. Thompson, Mrs. Jackson, &c.
- Of *Places*, as, London, Manchester, Paris, India, Australia; Oxford-street, Cheapside, Strand, &c.
- Of *Things*, as, a book, a cow, a mug, an umbrella, an engine, an omnibus, &c.
- Of *Qualities*, as, motion, swiftness, sharpness, whiteness, hardness, &c.
- Of objects *which can be seen*, as, a house, the stars, a balloon, a procession, an exhibition, lightning, &c.
- Of things *that can be heard*, as, sound, noise, thunder, music, speaking, singing.
- Of things *that can be smelt*, as, stench, odour, fragrance, perfumes, &c.
- Of things *that can be tasted*, as, salts, acids, sweets, bitters, &c.
- Of things *that can be felt*, or experienced, as heat, cold, pain, pleasure.
- Of things that can be *thought of*, or *talked about*, either real or imaginary, as, a friend, an enemy, a difficulty, a danger; the plague, the crops, trade, politics, religion; the weather; peace, war; charity, temperance, industry, honour, goodness, &c.

Nouns are of *two kinds*, common and proper.

A *common noun* is one which is used in reference to a whole class or kind of things—to things in general—as, man, woman, town, river, animal, vegetable, mineral, diamond; justice, mercy; life, death, &c.

A *proper noun* is that by which we describe a particular person, place, or thing—as, Charles, Liverpool, Thames, copper, &c.

There are also other divisions of nouns:—

Nouns of *multitude*,—as, tribes, societies, communities, herds, flocks; the people, an army, the military, the navy, the clergy, the laity, &c.

Abstract nouns; that is, the names of things which are not material or corporeal bodies, and therefore not objects of the outward senses, but only to be perceived by the thought and understanding, such as virtues, vices, and passions;—as, virtue, wickedness, wisdom, folly, prudence, envy, jealousy; attention, application, imitation, &c.

Derivative nouns, or nouns which are derived from other nouns;—as, the word Londoner, from London; citizen, from city; Roman, from Rome; artist, from art; professor, from profession, &c.

Verbal nouns, or nouns derived from verbs;—as, learning, from the verb to learn; walking, from the verb to walk; leaping, from the verb to leap; printing, from the verb to print, &c.

Nouns may be known in various ways; for instance, if a word admits of putting an article before it,—as, *a* man, *the* moon, *an* orange; or if a word makes sense alone, as, *astronomy, navigation, grammar, arithmetic*;—or, if it allows of some other words being supplied, such as, I *mean*, or I *speak about*, or, I *think of*; as, I mean Thomas Parker; or, I speak about London; or, I think of temperance, industry, and comfort.

Nouns have forms called *numbers*, by which one is distinguished from many. These numbers are two, singular and plural.

A noun in the *singular* number indicates but one object,—as, *a man, a book, an apple, the table.*

A noun in the *plural* number expresses two or more objects,—as, *men, books, apples, tables.*

Some nouns can only be used in the singular number,—as, *gold, lead, iron, bread, corn, justice, chastity.*

Some nouns have only a plural number,—as, *embers, alms, morals, mechanics, nuptials, tactics.*

Proper names, either where used to express distinction or eminence, or to denote more than one person of the same name, admit the plural number; thus we say of a number of wise men, *they are Solomons*; or of several beautiful women, *they are Venuses*; or of many orators, *they are Ciceros.* So we speak of *the four Evangelists, the twelve Apostles, the twelve Cæsars, the eight Henrys of England*, &c.

Some nouns are alike in both numbers,—as, *census, corps, means; apparatus, series; sheep, swine; species*, &c.

Some nouns when used in a plural sense do not take a plural form,—as, *ancestry, nobility, gentry, community*, &c.

The ways in which the plural number of nouns are formed, and particular rules for spelling the plural number, will be given in another Lesson.

Questions upon Lesson the Second.

What is etymology?
What are primitive words?
What are derivatives?
How many parts of speech are there in the English language?
Name them.
What is an article?
Is there more than one article?
Give an instance of a definite, and also of an indefinite article?
Are nouns ever used without articles?

Questions upon Lesson the Third.

What are nouns?
Mention some which relate to persons, to places, to things.
How many kinds of nouns are there?
Describe a common, and also a proper noun?
Are there not other divisions of nouns? If so, name them
What is meant by the numbers of nouns?
Give an instance of the plural number.
Have all nouns the plural number?
Are not some nouns alike in both numbers?

LESSONS IN FRENCH.—No. III.

By Professor Louis Fasquelle, LL.D.

Section V.

1. To render a sentence negative, *ne* is placed before the verb, and *pas* after it.

Je n'ai pas le cheval.	*I have not the horse.*
Vous n'avez pas la maison.	*You have not the house.*

2. When the verb is in a compound tense (§ 45, (8)] the first negative *ne* is placed before the auxiliary, and the second between the auxiliary and the participle.

Je n'ai pas eu le cheval.	*I have not had the horse.*
Vous n'avez pas eu la maison.	*You have not had the house*

3. It will be seen in the above examples that the *e* of *ne* is elided, when the verb begins with a vowel [§ 146].

4. When the words ni, *neither*; rien, *nothing*; jamais, *never*; personne, *no one, nobody*, occur, the word *ne* only is used, and those words take the place of *pas* [§41, (6)].

Je n'ai ni le livre ni le papier.	*I have neither the book nor the paper.*
Avez vous quelque chose ?	*Have you anything ?*
Nous n'avons rien.	*We have nothing, or not any thing.*
Personne n'a le livre.	*No one has the book.*
Vous n'avez jamais le couteau.	*You never have the knife.*

5. A noun used in a partitive sense (Sect. 4, Rule 1), and being the object of a verb, conjugated negatively, should not be preceded by the article, but by the preposition *de* only [§ 78, (7.)]

Nous n'avons pas d'argent.	*We have no money.*
Vous n'avez pas de viande.	*You have no meat.*

6. Quelqu'un, *some one, any one*; [§ 41, (7.)] quelque chose, *something, anything*; should only be used in an affirmative or interrogative sentence, or in a sentence which is negative and interrogative at the same time.

Avons nous quelqu'un ?	*Have we any one ?*
Avez vous quelque chose ?	*Have you anything ?*
N'avons nous pas quelque chose ?	*Have we not something ?*

7. In a negative sentence, ne—personne, signifies *nobody, not any body*; and ne—rien, *nothing, not any thing*.

Je n'ai personne.	*I have no one, not any one.*
Vous n'avez rien.	*You have nothing, or not anything.*

8. Avoir, to have, in the Present of the Indicative.

Negatively.		*Negatively and Interrogatively.*	
Je n'ai pas,	*I have not.*	N'ai je pas ?	*Have I not ?*
Tu n'as pas,	*Thou hast not.*	N'as tu pas ?	*Hast thou not ?*
Il n'a pas,	*He has not.*	N'a-t-il pas ?	*Has he not ?*
Elle n'a pas,	*She has not.*	N'a-t-elle pas ?	*Has she not ?*
Nous n'avons pas,	*We have not.*	N'avons nous pas ?	*Have we not ?*
Vous n'avez pas,	*You have not.*	N'avez vous pas ?	*Have you not ?*
Ils n'ont pas,	*They m. have not.*	N'ont ils pas ?	*Have they m. not ?*
Elles n'ont pas,	*They f. have not.*	N'ont elles pas ?	*Have they f. not ?*

Résumé of Examples.

Le tailleur a-t-il le bouton ?	*Has the tailor the button ?*
Le tailleur n'a pas le bouton.	*The tailor has not the button.*
Il n'a pas eu le drap ?	*He has not had the cloth.*
Il n'a eu ni le drap ni le cuir.	*He has had neither the cloth nor the leather.*
Ai-je de la viande ?	*Have I meat ?*
Vous n'avez pas de viande (R. 5).	*You have no meat.*
Avons nous quelque chose ?	*Have we any thing ?*
Nous n'avons rien.	*We have nothing, or not anything.*
Nous n'avons jamais de café (R. 5).	*We never have coffee.*

Exercise 11.

Ami, m. *friend.*	Drap, m. *cloth.*	Personne, m. *nobody.*
Angleterre, f. *England.*	Du tout, adv. *at all.*	Quelque chose, m. *something, anything.*
Aussi, *also.*	France, f. *France.*	Quelqu'un, m. *some one, anyone.*
Autre, *other.*	Histoire, f. *history.*	Soie, f. *silk.*
Chapelier, m. *hatter.*	Libraire, m. *bookseller.*	Velours, m. *velvet.*
Chien, m. *dog.*	Marchand, m. *merchant.*	Voisin, m. *neighbour.*
Coton, m. *cotton.*	Mon, m. *my.*	
Cousin, m. *cousin.*	Ni, conj. *neither, nor.*	
Deux, *two.*		

1. Le chapelier a-t-il de la soie ? 2. Le chapelier n'a pas de soie, mais il a du velours ? 3. A-t-il du velours de coton ? 4. Non, Monsieur, il n'a pas de velours de coton, il a du velours de soie. 5. Avez vous de la viande ? 6. Oui, Monsieur, j'ai de la viande. 7. Le médecin n'a pas d'argent. 8. Qui a de l'argent ? 9. Le marchand n'a pas d'argent, mais il a du drap, du velours, et de la soie. 10. Avez vous quelque chose ? 11. Non, Monsieur, je n'ai rien du tout. 12. Le tailleur a-t-il deux boutons d'argent ? 13. Non, Monsieur, il a deux boutons de soie. 14. Qui a votre chien ? 15. Le voisin a le chien de mon cousin. 16. N'a-t-il pas votre cheval aussi ? 17. Non, Monsieur, il a le cheval de votre ami. 18. Avez vous l'histoire de France ? 19. Non, Madame, je n'ai ni l'histoire de France ni l'histoire d'Angleterre. 20. N'avez vous ni le livre ni le papier ? 21. Non, Mademoiselle, je n'ai ni l'un ni l'autre. 22. Qui a du papier ? 23. Le libraire n'a pas de papier. 24. Quelqu'un a-t-il un livre ? 25. Personne n'a de livre.

Exercise 12.

1. Has the baker velvet ? 2. No, Sir, the baker has no velvet. 3. Who has silk velvet ? 4. The hatter has silk velvet and a silk hat. 5. Have you two silver buttons ? 6. No, Sir, I have a cloth coat, a silk hat, and a velvet shoe. 7. Has your neighbour a wooden table ? 8. Yes, Sir, he has a mahogany table. 9. Has your cousin a history of England ? 10. No, Sir, he has a history of France. 11. I have neither the cloth nor the velvet. 12. We have neither the meat nor the coffee. 13. Has any one a book ? 14. Your cousin has a book, a velvet coat, and a silk hat. 15. Have you the physician's book ? 16. Yes, Madam, I have the physician's book and the lady's gold pen. 17. Has the merchant cloth ? 18. The merchant has no cloth, but he has money. 19. Who has your neighbour's dog. 20. Nobody has my neighbour's dog. 21. Has any one my book ? 22. No one has your book. 23. Has your cousin's brother anything ? 24. No, Sir, he has nothing. 25. Who has your friend's book ? 26. Your brother has my cousin's book. 27. Has he the tailor's coat ? 28. He has not the tailor's coat. 29. We have neither the cloth nor the silk.

Section VI.

1. The verb *avoir* is used idiomatically in French, with the words quelque chose, chaud, froid, faim, honte, peur, raison, tort, soif, sommeil.

J'ai quelque chose,	*Something is the matter with me.*
Il a chaud,	*He is warm.*
Elle a faim.	*She is hungry.*
Nous avons honte.	*We are ashamed.*
Vous avez peur.	*You are afraid.*
Ils ont tort.	*They are wrong.*
Avez vous raison ?	*Are you right ?*
J'ai sommeil.	*I am sleepy.*

2. A noun, whether taken in a general or in a particular sense, is, in French, commonly preceded by the article *le*, in its different forms. [§ 77, (1.) (2.)]

Le pain est nécessaire.	*Bread is necessary.*
Il a le pain.	*He has the bread.*

3. A noun, preceded by the article *le*, retains that article after ni, *nor, neither*; but a noun taken in a partitive sense (Sect. 4, 1), takes after *ni* neither article nor preposition.

Je n'ai ni l'arbre ni le jardin.	*I have neither the tree nor the garden.*
Nous n'avons ni arbre ni jardin.	*We have neither tree nor garden.*

4. A noun, taken in a partitive sense, and preceded by an adjective, takes merely the preposition *de* [§ 78, (3)].

5. The following adjectives are generally placed before the noun :—

Beau, *handsome.*	Cher, *dear.*	Jeune, *young.*	Meilleur, *better.*
Bon, *good.*	Grand, *great, large.*	Joli, *pretty.*	Petit, *small.*
Brave, *worthy.*	Gros, *large.*	Mauvais, *bad.*	Vieux, *old.*
		Vilain, *ugly.*	

Résumé of Examples.

Avez vous quelque chose ?	*Is anything the matter with you ?*
Je n'ai rien (*literally, I have nothing*).	*Nothing is the matter with me.*
Votre frère a-t-il chaud ?	*Is your brother warm ?*
Il n'a ni froid ni chaud.	*He is neither warm nor cold.*
Votre sœur a-t-elle faim ou soif ?	*Is your sister hungry or thirsty ?*
Elle n'a pas faim, mais honte.	*She is not hungry, but ashamed.*
Votre ami a-t-il sommeil ?	*Is your friend sleepy ?*
Mon ami n'a ni sommeil ni peur.	*My friend is neither sleepy nor afraid.*
Avez vous raison ou tort ?	*Are you right or wrong ?*
Avez vous du lait ou du vin ?	*Have you milk or wine ?*
Je n'ai ni lait ni vin [R. 3].	*I have neither milk nor wine.*
Avez vous le lait ou le vin ?	*Have you the milk or the wine ?*
Je n'ai ni le lait ni le vin [R. 3].	*I have neither the milk nor the wine.*
Avez vous de beau drap et de bon café ?	*Have you handsome cloth and good coffee ?*

Exercise 13.

Au contraire, *on the contrary.*	Fusil, m. *gun.*	Petit, *small, little.*
Bouton, *button.*	Froid, m. *cold.*	Peur, f. *fear, afraid.*
Capitaine, *captain.*	Gros, *large.*	Quel, *what, which.*
Cousin, m. *cousin.*	Honte, f. *shame, ashamed.*	Raison, f. *reason, right.*
Chaud, m. *heat, warm.*	Mais, *but.*	Rien, *nothing.*
Faim, f. *hunger, hungry.*	Marteau, m. *hammer.*	Tort, m. *wrong.*
Ferblantier, m. *tinman.*	Menuisier, m. *joiner.*	Sel, m. *salt.*
	Poivre, m. *pepper.*	Sommeil, m. *sleep, sleepy.*

1. Qui a sommeil ? 2. Mon frère a faim, mais il n'a pas sommeil. 3. Avez vous raison ou tort ? 4. J'ai raison, je n'ai pas

tort. 5. Avez vous le bon fusil de mon frère? 6. Je n'ai pas le fusil. 7. Avez vous froid aujourd'hui? 8. Je n'ai pas froid, au contraire, j'ai chaud. 9. Avez vous de bon pain? 10. Je n'ai pas de pain. 11. N'avez vous pas faim? 12. Je n'ai ni faim ni soif. 13. Avez vous honte? 14. Je n'ai ni honte ni peur. 15. Avons nous du poivre ou du sel? 16. Vous n'avez ni poivre ni sel. 17. Quel livre avez vous? 18. J'ai le livre de mon cousin. 19. Avez vous le marteau de fer ou le marteau d'argent? 20. Je n'ai ni le marteau de fer ni le marteau d'argent, j'ai le marteau de bois du ferblantier. 21. Avez vous quelque chose? 22. Je n'ai rien. 23. Avez vous le gros livre du libraire? 24. Je n'ai ni le gros livre du libraire, ni le petit livre du menuisier, j'ai le bon livre du capitaine.

Exercise 14.

1. Are you sleepy, Sir? 2. No, Sir, I am not sleepy, but I am hungry. 3. Have you pepper or salt? 4. I have neither pepper nor salt; I have cheese. 5. Is your brother thirsty or hungry? 6. My brother is neither thirsty nor hungry? 7. Is your sister right or wrong? 8. She is not wrong, she is right. 9. Is the good joiner afraid? 10. He is not afraid, but ashamed. 11. Have you milk or cheese? 12. I have neither milk nor cheese; I have butter. 13. Have you the fine cloth or the good tea? 14. I have neither the fine cloth nor the good tea. 15. Is anything the matter with you, my good friend? 16. Nothing is the matter with me, my good Sir. 17. Have you no bread? 18. Yes, Madam, I have good bread, good butter, and good cheese. 19. Is the carpenter sleepy? 20. The carpenter is not sleepy, but the tinman is hungry. 21. Have you the tinman's wooden hammer? 22. I have not his wooden hammer. 23. Which hammer have you? 24. I have the steel hammer. 25. Have you a good cloth coat? 26. No, Sir, but I have a silk dress. 27. Has the tailor the good gold button? 28. Yes, Sir, he has the good gold button. 29. Who has my brother's gold watch? 30. Some one has the gold watch.

Section VII.

1. The pronouns le, *him, it*; la, *her, it*, are, in French, placed before the verb.* These pronouns assume the gender of the nouns which they represent.

Voyez vous le couteau? m.	*Do you see the knife?*
Je le vois	*I see it.*
Voyons nous la fourchette? f.	*Do we see the fork?*
Nous la voyons.	*We see it.*

2. The vowel of the pronouns le and la, is elided before a verb commencing with a vowel or an *h* mute [§ 146].

Avez vous le baton? m.	*Have you the stick?*
Je l'ai.	*I have it.*
Avons nous la canne? f.	*Have we the cane?*
Nous l'avons.	*We have it.*

3. The possessive adjectives mon, m. ma, f. *my*; ton, m. ta, f. *thy*; son, m. sa, f. *his, her*, agree in gender with the object possessed, that is with the noun following them [§ 21, (1) (2)].

Mon pupitre, m.	*My desk.*
Avez vous ma lettre? f.	*Have you my letter?*
Il a son fusil, m.	*He has his gun.*
Il a sa cravate, f.	*He has his cravat.*

4. Before a feminine noun in the singular, commencing with a vowel or an *h* mute, the masculine form, *mon, ton, son* is used [§ 21, (3)].

J'ai mon épée, f.	*I have my sword*
C'est son habitude, f.	*It is his or her habit.*
Le général a son armée, f.	*The general has his army.*

5. The adjectives notre, *our*; votre, *your*; leur, *their*, are used without variation before a noun of either gender, in the singular [§ 21, (1)].

Notre argent, m.	*Our silver.*
Votre canne, f.	*Your cane.*
Leur terre, f.	*Their land.*

* Except in the second person singular, and in the first and second persons plural of the imperative, used affirmatively.

6. The possessive pronouns le mien, m. la mienne, f. *mine*; le tien, m. la tienne, f. *thine*; le sien, m. la sienne, f. *his* or *hers*, can never be prefixed to nouns. The article preceding these pronouns, and forming an indispensable part of them, takes the gender of the object possessed; mien, tien, sien, vary for the feminine—nôtre and vôtre used as pronouns have the circumflex accent.

J'ai votre livre et le mien.	*I have your book and mine.*
Elle a sa robe et la mienne.	*She has her dress and mine.*
Vous avez votre plume et la nôtre.	*You have your pen and ours.*

Résumé of Examples.

Votre ami a-t-il le mouton?	*Has your friend the sheep or mutton?*
Il l'a, elle l'a.	*He has it, she has it.*
Il ne l'a pas.	*He has it not.*
N'avez vous pas l'encrier d'argent?	*Have you not the silver inkstand?*
Nous ne l'avons pas.	*We have it not.*
Avez vous votre fusil ou le mien?	*Have you your gun or mine?*
Je n'ai ni le vôtre ni le mien.	*I have neither yours nor mine.*
Son épouse a-t-elle sa robe ou la vôtre?	*Has his wife her dress or yours?*
Elle n'a ni la sienne ni la vôtre.	*She has neither hers nor yours.*
Ne l'avez vous pas?	*Have you it not?*
Votre frère ne l'a-t-il pas?	*Has not your brother it?*

Exercise 15.

Assiette, f. *plate.*	Crayon, m. *pencil.*	Parent, m. *relation.*
Biscuit, m. *biscuit.*	Cuisinier, m. *cook.*	Plat, m. *dish.*
Bœuf, m. *beef.*	Fourchette, f. *fork.*	Poisson, m. *fish.*
Boucher, m. *butcher.*	Matelot, m. *sailor.*	Porcelaine, f. *china.*
Commode, f. *chest of drawers.*	Mouton, m. *mutton, sheep.*	Sofa, m. *sofa.*
Couteau, m. *knife.*	Miroir, m. *looking-glass.*	Tout, *all.*
		Veau, m. *veal, calf.*

1. Avez vous la fourchette d'argent? 2. Oui, Monsieur, je l'ai. 3. Le cuisinier a-t-il le bœuf? 4. Non, Monsieur, il ne l'a pas. 5. Quel mouton avez vous? 6. J'ai le bon mouton et le bon veau du boucher. 7. Votre parent a-t-il la commode? 8. Non, Monsieur, il ne l'a pas. 9. A-t-il mon poisson? 10. Qui a tout le biscuit du boulanger? 11. Le matelot n'a ni son pain ni son biscuit. 12. A-t-il son couteau et sa fourchette? 13. Il n'a ni son couteau ni sa fourchette, il a son assiette [R. 4]. 14. Quel plat a-t-il? 15. Il a le joli plat de porcelaine. 16. Avez vous le mien ou le sien? 17. Je n'ai ni le vôtre ni le sien, j'ai le nôtre. 18. Avez vous peur, Monsieur? 19. Non, Madame, je n'ai pas peur, j'ai faim. 20. Quelqu'un a-t-il ma montre d'or? 21. Non, Monsieur, personne ne l'a. 22. Qu'avez vous, Monsieur? 23. Je n'ai rien. 24. Avez vous le sofa d'acajou de mon menuisier? 25. Non, Monsieur, je ne l'ai pas. 26. J'ai son joli miroir et son bon crayon.

Exercise 16.

1. Have you the silver pencil case? 2. No, Sir, I have it not. 3. Have you my brother's plate? 4. Yes, Madam, I have it. 5. Has the butcher the good biscuit? 6. He has it not; he has the good beef, the good mutton, and the good veal. 7. Have you my knife and my fork?* 8. I have neither your knife nor your fork? 9. Who has the good sailor's biscuit? 10. The baker has it, and I have mine. 11. Have you mine also? 12. I have neither yours nor his. 13. Are you hungry? 14. I am not hungry, I am thirsty and sleepy. 15. Are you not ashamed? 16. No, Sir, I am not ashamed, but I am cold. 17. Is your relation right or wrong? 18. My relation is right, Sir. 19. Has he my china dish or my silver knife? 20. He has neither your china dish nor your silver knife; he has your china plate. 21. Has any one my silver pencil-case? 22. No one has it, but your brother has your cloth coat. 23. Have you mine or his? 24. I have yours. 25. Has the baker the mahogany chest of drawers? 26. He has it not, he has the mahogany sofa. 27. Has the tinman my plate? 28. He has not your plate, he has mine. 29. Which sofa have you? 30. I have my mother's sofa. 31. I have neither his nor yours, I have mine.

* The possessive adjective must in French be repeated before every noun [§ 21 (4)].

LESSONS IN PHYSIOLOGY.—No. II.

MAN.

You remember what we said in our first lesson about the little germ, from which all animal substance comes. This germ is surrounded by a fluid in which it floats, and from which it draws those elements which are necessary for its growth and enlargement. It then becomes a cell, including within itself other little germs, which, on the bursting of this parent-cell, are set free to perpetuate themselves from generation to generation.

In a vegetable, as we find, all that is required for the growth of such a cell, is a supply of water and carbonic acid; because the acid being the product of carbon and oxygen, and the water of oxygen and hydrogen, the water and the acid supply the three elements—oxygen, hydrogen, and carbon—which enter into the composition of the plant. Now it is so arranged that the vegetable kingdom supplies all that is required for the growth and increase of the germ in the animal economy. In other words:—if a vegetable needs nothing more than a supply of water and carbonic acid for its maintenance and reproduction, then, to sustain life, an animal needs only a corresponding supply of vegetable substance. So with the little germ. By the principle of life within itself, it can take up and appropriate from the elements which surround it whatever is suited to its own nature, make it a part of itself, and impart to it its own vitality. It is in connexion with this principle of life that we must seek for those wondrous changes which all matter undergoes in the act of being taken up and assimilated to any living thing. For example:—The food which we take into our stomach, goes through a wonderful process before it is in a state to become a part of ourselves; and this process could never be effected but for the principle of life in the human body. It could not be done either by chemical action or by mechanical force. It is not only something different from these and from all other known physical causes, but that which rises above them—that which includes them and controls them—that to which they are subject, and by virtue of which, each particle takes on all the characteristic properties and attributes which belong to the body itself.

To the question:—What is this vital action?—we can give no other answer, than that it is one of those terms which man has invented to conceal his ignorance of those profounder laws which pervade the whole organic world. This, however, we can say, that in proportion to the vital activity of any organised structure, the shorter will be the term of its life. Increase the activity, and existence is shortened. On the other hand, diminish the activity, and life is prolonged. Take the following example:—Put a corn-seed in a place in which it will be impossible for the hidden life within it to be developed, and in this state it may remain for ages multiplied by ages. This suspended vital action is not to be looked upon as death, which implies a total loss of vital properties; but only as a dormant vitality. Let us suppose that the corn-seed had been deposited in an Egyptian mummy, and that it had been there for thousands of years, but that we take it out, and so change the conditions of its being as to subject it to the influence of soil, and rain, and light, and heat, and it will soon take root, spring up, bear fruit, and go through the whole vital operations, as if those operations had never been suspended. But mark—the seed which existed for thousands on thousands of years in one condition, in the possession of a hidden life, when that life becomes developed soon ceases to be. How is this? Because by putting the seed in the ground, and so bringing it under all those outward influences which favour vegetation and growth, we have increased the vital activity, and so shortened its life.

To take another illustration. Bring up nearer to the surface some of the deeper soil of a field, and seeds which had been long embedded in that soil, will come up in the form of flowers and plants. But how soon do these flowers wither, and these plants die? Raspberry trees have been raised from seeds taken from the stomach of a man whose skeleton was found thirty feet below the surface of the earth. Nor is it possible to say how long this vital action might be suspended without in the least degree impairing the vitality itself. Life is something which cannot be destroyed. We may damage and render useless the mechanism through which life manifests itself, but life we cannot touch. As all organised being has its origin or commencement in a single germ, it follows that in that germ there must be a vital and imperishable principle; and this principle it is which in every organised being challenges all the changes of time, and all the force of created and finite power to destroy.

From these little germs and cells (fig. 1.), we have seen, is derived the substance called cartilage or gristle, and out of this gristle or cartilage is bone developed. Of bones we have found that there are in the human body one hundred and ninety-eight, exclusive of the teeth. Of this number thirty-four are single bones, and all the rest go in pairs. The bones are the same in each arm and hand, in each leg and foot, on each side of the head, and the ribs are the same on each side of the trunk. We have seen what a beautiful structure these bones make in the human skeleton; how exquisitely they are fitted the one to the other; how firmly they are attached and held together by cartilage and ligament; and how easily and harmoniously they move upon each other by means of the synovial fluid which is found between these joints. The bones being the hardest parts of our bodies, they form a frame-work for protecting the vital organs, as the heart or lungs; they make complete cases where the more delicate textures, as the brain and spinal marrow, are securely lodged; they constitute also a firm basis on which the moving powers are fixed; a series of levers, by means of which, through the agency of the muscles, locomotion and all the various offices of life are performed.

Fig. 1.

The bones, then, would be of no use without the muscles. If the muscles need a lever, or a firm and inflexible body with which to act, this lever or inflexible body would be more than useless without the muscles as agents to move and work it. Now, whence is muscle derived, and how is it formed? To answer this question, we must again go back to the little germ. When the germ has grown into a cell, from the cell there comes a further development in the shape of filaments or threads (fig. 2.), of such exceeding fineness as in some instances not to exceed the 20-thousandth part of an inch. Larger than these, but of essentially the same character, are those fibres which enter into the formation of the muscles. These fibres consist of a series of filaments, and take the form of a tube, with a peculiar enlargement at frequent intervals. They are arranged in parallel lines, and present the appearance of bands or little bundles. Look at this mass of fibres as it exists in the larger muscles of the chest in a baby just before birth. You see how these fibres resemble so many small tubes, while the little bodies or enlargements which you observe upon them are centres of nutrition, from which come the cells that compose these fibres. In the adult, the diameter of these fibres is three times larger than it is in the infant, as you may see by looking at figure 3, which represents organic muscular fibres magnified three hundred and fifty times. And even this does not much exceed one fifteen-hundredth part of an inch.

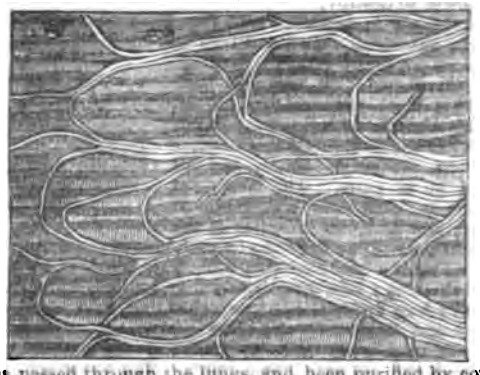
Fig. 2.

Fig. 3.

These fibres are not themselves penetrated with blood-

vessels, but the vessels run in parallel lines in the minute spaces between the fibres, so that each fibre is in close relation with a blood-vessel, from which it draws materials for its growth and renovation (fig. 4). These vessels are very minute and very numerous; and as they convey thither the blood after

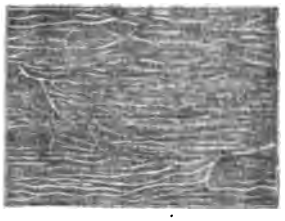
Fig. 4.



it has passed through the lungs, and been purified by coming into contact with the oxygen of the air which we breathe, this accounts for that beautiful bright red colour which distinguishes the muscle or flesh of animals. Without such a supply of blood the muscles would be wholly unfit for action. They would lose their power of contracting, and thus become useless in the animal economy.

Not only is the substance of muscle full of these capillaries, or hair-like blood-vessels, but, next to the skin, the muscles are most copiously supplied with nerves. These nerves form a series of loops, and seldom, if ever, terminate in the substance of the muscle itself (fig. 5). They possess the power or property of conveying impressions to the brain, the brain communicates with the mind, and the mind expresses itself through the will. The mind has not only the consciousness of power, but can express that power in its will and determination. If I wish to raise my hand or to extend my arm, I will it, and I do it. My will to do it, is my power to do it. If the structure of my body be perfect, my will acts on the nervous system, the nerves act as a medium of conveying an impression or stimulus to the particular muscles, and no sooner is the stimulus felt, than the hand is raised, or the arm is extended.

Fig. 5.



But the most wonderful thing in the muscles is their power of contracting, or shortening themselves, on the application of any external stimulus. Something of the same kind we find in the vegetable kingdom. Touch ever so gently the leaf of the Sensitive Plant, and it will immediately contract, or draw itself in, or close. Stimulate the muscle itself, or convey the stimulus through the nerves which go to the muscle, and immediately the contraction takes place. We do not mean that there can be no contraction without nervous action. The contrary of this is true. But, wherever a nervous system exists, the nerves have to do more or less with the contraction of the muscles. This contraction will take place under the influence of heat, or cold, or electricity. If you plunge your hand into an alkaline or acid fluid, you will have the feeling of contraction in the muscles of the hand. This contraction does not affect the bulk of the muscle. As you make its two ends approach each other, you indeed shorten it in the direction of its fibres, but its diameter enlarges in the same proportion. This you may prove by a very simple experiment. Take a skein of thread or worsted in loose threads, fasten both ends to a piece of whalebone or hoop: bring these two ends to approach each other by bending the hoop or whalebone, and you will find that you have shortened the threads in their length, but increased their diameter, as they bulge out in the centre. Or take a still simpler experiment. When you undress on going to bed, make naked your arm, then bend it, and you will see how much thicker it appears than when you extend it, or hold it down. It is the position of the muscles which is altered, not their bulk.

In cold-blooded animals this power of contraction is found to remain for some considerable time after death. For example:—the heart of a frog will go on beating for many hours after it has been taken from the body; and so the heart of a sturgeon which had been first filled with air, and then hung up to dry, has been seen to continue beating until it became so dry as to rustle with every successive movement. In the case of men who have been executed, the heart has been known to contract even sixteen hours after death.

This power of contraction depends on the health and nourishment of the muscles. Being nourished by a due supply of blood, the flow of blood increases with the use that is made of the muscles themselves. What would be sufficient for an individual leading an inactive life, would be far too little for another individual who is continually exercising his muscular power. The nourishment is in proportion to the flow of pure blood; and in proportion to the nutrition is the power of the muscle. Hence it is, that the more a muscle is exerted or exercised, the more powerful and the more bulky does it become. For example:—look at the arm of a blacksmith, or at the leg of an opera dancer, and what a difference do they present in bulk and strength to the leg and arm of persons whose muscles are never called into such active and healthful play. Fig. 6 gives a view of the form and arrangement of a number of the principal muscles in the human body.

Fig. 6.

The muscles divide themselves into two classes—THE VOLUNTARY, and THE INVOLUNTARY. The voluntary muscles

are those which are under the influence and government of the will—such as the muscles of locomotion. If I wish to move from one place to another, I have but to will it, and at once all the muscles needful for motion are called into exercise. But the involuntary muscles are those over which the will has no power. Over the movements of such vital organs as the heart, stomach, and intestines, we have no control. Cases have been reported of individuals having the power of determining the action of the heart, but it may be questioned whether such cases have ever been fully established.

In addition to these two divisions, there is the class of MIXED MUSCLES, as the diaphragm and other organs of respiration, certain muscles of the eye, and some others, of the action of which we are not sensible, unless the mind be directed specially to them, and yet we have the power of increasing or suspending their action for a longer or shorter length of time.

There is part of the muscles called TENDONS, which present the appearance of a fibrous cord, and conduct the motions of the muscles to the bone. They are made up of small white fibres, closely united to each other, and have a beautiful shining silvery appearance. This appearance is owing to the fact, that they are not, like the body of a muscle, supplied with blood-vessels. Into one of these tendons all the fibres, and consequently all the strength of one of the largest and most powerful muscles, may be seen to concentrate and become fixed on a small bony surface, where there would not be room for the insertion of all the muscular fibres. These tendons, again, are protected by sheaths, which are composed of close and strong fibres; while some of them, as those of the wrist and in the instep, contain the united tendons of several muscles. An arrangement this, which, like all the other arrangements in the human body, sets forth the wisdom and the goodness of that God all whose works are perfect, and whose infinite and unchangeable mind delights in the happiness of all his creatures.

The form and arrangement of the muscles are such as we might expect from a Being of supreme goodness. These muscles are the instruments or active agents in performing the various movements of the body. It is in connexion with them that we are endowed with the power of moving from place to place, and of performing every manual exercise and every bodily exertion. Deprive us of this muscular system, alter even its beautiful arrangement, and how do we know that we could either walk or speak? Speech we should have none. The blood would cease to circulate. The stomach and the intestines could no longer urge on their contents. The fluids could no longer move forward in their appointed channels.

Of these muscles there are not fewer in the human subject than five hundred and twenty-seven, of which two hundred and fifty-seven are pairs, and lie on either side of the body; and with the exception of four single muscles situated on the middle line of the body, all the rest are internal, and are connected with the vital functions.

What a world do we each carry about with us! How sublime are its wonders! KNOW THYSELF, is a sentiment which was deemed worthy of a divine origin and a heavenly descent. And yet how little does man study himself—his own nature—body, soul, and spirit! Familiar with the world without, how little does he know of the world within! While throwing back fold after fold of the veil from the face of external nature, and inquiring into its hidden secrets, how forgetful is he that there is the temple of his own humanity still to enter, with its deeper veil to lift, and its grander mysteries to explore! Let it not be so with us! Let us give ourselves to diligent study, and just as we advance step by step—just as we come to know more and understand more of the curious structure of our own bodies, the more inclined shall we be to take up the sentiment of the inspired writer, and with the same loving and adoring feelings to exclaim—"I am fearfully and wonderfully made; marvellous are thy works, and that my soul knoweth right well."

QUESTIONS FOR EXAMINATION.

Whence does the vegetable get its supply of materials?
What provision exists for the growth of the animal economy?
What is that substance called in which the bones are formed?
How and from what is the muscle formed?
What gives to the muscles their beautifully bright red colour?
In connexion with what are these little hair-like blood vessels found?
Are the muscles largely supplied with nerves?
What office do the nerves fulfil in connexion with the muscles
What is the grand distinguishing property of a muscle?
In contracting, does the muscle lose any of its bulk?
Explain by some example how the bulk remains the same.
Does this power of contracting depend on the nerves?
Can muscle contract after death?
Give an example in proof of this fact.
On what does the nourishment of a muscle depend?
Does a muscle increase by exercise?
Give an example of this increase in some well-known cases.
Into how many classes do the muscles divide themselves?
What do you mean by the involuntary muscles?
What examples have we of involuntary muscles?
Are there any mixed muscles? Name one or two.
What is a tendon?
What purpose do tendons serve?
What would occur if the muscular system was changed?
What does the present arrangement prove in relation to God as the Creator?

BIOGRAPHY.—No. I.

ALEXANDER MURRAY.

IN bringing before our readers occasional biographical notices, we shall endeavour to select such examples—like that of Stone in our first number, and that of Murray in our present number—as will tend to excite in all, but especially in the young, a laudable desire to imitate their indomitable industry and their noble self-denial, in the acquisition of the various branches of knowledge, or walks of art, which have made their names remarkable. Every individual who allows the faculties of his mind a fair degree of scope and exercise, will sooner or later discover that there is some art or science, or some peculiar walk of life, in which he is more likely than in any other to rise to excellence; and that if he follows the real bent of his genius in an honest and honourable manner, he will be sure to meet with success, not only in the superiority to which he will attain in his own peculiar department, but in the high reward with which his labours will ultimately be crowned.

Alexander Murray was the son of a shepherd who lived in the shire of Kircudbright. At the age of 76, his father taught him his letters by writing them on a board with a burnt stick, for want of book and slate.

There was, indeed, a "Shorter Catechism" in that humble dwelling, which in Scotland is generally printed with a copy of the alphabet, in a large type; it was bought by the old man expressly for his little son, but then it was deemed "too good a book" to be commonly handled, and was therefore locked up till these rude implements for acquiring knowledge had fully answered their purpose. Then only was the catechism presented, and in a month or two, Sandy could read the easier parts of it; and with the board and the brand, he still daily amused himself with copying the printed letters. Not long after, his father gave him a small psalm book, for which he totally abandoned the catechism—a book which he seemed never to have liked; and this cannot be much wondered at; for it contained such an abstract and condensed view of the Scriptures, as was only adapted for the hardest headed Calvinistic theologian. He soon committed many psalms to memory, and longed for a new book. But here difficulties arose; for what books were likely to be found in a Galloway shepherd's hut seventy years ago? The Bible, indeed was used every night in the family; but the Bible appropriated to these exercises of domestic religion, Sandy was not permitted either to open or touch. The rest of the books were put up in chests. At length, however, he obtained a New Testament, and read the historical portions with great curiosity and ardour; but he longed to read the Old Testament, and actually went to where he knew an old loose-leaved Bible lay, and carried it away piece-meal. He pored over these pieces of the Bible in secret for many months, but durst not show them openly; and as he read constantly and remembered well, he soon astonished all the neighbours by the large passages of Scripture he was able to repeat.

Two or three scores of sheep, with four muirland cows, were the whole property of his father. No sooner, therefore, was he

seven or eight years of age, than he was sent to the hills with the sheep. But he was not robust, and consequently not so agile as those who were so; and he was short-sighted, which his father did not know; his own account is, "I was sedentary, indolent, and given to books, and writing on boards with coals."

Sandy's father was too poor to send him to school, but on one of his uncles coming to pay the family a visit, he heard such accounts of the genius of his nephew, whose abilities and knowledge were the discourse of the whole glen, that he offered to support him for a short time at a school in New Galloway. Here Sandy made, at first, only an awkward figure. "My pronunciation," he says, "was laughed at, and my whole speech was a subject of fun. But I soon gained impudence; and before the vacation, I often stood *dux* of the bible class. I was in the meantime taught to write copies, and use paper and ink. But I both wrote and printed, that is, imitated printed letters, when out of school."

Scarcely, however, had three months elapsed, when illness compelled him to return home; and for nearly five years he was left again to be his own instructor. As soon as he became sufficiently well, he was once more a shepherd's boy. He now spent every sixpence that friends or strangers gave him, on ballads and penny histories, bundles of which he carried in his pockets, and read them when sent to look for cattle on the banks of Lake Loch, Greenock, and on the wild hills of its neighbourhood. Still he excited much astonishment by his attainments, and many said he was "a living miracle." When about twelve years old, he borrowed from a friend, a translation of the works of Josephus, the Jewish historian, and Salmon's Geographical Grammar. From the latter he derived "immense benefit;" it gave him an idea of geography and universal history, and many years after he arrived at manhood, he says, "I actually recollect at this day almost everything it contains." He learned to copy the maps which he found in this volume; he even made similar delineations of his native glen and its neighbourhood; and the grammar of geography had no little share in determining the direction and character of his future life.

He now went as a teacher into the families of two of the neighbouring farmers, and received for his labours during the winter, the sum of *sixteen shillings*. He immediately laid out a part of it in books; one of which was "Cocker's Arithmetic," and in two or three months, advanced to the rule of three, with no other assistance except the use of an old copy-book of examples made by some boy at school, and a few verbal directions from his brother Robert.

At school, during three months and a half, when he was about fifteen years of age, he seems to have imbibed his taste for learning foreign languages, about which Salmon's Grammar had previously awakened much interest. Observing that the divisions of the 119th Psalm were marked by the letters of the Hebrew alphabet, he printed them off in his usual way and kept them, and began the study of the French language. But, an interesting incident occurred; one of his class-mates told him that he had once studied Latin for a fortnight, but had not liked it, and that he still had "the Rudiments" by him. The results of this conversation he thus describes:—"I said, Do lend it me; I wish to see what the nouns and verbs are like, and whether they resemble French. He gave me the book. I examined it for four or five days, and found that the nouns had changes on the last syllables, and looked very singular. I used to repeat a lesson from the French Rudiments every forenoon at school." Accidentally putting his Latin Rudiments in his pocket by mistake, and pulling it out, his master said, "Sandy, I shall try thee with Latin; and accordingly, he read over to me no less than two of the declensions. It was his custom to permit me to get as long lessons as I pleased, and never to fetter me by joining me to a class. There was at that time in the school a class of four boys, advanced as far as the pronouns in Latin grammar. They ridiculed me on account of my separated condition. But before the vacation, I had reached the end of the Rudiments, knew a good deal more than they did, by reading at home the notes at the foot of each page, and was so greatly improved in French, that I could read almost any French book at the opening of it. I compared French and Latin, and rivetted the words of both in my memory by this practice. When proceeding with the Latin verbs, I often sat in the school during play-hours, and pored on the first page of a schoolfellow's Greek Grammar—the only one I had ever seen. He was then reading Livy and learning Greek. By help of his book I mastered the letters, but I saw the sense of the Latin rules in a very indistinct manner." Murray now obtained two or three Latin books from a friend and some of his school-fellows, and was much aided by one that had a literal interpretation. "When my lesson was prepared," he says, "I always made an excursion into the rest of every book; and my books were not, like those of other schoolboys, opened only in one place, and where the lesson lay."

In the following winter he was, as usual, occupied in teaching; but he continued to pursue his studies in private. Having bought an old copy of Ainsworth's Latin Dictionary, he says—"I literally read the dictionary throughout. My method was to resolve the leaves of the letter A, to notice all the principal words and their Greek synonymes, not omitting a glance at the Hebrew; to do the same by B, and so on through the book. I then returned from X and Z to A; and in these winter months, I collected a large stock of Latin and Greek vocables."

He was now sixteen years of age, and he devoted the summer at this time, to hard and continued reading. He had, in fact, and that chiefly by his own unassisted exertions, made himself familiar with the French, Latin, Greek, and Hebrew languages, and perused several of the principal authors in all of them, within about a year and a half from the period when they were all entirely unknown to him—a most extraordinary instance of youthful ardour and perseverance.

It was not long before an event occurred to him, of signal importance. Mr. Kinnear, a journeyman printer in the King's Printing-office at Edinburgh, urged him to send an account of himself and his attainments to that city, with a promise to bring it before some of its literary characters; the result was, that measures were taken to have the classes of the university thrown open to him, and his maintenance secured during his time of attendance. Passing on through the course of education necessary to qualify him for the ministry in the Scottish church, he continued to pursue, with his former enthusiasm, the study of languages. He devoted his leisure moments, while minister of Uir, in Dumfriesshire, for six years, to the composition of his stupendous work on the languages of Europe.

On the professorship of oriental languages, in the university of Edinburgh, becoming vacant in 1812, he was most warmly recommended to become a candidate to fill this chair. Among his testimonials was that of Mr. Salt, so eminent as an orientalist:—"My acquaintance with Mr. Murray," he wrote, "originated in my admiration of the deep erudition and extensive research displayed in his edition of Bruce's 'Abyssinia.' Having twice visited that country, I was led to pay particular attention to its history and literature, and in these pursuits I received so much assistance from Mr. Murray's labours, that I took an early opportunity, on my return to England, in February, 1811, from the mission to Abyssinia in which I had been engaged, to recommend him to the Marquis Wellesley as *the only person* in the British dominions, in my opinion, adequate to translate an Ethiopic letter which I had brought from Ras Willida Selasé, addressed to the king. My recommendation was attended to, and Mr. Murray finished the translation in the most satisfactory way."

He was elected to the vacant office, and received from the senate of the university the degree of doctor of divinity. His health was, unhappily, but weak; in a few months illness seriously increased. To the last, however, he was surrounded by his books and papers, and dictated to an amanuensis; but Dr. Murray died in his thirty-eighth year, having prosecuted, during his short life, the study of languages with a zeal and success rarely approached, and probably never surpassed.

ANSWERS TO CORRESPONDENTS.

*** The suggestions of our correspondents at Leicester and Brighton shall receive our serious consideration.

PARLEZ VOUS FRANCAIS.—As we stated, in reply to a correspondent, in our last number, the "Series of Lessons in French," reprinted from the *Working Man's Friend* (which contains Twenty-five Lessons and an Appendix), will, "by special permission of her Majesty's Postmaster-General," be transmitted free to any person's address on the receipt of *Seven Penny Stamps*, at this office.

W. W.—The WORKING MAN'S FRIEND, New Series, is now issued in half-yearly volumes, neatly bound and lettered, price 2s. 6d.—Vol. I. is now ready, containing the HISTORY of CHINA and the CHINESE, and also the HISTORY of HUNGARY complete. The volume contains nearly two hundred engravings.

*** *Other Answers and Solutions in our next number.*

Printed and Published by JOHN CASSELL, 335, Strand, and Ludgate-hill, London.—April 17, 1852.

LESSONS IN GEOMETRY.—No. II.

INSTRUMENTS USED IN PRACTICAL GEOMETRY.

In the operations of practical geometry, a case of mathematical instruments must be considered as an essential requisite. These instruments vary in number and quality, according to their price. Some are made of wood, bone, and ivory—as rulers and scales; others are made of brass and steel, German silver, and other compound metals, such as compasses, drawing pens, and protractors. We shall proceed to describe the most useful, and afterwards to show their application.

The *Common Ruler* or *Straight-edge*.—This instrument generally consists of the bevelled edge of the plane or diagonal scale, of the common Gunter's scale, of an ordinary foot rule, or of a plain flat rule, made with a fine straight edge, for the sole purpose of drawing straight lines from one point to another, or through any two points. It is sometimes made in the form of a right-angled triangle (fig. 1), with a similar edge, to serve the various purposes of drawing straight lines, perpendiculars, right-angled triangles, and parallel straight lines. In the mechanical arts, a straight line is most readily obtained by fixing a well-chalked string firmly at both ends over the place where it is wanted, on a board or stone, raising it, *when tense* (*i.e.* stretched), above the same, and then letting it drop suddenly, when the white or chalky trace of the string will be marked on the board or stone as a straight line.

Fig 1.

The *Parallel Ruler*.—This very useful instrument is constructed in a variety of forms. Those represented in figs. 2, 3, and 4, are the most common, and the cheapest. The

Fig. 2.

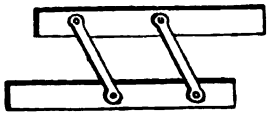


Fig. 3.

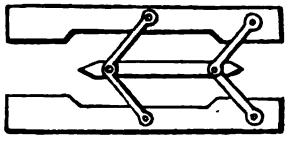
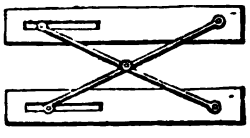


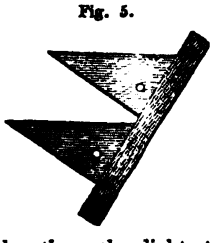
Fig. 4.



defect of the construction in fig. 2 is, that in drawing a parallel to a straight line through a given point, if the latter be at a considerable distance from the former, the ruler may, from its lateral motion, pass the point altogether, and render the problem nugatory. This defect is obviated by the constructions in figs. 3 and 4, provided they be properly managed; but this management is the result of a little practice.

The triangular ruler represented in fig. 1 being made to slide against a fixed ruler or straight-edge, as represented in fig. 5, is frequently employed for the purpose of drawing parallel straight lines. In many cases, this apparatus will be found even more handy for this purpose than the parallel rulers represented above. Fig. 5 represents the same triangle in two different positions, and not two separate triangles.

Fig. 5.



In order to test the accuracy of a ruler, let it be applied to one eye, and viewed along its edge from one end to the other; the slightest departure from the straight line will then become visible. A good ruler, besides having a straight edge, must be perfectly flat and even, flexible, and made of well-seasoned wood. Some are made of ivory, bone, and metal; these are less liable to be affected by changes in temperature, or by the humidity of the atmosphere. Parallel straight lines are most easily drawn by artists and mechanics, with an F or a T square, of which the form is distinctly noted by the name.

The *Compasses*, of which there are several kinds. This instrument, which usually consists of two equal legs jointed at one extremity, is employed for measuring the lengths of straight lines, measuring and laying off distances, and describing circles or arcs of circles in general. The *Dividers*, or compasses with dry points, represented in fig. 6, are chiefly used for dividing straight lines into equal parts, or into parts having any other proportion to each other. The best kind are furnished with a turnscrew for tightening the screw-axle at the joint. Others are furnished with an arc and tangent screw, to *fix* the legs at any required distance apart.

Fig. 6.

The *Socket Compasses*, represented in fig. 7, is furnished with moveable points, or pieces, which can be inserted in the socket at pleasure, according to the use which is to be made of them. It is chiefly employed in *describing*, that is, *drawing* circles, in ink, or in pencil, or in mere trace. The *tracing-point* in fig. 7 is furnished with a joint and a screw, in order to keep it perpendicular to the paper when the legs are stretched to a great length. The *ink-point*, represented in fig. 8, is furnished with a screw, to admit more or less ink at pleasure, with a joint for the same purpose as the tracer, and with a joint in one of the leaves of the point to admit of its being cleaned. The *pencil* or *crayon-point*, represented in fig. 9, is furnished with a joint for keeping the pencil or crayon perpendicular to the paper, and a socket or case for holding it. The socket compasses are also furnished with a *lengthening bar*, represented in fig. 10, which is furnished with a socket exactly the same as that of the leg, in order to admit of the *description*, that is, the *drawing* of larger circles than those which can be drawn only by the use of the moveable points and legs of the compasses.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

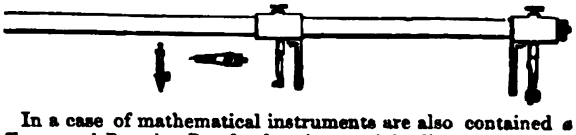
The *Bow Compasses*, so called because in their first construction they could be shut up into a hoop, which served as a handle to them; or the *Plug Compasses*, represented in fig. 11, and so called because the stationary leg screws out and in like a plug, are only used for describing circles of a very small size. Such compasses are of the greatest utility to draughtsmen and engineers in drawing their plans. The plug construction seems to present some advantages over the old bows.

Fig. 11.

Beam Compasses are employed for describing circles of very large radius, and such as are far beyond the reach of a case of mathematical instruments. They consist of a long beam or bar, carrying two brass *cursors*, that is, pieces on which it *runs*. One of these is fixed at one end, and the other slides along the beam, and is furnished with a screw to fix it at any required distance. To the

cursors may be screwed points of any kind, whether steel tracers, pencils, or crayons, or ink points. This apparatus is represented in fig. 12. To the fixed cursor there is sometimes applied an adjusting or micrometer screw, as seen in the figure, to enable a given distance or radius to be taken with the greatest nicety.

Fig. 12.

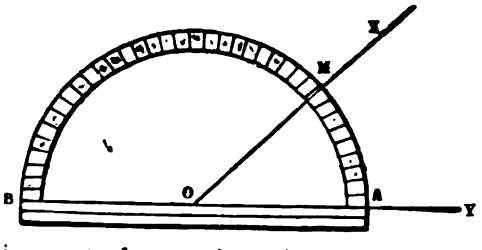


In a case of mathematical instruments are also contained a *Tracer and Drawing Pen*, for drawing straight lines in trace, or in ink. These two are usually joined in one instrument, the tracing point being screwed into the drawing pen; this instrument is represented in fig. 13, where the *ink point* is constructed exactly on the same principle as that of the socket-compasses.

Fig. 13.

There is also an instrument called a *Protractor*, for measuring angles upon paper, which is represented in fig. 14, and consists of a semicircle divided into degrees, from 0° to 180° each way, the 90th degree being right above the centre o. The straight line A B in the figure, is the diameter of the semicircle, and is called the *fiducial* (or *true*) edge of the protractor to be applied to one of the legs of the angle to be measured; the arch A M B, being the fiducial edge to be applied to the other leg. Thus, in order to measure the angle X O Y, the centre of the instrument is placed on the vertex o of the angle, and the edge o A on the leg o Y, so as to coincide with it exactly; then the angle A O M, on the arch A M B, determined by the point M, through which the other leg o X passes, is the measure of the angle X O Y. In this case, the measure appears to be nearly 45 degrees, as the figure represents divisions on the arch or limb of the protractor at every five degrees.

Fig. 14.



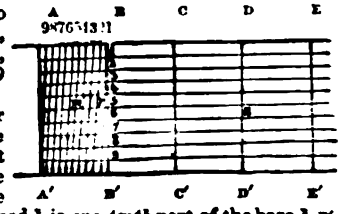
This apparatus for measuring angles is sometimes engraven on the upper side of a pair of parallel rulers, and sometimes on the obverse side of a plane scale. The protractor is more commonly made so that the centre of the semicircle, and the fiducial edge containing it, shall be on the outside of the instrument rather than on the inside, as above.

The *Plane Scale* is a flat ruler with several lines of equal parts, on one side, divided according to certain proportional parts of an inch; and having, on the other side, the *diagonal scale*, decimally divided so as to measure units, tens, and hundreds of equal parts, with a very considerable degree of exactness. The construction of this scale, so useful in graphical *(i.e. drawing)* operations, such as the construction of plans, maps, and charts, of architectural designs, of plans and sections of machinery, &c., is founded on the properties of similar triangles, as treated in the sixth book of Euclid. We shall endeavour to give our readers a practical idea of its construction.

On a straight line AB, (fig. 15,) divided into any convenient number of equal parts, AB, BC, CD, DE, &c., one, AB, is assumed as the standard unit of measure. From the different points, A, B, C, D, E, &c., perpendiculars of a convenient length, as AA′, BB′, CC′, DD′, EE′, &c. are drawn to the straight line AE, and terminated in the straight line A′E′ parallel to AE. The unit AB is divided into 10 equal parts; then the opposite part A′B′ is similarly divided; next the perpendicular BB′ is divided into 10 equal parts, and through each division, straight lines parallel to AE or A′E′ are drawn.

The divisions of the straight line AE are now marked with the numbers 1, 2, 3, &c., from C to E, to denote units. The divisions of the standard unit AB, are marked 1, 2, 3, 4, 5, 6, 7, 8, 9, from B to A, to denote tenth parts of a unit; and the divisions of the perpendicular BB′ are marked 1, 2, 3, 4, 5, 6, 7, 8, 9, from B to B′, to denote hundredth parts of a unit. Or, if the divisions of the straight line AE denote *hundreds*, those between B and A denote *tens*, and those between B and B′ denote *units*. The scale is rendered complete by drawing straight lines from B on BA, to 1 on B′A′; from 1 on BA, to 2 on B′A′; from 2 on BA, to 3 on B′A′; and so on, till one be drawn from 9 on BA, to A′ on B′A′.

Fig. 15.



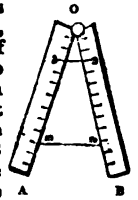
By the nature of similar triangles, hereafter to be explained, the small part of the parallel to the base 1 B′, within the triangle B 1 B′, at the division marked 1 is *one-tenth* part of the base 1 B′, and consequently *one-hundredth* part of the line AB; the small parts of the other parallels are in succession, *two-hundredths*, *three-hundredths*, &c. Hence, if a straight line is to be measured, take its length in the compasses, and apply it to the scale from B towards E. If it measures an exact number of units, say from B to E, then the straight line may be said to measure 3, 30, or 300 equal parts, according as AB is made to stand for 1 unit, 1 ten, or 1 hundred. If it does not measure from B to B exactly, but extends from B exactly to one of the division marks between B and A, say 4, then the straight line may be said to measure 3.4, 34, or 340 equal parts, according to the standard unit, as before. If it does not extend from B to the division marked 4 between B and A exactly, but falls somewhere between 4 and 5, then move the compasses downwards, preserving one point always in the line BB′, and both points parallel to AE, till the other point fall on the intersection of the diagonal marked 4, 4, with one of the parallel straight lines marked on BB′, say 6; then the straight line may be said to measure 3·46, 34·6, or 346 equal parts, according to the standard unit, as before.

For the purposes of navigation, dialling, &c., the plane scale has frequently on the side obverse to the diagonal scale just described, a set of lines, besides those of equal parts, containing divisions for the measurement of leagues, rhumbs, chords, sines, tangents, semitangents, secants, lines of longitude, &c. Such scales are considered the best, as they are generally executed with great care. The scale called Gunter's scale has the same divisions on one side of it, as are to be found on the plane scale, but of a larger size, and when well constructed, admitting of greater accuracy; but being usually made of boxwood, this is seldom the case. The obverse side of Gunter's scale, has a set of lines representing the logarithms of the numbers which denote these divisions; by means of the logarithmic lines, arithmetical calculations can be performed instrumentally, that is, without the operation of the ordinary rules. A modification of this instrument, called the sliding Gunter, is still more ingenious in its construction, and still more useful as an instrument of calculation. The explanation of these instruments, however, belongs to a more advanced state of knowledge among the generality of our readers. This we hope to reach by their perseverance.

One of the most useful instruments in a mathematical case, is the *sector*; a mere sketch of its appearance is given in fig. 16. It is composed of two flat rulers, moveable on an axis, or jointed at one end like a pair of compasses; hence, it is called by the French, *compas de proportion*,—the compasses of proportion. From the centre of the axis or joint, several scales are drawn on the faces of the rulers, so as to correspond exactly with each other. The two rulers are called the legs of the sector, and represent the radii of a circle; and the middle point of the joint, its centre. It contains a scale of inches, lines of equal parts, of chords, secants, and polygons, on one side of each leg; and on the other side of each leg, two lines of sines, tangents, &c., besides lines of the logarithms of the numbers expressing these quantities along the whole length of the sector, when stretched to an angle of 180 deg., as well as the logarithms of the natural numbers.

As in the case of the plane scale, we can here only give one or two examples of the use of the sector, by way of illustration. Thus, in the figure, O is the joint of the sector, O A and O B are its legs, the marks on the legs represent the divisions of the line, of lines or equal parts. Its use is to find straight lines that shall be to one another in a given proportion. Suppose, for example, that it was required to find a straight line whose length shall be to the length of a given line as 3 to 10. Open the sector until the distance of the two points marked 10 on its legs is equal to the length of the given line, which may be easily done by the help of a pair of common compasses or dividers; then, the distance of the two points marked 3 on its legs, will be the length of the straight line required.

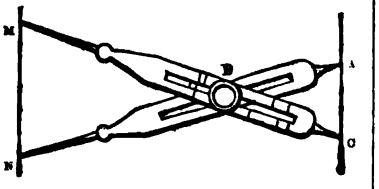
Fig. 16.



Again, suppose that two straight lines were given, and it was required to find their ratio to each other in numbers. Open the sector until the distance of the two points marked 10 on its legs, is equal to the length of the greater of the two given straight lines; then taking the length of the smaller of the two given lines in a pair of compasses, apply this distance to the two points of any number less than 10 marked on its legs, until it be found that it coincides exactly with that of two points having the same number, say 3; then the two given straight lines are to one another in the ratio of 10 to 3; or, in other words, the smaller is *three-tenths* of the greater.

The *Proportional Compasses*, called by the French *compas de reduction*—the compasses of reduction—are represented in fig. 17, and consist of two legs AN, CM, intersecting (*i.e.*, crossing) each other at any point within certain limits, according to the position of the button and screw B round which they are made to turn. These legs are graduated in such a manner that, by screwing the button at the proper place, the distance from A to C may be at pleasure one-half, one-third, one-fourth, &c., of the distance from M to N. By this instrument, a straight line may be easily divided into any number of equal parts, or into any other proportional parts required.

Fig. 17.



The invention of this instrument is claimed, by a recent writer, for James Besson, a French mechanician, who published an account of it in his "Théâtre des Machines," a work of which the plates were engraved before 1569. He says it is usually attributed to Justus Byrgius, who published his description of it in 1603. John Robertson, librarian to the Royal Society, in his "Treatise on Mathematical Instruments," London, 1775, ascribes the invention of a similar instrument to Fabricius Mordente in 1554, according to a statement made by his brother, Gaspar Mordente, in his book on the Compasses, published at Antwerp in 1584.

Questions on the preceding Lesson.

Describe the common ruler or straight edge, and the various purposes to which it is applied.

How is a straight line obtained in the practice of the mechanical arts?

Describe the various forms of the parallel ruler, and its use; and state the defect of the common construction.

How is the accuracy of a ruler to be tested, and what qualities should it possess?

Describe the nature of a pair of compasses, and its different uses. What are dividers? socket-compasses? the tracing point? the ink point? the crayon point? the lengthening bar? the bow and plug compasses? the beam compasses?

What is the tracer and drawing pen? the protractor and its use? the plane scale and its use? the diagonal scale? what does the distance M.N. or P.N. measure on the scale in fig. 15? take off the distances represented by the following numbers on the same scale; 376, 289, 174, 385, 3·2, 2·36 and 37·2.

Give some account of the plane and sliding Gunter's scales.

What is the sector, and its use? what its French name? what are the proportional compasses, and their use? what is the French name? who was its inventor?

LESSONS IN MUSIC.—No. II.

By the Rev. John Curwen.

It is important that the learner should become thoroughly and practically *familiar* with the structure of that musical "scale of all nations and of all time" which was partially described in the last lesson. The following account, by Colonel Thompson, who is no less distinguished for his philosophical and learned disquisitions on the science of music than for the other great services which, by pen and speech, he has rendered to his countrymen—the following account by him, of the first attempts of philosophy to measure this scale, will interest the student:—

Division of the String of a Monochord

DOH'
TE
LAH
SOH
FAH
ME
RAY
DOH

"The dispute upon this point (the application of science to music), is at least as old as the contest between Aristoxenus and the Pythagoreans, which dates as early as 300 years before the christian era. * * * The opposition of Aristoxenus was, in reality, nothing but a good ear declaring itself against a faulty division. The musical mathematicians of antiquity took as many as three successive steps into the truth, but their next was a marvellous blunder. * * *

"The histories of all nations refer to very early periods the discovery that certain successions or combinations of sounds have the effect upon the ear which is implied by *music;* and it may be assumed that in all countries a considerable degree of practical acquaintance has been acquired with the sounds before any person has thought of investigating the cause. The story of Pythagoras listening to blacksmiths' hammers, and discovering that the different sounds had some relation to the weights, has been sufficient to secure to that philosopher the renown of being the first who sought for the explanation of musical relations in the properties of matter. The account given by Nichomachus is, that Pythagoras 'heard some iron hammers striking on an anvil, and giving out sounds that made most harmonious combinations with one another, all except one pair,' which led him to inquire what were the peculiarities of the hammers which produced these different effects. Whether this is an exact account or not, some observation of this kind appears to have speedily led to the discovery, that *of strings of the same thickness and composition, and stretched by the same weight, those gave the same musical sound* (or were what is called in unison) *which were of equal lengths;*—that if of two strings in unison, as above, one was shortened by a half, it produced a sound which, though very far from being in unison with the sound of the other, might be heard contemporaneously with it, with a strong sensation of satisfaction and consciousness of agreement, and that the two sounds in fact bore that particular relation to each other by which two voices, of very different kinds, like those of a man and a child, can sing the *same* tune or air as really as if they sang in unison, being what musicians have since distinguished by the title of *octaves;*—that if, instead of a half, the string were shortened by a third part, there was produced a note which, heard either in combination with or succession to the first, created one of those marked effects which all who had attained to any degree of musical execution by the guidance of the ear had treasured up as one of the most efficient weapons in the armoury of sweet sounds, being what modern musicians name the *fifth;*—and that if, instead of a third part, it was shortened by a fourth, there was produced another note very distinct from the last, but which, like it, was immediately recognisable as one of the relations which experimental musicians had agreed in placing among their sources of delight, being the same which in modern times is called the *fourth.*

"So far, Pythagoras and his followers appear to have run well. Instead, however, of pursuing the clue of which they already had hold, and examin-

ing the effects of shortening the original string by a fifth part and by a sixth, they strayed into shortening the results of previous experiments by a third, and lengthening them by an eighth, * * and here was the beginning of sorrows. * * The attempt (beyond these three steps) at the division of the "Canon"—in other words, at the division of a string into the lengths which produce the sounds that make music in a single key—was a failure."—See "Exercises, Political, Literary, &c., by Lieut.-Colonel T. Perronet Thompson." Vol. II., Article "Enharmonic of the Ancients." See also his "Theory and Practice of Just Intonation," a shilling pamphlet, published by Effingham Wilson.

The experiments of modern philosophers have been rewarded with the discovery that a musical string divided in the proportions given underneath will produce the notes of the scale as there described. Let it be noticed that the figure 1 stands for the whole length of the string, whether a foot, a yard, or any other measure, and whatever sound (in pitch) it gives—that sound being taken for the key note—DOH. It may also be mentioned that the same numbers denote the comparative lengths of organ pipes capable of sounding the corresponding notes.

Name of Notes.	DOH	RAY	ME	FAH	SOH	LAH	TE	DOH¹
Length of String.	1	8/9	4/5	3/4	2/3	3/5	8/15	1/2

Perhaps these proportions will be better understood by the diagram in the preceding column. A single string thus stretched and used for these experiments is called a monochord. If the student is a mechanic, let him make one and verify the measurements here given. Let him suspend a board of four or five feet against a wall. To the upper part of this board fasten the end of a pianoforte-wire or other musical string which is of the same thickness throughout. Let the wire pass down the face of the board, over a firm wooden bridge, an inch or so high, and close to the top, and over a moveable bridge at the bottom; and let it be kept stretched by a heavy weight. Set your moveable bridge (which the weight will keep in its place) at the bottom, marking the spot, and take the sound of the whole string, by the help of a fiddle-bow, for your DOH, or key-note. Then (having properly measured and marked the board) move the bridge to the other divisions, sounding each note as before. It may be well to mention that Colonel Thompson maintains, and with good show of reason, what he calls the "duplicity" of RAY and TE. They are *sometimes* sounded by good singers and violin-players a very small degree lower than their usual position given above. These experiments will fix in your mind a clear notion of the scale.

It will be well for you to understand the connexion between these musical notes and the *vibrations* of the sonorous body which produces them,—whether that body be the string of a violin, the air in an organ pipe, a small plate of glass or metal, or the "chordæ vocales"—the vocal chords—of that wonderful little box instrument, called the "larynx," which you can feel in your own throat. Sounds produced by *irregular* vibrations are not musical. They form the "roar, rattle, hiss, buzz, crash," or some other noise. But sounds produced by equal and regular vibrations are musical. "That musical notes are produced by a rapid succession of aërial impulses at equal intervals, is very clearly illustrated by an instrument called the *syren*, the invention of Cagniard de la Tour. A blast of air is forced through a narrow aperture in a pipe; and a flat circular disk, perforated near its circumference with a number of small holes equidistant, and in a circle concentric with the disk, is so applied to the pipe, that the blast is interrupted by it, excepting when one of the holes in the disk is opposite to that of the pipe; and when the former is made to revolve rapidly, the resulting aërial impulses cause a series of isochronous vibrations that produce a musical note, and the corresponding number of its vibrations can very easily be computed, from knowing the number of holes and of revolutions of the plate. The results obtained by this instrument agree exactly with those found by other methods." (See the work on "Acoustics" in Chambers's Educational Course). The more rapid the vibrations of the sonorous body, the more "acute" (shriller, or higher) the note produced. The following are the results of such experiments as those just referred to. Arithmeticians may notice that the proportion of the *vibrations* is *inversely* as the *length of the strings* given above. But we here print the fractions with a common denominator to make the relations more obvious.

THE NOTES OF THE SCALE.	DOH	RAY	ME	FAH	SOH	LAH	TE	DOH¹
The proportion of vibrations given by each note.	24	27	30	32	36	40	45	48
While the key note gives the following number	24	24	24	24	24	24	24	24

If our arithmetical friend will now work a few sums in proportion, he will be able to show the value of the intervals *between* the several notes of this scale. Thus the vibrations of DOH differ from those of RAY, in being *three* less, and (three being one-ninth of twenty-seven) DOH has therefore only *eight-ninths* of RAY's vibrations. The same proportion will be found between FAH SOH, and LAH TE. These intervals are called the "great tones." The proportion of RAY ME, and of SOH LAH is *nine-tenths*. These are the "small tones." The proportion of ME FAH, and of TE DOH, is *fifteen-sixteenths*. These are called semitones, or more properly, Tonules. If you calculate from the length of the string given above you will find still the same proportions existing.

Let our arithmetical friend reduce these "ratios," or proportions, of the three intervals *in* the scale to fractions having a common denominator. They will then stand thus:—

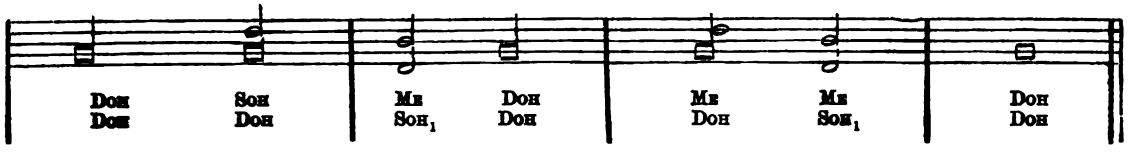
THE GREAT TONE = 1280/1440 THE SMALL TONE = 1296/1440 THE TONULE = 1350/1440

Now this evidently means that the lower note of the "great tone" has 1280 vibrations, while the higher note has 1440, and (as the lengths of string are in inverse proportion to the vibrations) that it takes 1440 degrees of the string, while the higher takes only 1280 such degrees. Therefore the proportional *difference between* them, whichsoever way you look at it, is *one hundred and sixty* degrees. In the same way you will find that the difference between the two notes of this "small tone" is *one hundred and forty-four* degrees, and that the interval of the "tonule" is *ninety* degrees. The degrees in each case are of similar value, all measured on the same scale (common denominator) of 1440 degrees. We may therefore treat them as belonging to one scale, and adding three "great tones," two "small tones," and two "tonules" together, we shall obtain a perfectly measured scale of 948 degrees. As all these numbers, however, will divide by 2, retaining, of course, the same proportion to one another, it is better to regard the scale as composed of 474 degrees, containing three "great tones" of 80 degrees, two "small tones" of 72 degrees, and two "tonules" of 45 degrees, and this is the smallest perfect measurement of the scale in plain figures. But if the pupil will go one step further, and divide each of these intervals by nine, he will see how we obtain the *proximate* scale of fifty-three degrees. The tonule will be exactly 5 degrees, the small tone exactly 8 degrees, and the great tone only one-ninth of a degree less than 9 degrees. Adding these together, as before, you will have the "Index Scale," as Colonel Thompson calls it, "of fifty-three," and you will see that it is three-ninths or one third of a degree too large. We strongly advise the pupil to construct a "monochord," and try for himself whether this is not in truth an accurate description of that scale of related notes which God has made most suitable to human ears and souls. All the books of science are agreed that it is; and experience bears the same testimony. It is the more important that you should understand these points, because the true scale is dreadfully abused by the common keyed-instruments. Many of these are tuned by what is called "equal temperament;" that is, the scale is divided into twelve equal semitones, and it follows that the tones are all 79 degrees (of the perfect scale of 474), while they *ought* to be sometimes 80 and sometimes 72 degrees! and the tonules (semitones) are both 39½ instead of 45!! They might as well cut down the fingers of a statue to "equal temperament!" Human ingenuity will surely deliver us soon from this monstrous

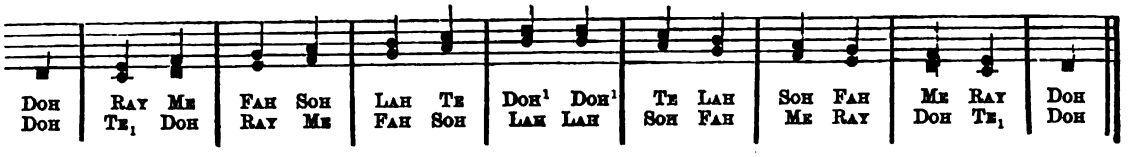
distortion. You will understand now why it is so often pleasanter to sing "without the piano."

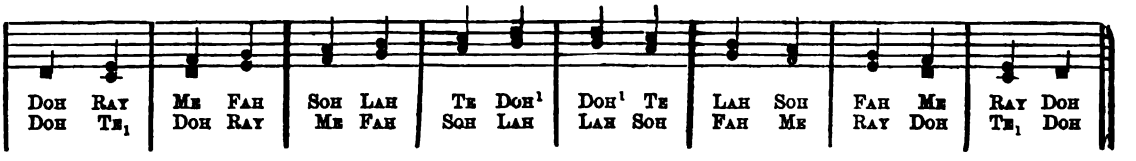
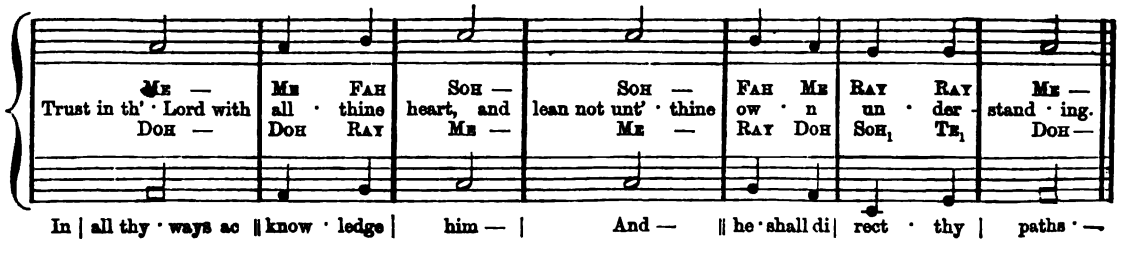
You will have noticed, in connexion with these statements, that a sound produced by twice the number of vibrations (or half the length of string), as compared with any other sound, is so much like that other sound as to be called by the same name,—thus, DOH and DOH^1. Notes thus related are said to be at the interval of an "octave" (eighth), the one to the other. They are also called "replicates" of one another. Each note of the scale, therefore, has its higher and lower replicates as far as the voice can reach. A figure "one" (or "two," if needed) above the note shows that it is the higher replicate. A figure below a note shows it is the lower replicate. Be careful to notice this in connexion with the exercises which follow.

EXERCISE 5.—KEY G.



NOTE.—In this exercise take a middle sound of your voice (neither high nor low) for the key-note or DOH. A friend again will be needed to set you a "pattern" with voice or instrument. Tell him to play or sing G, D, B, G, B, B, G. He may understand these names better than those by which you are learning, and to which *your* attention must at present be confined. Take care to sing the upper SOH with a clear trumpet-like sound, and ME with a calm but firm effect. Sing the exercise *slowly*, but with sustained decision. It will greatly add to your pleasure if you can get a friend to sing the second line of notes while you are singing the first. This exercise, too, will give you confidence. [If you are singing from the staff above, remember that one voice will take the higher notes of each couple while the other voice is taking the lower notes. The open notes, which you have here, *when they occur in the same tune* with the black notes, which were used in the former exercises, are to be sung twice as long, in time, as the black notes; and the open notes without a stem, like the last note in this exercise, are to be twice as long as those with a stem. This relative length does not however hold true out of the same tune. An open note in one tune may be no longer than a black note in another, and a black note in one tune no shorter than an open note in another. Let it, however, be repeated that it will be much better for the learner not to pay any attention at present to the old "notation" (way of writing), or to the remarks thus placed between brackets. He may get his mind puzzled with the notation of music, when he ought to be giving his whole attention to music itself. Sing exclusively from the syllables, and never leave an exercise until you can sing it correctly *from memory*, pointing on the modulator the while.]

EXERCISE 6.—KEY D (OR C).

NOTE.—Take some low sound of your voice for this and the next exercise. Be careful to give an "accent" (additional *force*, not length of sound) to the notes which follow an upright bar. The exercise which follows differs from the present only in this quality of "accent," and yet how great the difference! Learn to sing both the upper and the lower "parts."

EXERCISE 7.—KEY D (OR C).

EXERCISE 8.—BRAILSFORD'S CHANT.—KEY F.

ME — ME FAH SOH — SOH — FAH ME RAY RAY ME —
Trust in th' · Lord with all · thine heart, and lean not unt' · thine ow · n un · der · stand · ing.
DOH — DOH RAY ME — ME — RAY DOH SOH$_1$ TE$_1$ DOH —
In | all thy · ways ac ‖ know · ledge | him — | And — ‖ he · shall di | rect · thy | paths · —

NOTE.—The learner's attention is directed exclusively to that which lies *between* the two staves of five lines. Do not attempt the words until you have perfectly mastered the syllables. Tell your musical friend, who sets you the "pattern," to play in the treble clef with one flat. If, however, you can sing the "scale" with accuracy you will not need his help. Take some *rather* low sound for DOH. Sound the "tonic chord," or DOH, ME, SOH. Let the three notes be well established in your ear. Then notice

found in the *stem*. Thus the stem or form on which the cases of *pater* are formed is *patr;* by inserting *e*, the stem *patr* becomes *pater*, the *nominative* case.

Requesting you to call these changes in the terminations of nouns and adjectives *case-endings*, I add that these *case-endings* are to be termed the Latin *signs of the cases*. For these Latin signs there are corresponding English signs; the English signs give (in part) the meaning of the Latin signs. Thus, *of* is the English sign and meaning of the Latin genitive *i*; *to* or *for* is the English sign and meaning of the Latin dative *o; by, with* or *from*, is the English sign and meaning of the ablative *o*. Now as in Latin the *o* of the dative is not in form distinguished from the *o* of the ablative case, some difficulty arises in reading Latin. This difficulty grows less by practice, and eventually disappears, for the sense points out in each instance whether the dative or the ablative case is the case intended by the author. Something similar exists in English; for, since, as I have shown you previously, the nominative and the objective, or the subject and the object, are in our nouns the *same in form*, we learn only by the sense which of the two is meant. With us, however, there is no difficulty, because the sense is determined by the position, for in English, in general, the subject *precedes*, the object *follows*, the verb. Inasmuch, however, as the subject in English undergoes no change in becoming the object, and inasmuch as no preposition goes before either subject or object, so have we no natural English sign for the Latin *nominative* or the Latin *accusative*, and consequently are forced to indicate the former by the word *subject*, and the latter by the word *object*. Finally, the English sign of the *vocative* is O; the corresponding Latin sign is in some nouns *e*, in others the form in the vocative is the *same* as the form in the nominative. Having given these explanations, I place under your eye at once the *case-endings* of a noun in Latin, with the corresponding English signs.—

	Singular.		Plural.	
	Latin Case-endings.	English Signs.	Latin Case-endings.	English Signs.
Nominative	*us*	(subject)	*i*	(subject)
Genitive	*i*	*of*	*orum*	*of*
Dative	*o*	*to* or *for*	*is*	*to* or *for*
Accusative	*um*	(object)	*os*	(object)
Vocative	*e*	O	*i*	O
Ablative	*o*	*by, with,* or *from*	*is*	*by, with,* or *from*

You thus see that in Latin the *case-endings* of the singular are different from the *case-endings* of the plural. You also see that the English signs are the same in both *singular* and *plural*. For the sake of comparison, we commonly use a contraction for the names of the cases; thus, N. or Nom. for nominative; G. or Gen. for genitive, and so on with the rest. The *case-endings* which I have just set before you are not the case-endings of all the Latin nouns. I have given these because they are the most distinct. Others, however, must not be omitted. I will exhibit them to you first in succession, and then the whole combined in one view. In order to do so, I must set before you what are called the *declensions*. The *declensions*, or *methods* in which the *falls of the cases* take place, are in number *five*. To express the same thing differently, in order to assist you in understanding what I mean, I add that all the Latin nouns have by grammarians been arranged into *five classes*. In this classification regard has been had to the termination of the *genitive case singular*. Thus in the *first declension* the *genitive case* of the *singular number* ends in *ae* diphthong, pronounced like our *ee*; in the *second declension* the *genitive* ends in *i:* in the *third*, in *is;* in the *fourth*, in *us;* in the *fifth*, in *ei*. These endings are termed the signs of the declensions, and may be thus presented :—

Declensions	1st	2nd	3rd	4th	5th
Signs	*ae*	*i*	*is*	*ûs*	*ei*

The sign of the *fourth* declension has a circumflex accent A over it, in order to distinguish it from other cases, namely, the nominative *us*, and the accusative *us*. In the same way over the *ablative* case of the first declension, we put a circumflex accent thus, *â*, as in *femînâ,—by, with,* or *from a female*, in order to distinguish the ablative case or form from the nominative *femina,—a female*. You may here be informed that adjectives are for the most part declined, that is, form their cases in the same manner as the nouns which correspond with them in form; for instance, *bonus*, ending in *us*, is declined like *dominus*, which also ends in *us;* and *bona* ending in *a*, is declined like *femina*, which also ends in *a*.

A preliminary remark must be made respecting the *article*. The Latin language is *without an article*. Neither the definite article *the* nor the indefinite article *a* is found in Latin. Consequently, we cannot from the form, tell whether *femina* should be translated *female, a female*, or *the female*. In this particular there is, in construing or translating from the Latin, no other guide than the sense as it may be gathered from the general import of the sentence or the narrative; and you will also now be aware that *female, a female*, and *the female*, are equally to be put into Latin by *femina*.

Questions for Examination.

What do you mean by a *proposition?* By what other terms may it be designated? what is the *copula?* the *subject?* the *object?* the *attribute?* Give an instance of a *simple* proposition. Give an instance of a *complex* proposition. What two parts of speech must the simplest proposition contain? How do English adjectives differ in form from Latin adjectives? what do you mean by *concord?* How many *concords* are there? repeat the general rule. What is meant by *case?* by *declension?* how many *cases* are there in Latin? how many *declensions?* give the Latin sign of the *fifth declension;* of the *first;* of the *fourth;* of the *second;* of the *third*. When does one noun require another to be in the *genitive case?* By what question may you find the *dative case?* the *ablative case?* the *nominative case?* how do you know the *vocative case?* Is the *nominative* really a case? what are *case-endings?* what are the *English signs?* Are the *case-endings* of all the Latin nouns the same? how is the *ablative case singular* of the *first* declension distinguished from the *nominative case singular?* what is the stem of *bonus?* when *bonus* is connected with a feminine noun, what does it become? What does "*government*" mean in Latin Grammar? what is the Latin sign of the English *by?* of the English *for?* what is the English sign of the Latin *arum?*

LESSONS IN ARITHMETIC.—No. IV.

RULE OF SIMPLE ADDITION.

This rule, although called *Simple* Addition, is confessedly one of the hardest rules in Arithmetic; not so much on account of its actual difficulty, as on account of its irksomeness, and the liability of the computer to forget at every step the sum which he has gained. We shall endeavour to obviate this by a piece of practical advice as we proceed; in the meantime, we state the *general principle* on which the rule is formed, viz.—*Like things can only be added to like;* or, in other words, *if things are not alike they cannot be added together*. For example, if any one were to ask the question, what is the sum of 5 apples and 6 pears? The answer would simply be, we cannot tell; or, in other words, there is no answer to this question. We know that the sum of the numbers 5 and 6 is 11; but we cannot say that 11 is the answer to the question; because 5 apples and 6 pears, do not make either 11 apples, or 11 pears. In like manner, we cannot add units to tens, tens to hundreds, or hundreds to thousands, and preserve their individuality; but we can reduce the numbers of higher name into their equivalents of the lower name, and thus combine them by addition, when required. Hence arises the following rule for the addition of large numbers, that is, when they consist of several ranks and periods.

Rule. Arrange the numbers to be added together, in such a manner that the units' figure of each may stand all in one vertical or upright column; the tens' figure of each, in another to the left of the units' column; the hundred's figure of each, in another to the left of the tens' column; and so on, till all the figures of each number be arranged in their own proper columns. Then draw a line under all the columns, and beginning at the unit's column, find the sum of all the figures it contains; if this sum does not exceed 9, place it under the line in its proper column or place of units; and proceed to do the same with the figures in the column of tens. But, if the sum of the figures in the units' column reaches the number 10, then put a cipher in the units' place under the line, and increase the column of *tens* by 1. This is called, in the language of the schools, *carrying one* to the next column. Again, if the sum of the figures in the units' column exceed 10, then put the units'

figure of the sum under the line in the units' place, and *carry the number of tens* to the next column; that is, if the sum of the units' column be among the *teens*, carry *one*, as before; and if it be among the *tys*, carry the *number of the tys* or *tens* to the next column.

Having found the sum of all the figures in the tens' column, including the number of tens carried from the units' column, if this sum does not exceed 9, place it under the line in its own proper column or place of tens, and proceed to do the same with the figures in the column of hundreds. But if the sum of the figures in the tens' column reaches the number 10, it is then *ten tens*, or a hundred; you therefore put a cipher in the tens' place under the line, and increase the column of *hundreds* by 1; that is, *carry one* to the next column. Again, if the sum of the figures in the tens' column exceeds 10, then put the units' figure of the sum (which is so many tens) under the line in the tens' place, and *carry the number of hundreds* (which is so many tens of tens) to the next column; that is, if the sum of the tens' column be among the *teens*, carry *one*, as before; and if it be among the *tys*, carry the number of the *tys* or *tens* to the next column. Proceed in the same manner with the successive columns of hundreds, thousands, tens of thousands, &c., whatever be their number; and under the last column, to the left, of course, place the sum of all the figures in that column, so that the units' figure of the sum may be under the line in the proper place of the column to which it belongs, and the tens' figure of the sum (if it contain any) in the place of the column which would have been to the left of that column had there been one more column of figures to be added.

In the preceding rule we have supposed that the sum of any column of figures may not exceed 99; if this, however, should be the case with any sum, the rule still is to put down the units' figure of the sum under the column to which it belongs, and to *carry the number of tens*, which may be so great as to reach a hundred and upwards. In these cases the simplest rule is to put down the right hand or units' figure of the sum, and carry the rest of the figures, as they stand, at once to the next column; thus, if the sum of any column was 175, the rule requires that the units' figure 5 should be put down under the line in its proper column, and that 17 should be carried to the next column, and added along with the figures of that column. In order to make the learner familiar with the mode of operation to be followed in this rule, we shall give some examples.

EXAMPLE 1.—Add together the following numbers:—56374, 89768, 37845, 97683, 98989, 76876, 79888, and 12345.

	Hundreds of thousands.	Tens of thousands.	Thousands.	Hundreds.	Tens.	Units.
		5	6	3	7	4
		8	9	7	6	8
		3	7	8	4	5
		9	7	6	8	3
		9	8	9	8	9
		7	6	8	7	6
		7	9	8	8	8
		1	2	3	4	5
Sum	5	4	9	7	6	8

MODE OF OPERATION.

Here, beginning with the column of units at the bottom, and just above the line there drawn, you say, if you follow the ordinary manner, 5 and 8 make 13; 13 and 6 make 19; 19 and 9 make 28; 28 and 3 make 31; 31 and 5 make 36; 36 and 8 make 44; 44 and 4 make 48; then 48 is the sum of the figures in the first or units' column. Now, here we shall give the piece of advice we promised; and it is this:—In order to avoid the repetition of the names of the successive sums arising from the addition of each figure as it comes in order, you should just look at each figure without naming it, perform the operation mentally, and utter the names of the successive sums only once, as they come in order, till you come to the last; thus, 5, 13, 19, 28, 31, 36, 44, 48. You now put 8 under the line, in the place or column of units, and carry 4 (as tens) to the next column, which is the column of tens. Then, proceeding as before, beginning with the figure or number you have *to carry* (that is *to add* to the next column), you say, 4, 8, 16, 23, 31, 39, 43, 49, 56. Now, put 6 under the line, in the place or column of tens, and carry 5 (as hundreds) to the next column, which is the column of hundreds; and for this reason, that 56 tens, make 5 hundreds and 6 tens. Again, you say, 5, 8, 16, 24, 33, 39, 47, 54, 57; and put 7 under the line, in the place or column of hundreds, and carry 5 (as thousands) to the next column, which is the column of thousands; and for this reason, that 57 hundreds make 5 thousands and 7 hundreds. Proceed in this manner until you reach the sum of the last column on the left, which is 54; and then put 4 under the line, in its own proper column, which is tens of thousands, and 5 under the line in the next column, which is hundreds of thousands; and for this reason, that 54 tens of thousands make 5 hundreds of thousands, and 4 tens of thousands. In this way you find the sum of the numbers proposed in the question—viz., 549,768; or, five hundred and forty-nine thousand, seven hundred and sixty-eight.

EXAMPLE 2.—Find the sum of the numbers: 56, 4008, 973, 48973, 101, 497856, 3001, 999, and 50103.

					5	6
			4	0	0	8
				9	7	3
		4	8	9	7	3
				1	0	1
	4	9	7	8	5	6
			3	0	0	1
				9	9	9
		5	0	1	0	3
Sum	6	0	6	0	7	0

METHOD OF OPERATION.

Here, the method of performing the operation of addition is the same as before. The numbers both of this and the preceding example, are placed in lined columns to enable the learner to follow the process with accuracy and clearness. After he has acquired some practice in addition, of course it will be advisable to omit the lines between the columns, and to place the numbers so carefully under each other, that no mistake may arise in computation, from going out of one column into another while finding the sum of any particular column. The sum of the figures in the first column in this example is 40; therefore a cipher is put in the place of units, and 4 is carried to the next column. The sum of the figures in the second column, with this 4, is 37; therefore, 7 is put in the place of tens, and 3 is carried to the next column. The sum of the figures in the third column, with this 3, is 40; therefore, a cipher is put in the place of hundreds, and 4 is carried to the next column. Proceeding in this manner we reach the last column to the left, and the sum of the whole of the given numbers is 606070, which is the answer required.

PROOF OF ADDITION.

There are various ways of proving addition, that is of testing or trying the accuracy of the operation, by performing it in another manner. One of these is to perform the addition by beginning to find the sum of the figures in each column at the top, instead of at the bottom, and proceeding downwards until the whole of them are added together. This method proceeds on the very obvious principle, that *if numbers are to be added together, it is of no importance, as regards the final result, in what order they are taken;* for, if correctly added, they are sure to give the same sum, namely, the collection of all the units of which they are composed.

Another method is to divide the numbers into two, three, or more sets, as may be found convenient; add each of these sets separately; then, collect all these partial sums into one sum, and it will be the complete sum of all the given numbers. This method is founded on the obvious principle, that *the whole is equal to the sum of all its parts, in whatsoever way the sum of these parts may be found.* To make this method plain, we shall apply

it to the first example given above. Here, taking the first four numbers and finding their sum, and the last four numbers and finding their sum, they stand as follows:—

First four lines.	Second four lines.
56374	98989
89768	76876
37845	79888
97683	12345
1st partial Sum 281670	2nd partial Sum 268098

Now taking these partial sums, and adding them together as follows, we have the true sum of all the numbers; thus:—

1st partial Sum	281670
2nd partial Sum	268098
Total Sum	549768

As this result agrees with the former, the proof is considered complete. The best proof in general, however, is repeating the operation of addition several times both ways; that is, first computing the sum from the bottom of the columns to the top, and then from the top to the bottom, until the computer is perfectly satisfied that he cannot be mistaken.

Questions on the preceding Lesson.

1. Find the sum of all the numbers from 1 to 100.

2. 142857 + 428571 + 285714 + 857142 + 571428 + 714285 + 142857.

3. 9034781 + 57 + 4897 + 309 + 587896 + 369875625 + 1876 + 398 + 79 + 8.

4. Arrange the nine digits in the form of a square, that is, in three rows of three figures each, so that when the columns are added vertically (up and down), horizontally (from side to side), or diagonally (from corner to corner), they will still produce the same sum.

5. As another exercise of the same kind, but on a larger scale, we extract the following square from Professor De Morgan's "Elements of Arithmetic," in which the columns also added vertically, horizontally, or diagonally, will all produce the same sum, thus affording *twenty-three* different exercises in addition:—

2016	4212	1656	3852	1296	3492	936	3132	576	2772	216
252	2052	4248	1692	3888	1332	3528	972	3168	612	2412
2448	288	2088	4284	1728	3924	1368	3564	1008	2808	648
684	2484	324	2124	4320	1764	3960	1404	3204	1044	2844
2880	720	2520	360	2160	4356	1800	3600	1440	3240	1080
1116	2916	756	2556	396	2196	3996	1836	3636	1476	3276
3312	1152	2952	792	2592	36	2232	4032	1872	3672	1512
1548	3348	1188	2988	432	2628	72	2268	4068	1908	3708
3744	1584	3384	828	3024	468	2664	108	2304	4104	1944
1980	3780	1224	3420	864	3060	504	2700	144	2340	4140
4176	1620	3816	1260	3456	900	3096	540	2736	180	2376

6. We add another example of the same kind, which will afford 15 exercises on larger numbers than those in the preceding square:—

2177956	4652906	1583968	4058918	989980	3464930	395992
494990	2276954	4751904	1682966	4157916	1088978	2870942
2969940	593988	2375952	4850902	1781964	3563928	1187976
1286974	3068938	692986	2474950	4256914	1880962	3662926
3761924	1385972	3167936	98998	2573948	4355912	1979960
2078958	3860922	791984	3266934	197996	2672946	4454910
53906	1484970	3959920	890982	3365932	296994	2771944

LESSONS IN ENGLISH GRAMMAR.—No. IV.

NOUNS (*continued*).—NUMBER.

Number is the distinction of one object from many. We have already said that nouns have two numbers—the *singular*, which expresses only one object, as *a book*; the plural, which expresses two or more objects, as *books*. For this and some other particulars as to number, we refer to our last lesson, only adding that some nouns are always expressed in the plural—such, for example, as *snuffers, scissors, bellows, tongs, pincers*, and many other things formed of two or more parts, and which cannot be separated without making the thing imperfect. Such words as *wages, thanks, riches, respects*, are also included in this class.

The ways in which the plural number is formed are so various, that your close attention will be necessary.

The most common and simple mode of forming the plural is that of adding the letter *s* to the singular, which is the root, or the radical form of the word, thus:—

Singular.	*Plural.*	*Singular.*	*Plural.*
Apple	Apples	House	Houses
Book	Books	Sofa	Sofas
Cloud	Clouds	Table	Tables

Ch, sounded hard, like *k*, admits only of *s* to form the plural, as, *monarch* in the singular, is written *monarchs* in the plural. But when a singular noun ends with *ch* soft, *sh*, *s*, *ss*, or *x*, the plural is formed by adding *es*, thus:—

Singular.	*Plural.*	*Singular.*	*Plural.*
Beech	Beeches	Page	Pages
Bolus	Boluses	Prince	Princes
Lass	Lasses	Tax	Taxes
Lash	Lashes	Breeze	Breezes

This rule applies also to some nouns which end in *o*, preceded by a consonant. Thus *hero*, singular, makes *heroes*, plural. Exception to this rule will, however, be found in all modern books, in such words as *grotto, portico, halo, canto, solo, two, folio, quarto, octavo, duodecimo*, &c. To these words *s* only is now added, by most writers, to form the plural.

Singular nouns ending in *y*, preceded by a consonant, form the plural by changing *y* into *ies*, as in the words following:—

Singular.	*Plural.*	*Singular.*	*Plural.*
Company	Companies	Fairy	Fairies
City	Cities	Lady	Ladies
Cherry	Cherries	Beauty	Beauties
Spy	Spies	Vanity	Vanities

But nouns ending in *ey* in the singular are formed in the plural by adding *s* only, as

Singular.	*Plural.*	*Singular.*	*Plural.*
Alley	Alleys	Delay	Delays
Attorney	Attorneys	Galley	Galleys
Boy	Boys	Key	Keys
Covey	Coveys	Valley	Valleys

These exceptions are formed in consequence of a vowel having been used before in the same syllable. There are also some nouns ending in *ey* in the singular, in which the plural is formed by adding *ies*; thus *money* in the singular is spelt *monies* in the plural; *journey* in the singular, *journies* in the plural; *chimney* in the singular, *chimnies* in the plural.

Nouns which end in *f* or *fe* in the singular number, are formed in the plural by changing the *f* or *fe* into *ves*, as

Singular.	*Plural.*	*Singular.*	*Plural.*
Calf	Calves	Life	Lives
Half	Halves	Self	Selves
Knife	Knives	Shelf	Shelves
Leaf	Leaves	Thief	Thieves
Loaf	Loaves	Wife	Wives

There are, however, exceptions to this rule; the following nouns in the singular number become plural by the addition of *s* only, as:—

Brief	Dwarf	Hoof	Puff
Chief	Grief	Muff	Roof
Cliff	Gulf	Mischief	Ruff
Cuff	Handkerchief	Proof	Scarf

And other nouns with similar endings. Also such nouns as *fife*,

strife, safe, &c. But *staff* and *wolf* in the singular are made *staves* and *wolves* in the plural.

The noun *man* and all its compounds, form the plural by changing the *a* into *e*; as *man, men; woman, women; footman, footmen; statesman, statesmen.* Other nouns take *en*, or *ren*, to form their plural; thus, *child, brother, ox*, in the singular, become *children, brethren, oxen*, in the plural.

The plural of some nouns is *irregularly* formed; as for example:—

Singular.	*Plural.*	*Singular.*	*Plural.*
Foot	Feet	Tooth	Teeth
Goose	Geese	Penny	Pence
Mouse	Mice	Die	Dies

A *die*, the stamp used in coining, embossing, &c. takes the regular plural, and becomes *dies*. *Dice*, the small square piece of ivory used by gamesters, is generally spelt only in the plural.

Some nouns have two forms of the plural, and two different meanings. The noun *brother* has two plurals in use, namely, *brothers*, and *brethren*. *Brothers* is applied to natural relations, as when we speak of *brothers* and sisters; or when we say James and Charles are *brothers*: the word *brethren* is used in a more figurative sense; as men and *brethren;* or, all men are *brethren;* or *brethren* should love one another. The noun *index* has two plurals, *indexes* and *indices; indexes* mean tables of contents; *indices*, signs in algebra. The noun *penny* has two plurals; *pennies*, meaning a number of separate coins; *pence* expressing the value in reckoning up; as, I have six *pennies*, or, It cost me *sixpence*.

Many nouns taken from foreign languages retain their original plurals. A few examples may be given:—

The French	*Beau*	makes	*Beaux*	in the plural.
The Hebrew	*Cherub*	,,	*Cherubim*	,,
,,	*Seraph*	,,	*Seraphim*	,,
The Greek	*Phenomenon*	,,	*Phenomena*	,,
The Latin	*Erratum*	,,	*Errata*	,,
,,	*Magus*	,,	*Magi*	,,
,,	*Genus*	,,	*Genera*	,,
,,	*Radius*	,,	*Radii*	,,

And such words as *addendum, arcanum, datum, desideratum, dictum, medium, memorandum, stratum*, &c. change the *um* into *a* in order to form the plural; as *addenda*, &c.; *us* in the singular becomes *i* in the plural. Where the singular ends in *ex* or *ix*, the plural ends in *ices;* where words end in *a* in the singular, they take *æ* in the plural. To give all the examples would occupy very considerable space. Those who study our Latin and other lessons will obtain a key to the whole.

The names of many herbs are used only in the singular; as, *asparagus, grass, mint, spinach, balm, marjoram, parsley, sage.* Among the exceptions, are:—

Singular.	*Plural.*	*Singular.*	*Plural.*
A nettle	Nettles	A poppy	Poppies
A lily	Lilies	A cabbage	Cabbages

The names of several sorts of corn, pulse, and other articles of food are said to have no plurals, though many of them denote things which consist of two or more parts, and are therefore, strictly speaking, plural. *Barley, wheat, rye, honey, milk, butter*, &c. cannot be rendered in the plural, though the words are often used to describe large quantities; but *ale, beer, bread, soup, stew*, &c. may be rendered in the plural, and are often so rendered by having an *s* added to the singular, as *ale, ales*; &c.

Two or more nouns united and forming one complex name, or a name and a title, or two names, have the plural termination annexed to the last only, as *the Miss Smiths*, or, *the three Dr. Clarkes*, or, *the two Mr. Thomsons;* or, *queen consorts*, lord *chancellors*, lord *lieutenants, colonel majors*, &c. These terminations may not be critically correct, but general usage has decided in their favour.

The words *spoonful, mouthful*, &c. are compound nouns which cannot be divided; their plurals are *spoonfuls, mouthfuls*, &c.

The words *means, news*, and *pains*, are used both as singular and plural nouns.

There are cases in which no change is made to denote plurality, as in *stone*, meaning weight; *sail*, signifying ships; *stand*, when applied to arms; *head*, referring to cattle; *foot*, infantry; *horse*, cavalry; *brace, leash, dozen, hundred, thousand*, &c. The neglect of the plural termination in such cases may not be strictly grammatical, but, as we have said above, common usage may justify the neglect and preserve us from the charge of vulgarity.

As to the use of capital letters. A *proper noun* ought always to begin with a capital letter. In cases where a noun is used both as a common and a proper noun, the capital letter should be employed when it is used in the latter way. Thus we say, Many *dukes* were present, but those most noticed were the *Duke* of Wellington, and the *Duke* of Richmond. Or, In the Exhibition were the portraits of three *queens*, the *Queen* of England, the *Queen* of Spain, and the *Queen* of Portugal. In books printed during the last century, the first letter of every noun was made a capital; capital letters are now used but sparingly.

QUESTIONS ON THE FOREGOING LESSON.

What is meant by number?
Have all nouns the plural number?
What is the most common mode of forming the plural?
In what cases are the plurals formed by adding *es*?
How is the plural formed when the noun ends with *y* preceded by a consonant?
When a noun ends in *ey*, how is the plural formed?
Into what form must *f* or *fe* be changed to make the plural?
Mention some exceptions to this rule.
Give some instances of irregularly-formed plurals.
Have not some nouns two forms of the plural?
Are the names of herbs used in the singular or plural?
What is the modern custom as to the use of capital letters in the spelling of nouns?

LESSONS IN ANCIENT HISTORY.—No. II.

By Dr. R. FERGUSON.

You will remember that our first lesson carried us as far down as the reign and the conquests of Sesostris or Rameses the Great. This prince was the most celebrated of the Egyptian monarchs, while the victories ascribed to him are so mighty and so remarkable that it has been a question whether such a personage ever lived. Not only did he subdue the mountainous districts east of Egypt, and part of the Arabian peninsula, but his fleet scoured the Indian seas, and his expeditions extended as far as the western coast of Hindostan. Ethiopia also became subject to his arms, and was compelled to pay a tribute of ebony, gold, and elephants' teeth. His campaigns in Asia and Europe were equally successful, while his exploits in the neighbourhood of Assyria and the Euphrates are represented in the sculptures of the tomb of Osymandyas, which are thus described by a modern writer:—

"On the north face of the eastern pyramidal-tower is represented the capture of several towns from an Asiatic enemy, whose chiefs are led in bonds by the victorious Egyptians towards the camp of their army. In the scene, an insolent soldier pulls the beard of his helpless captive, while others wantonly beat the suppliant, or satiate their fury with the sword. Beyond these is a corps of infantry in close array, flanked by a strong body of chariots; and a camp, indicated by a rampart of Egyptian shields, with a wicker gateway, guarded by four companies of sentries, who are on duty on the other side, forms the most interesting object in the picture. Here the booty taken from the enemy is collected: oxen, chariots, wagons, horses, asses, sacks of gold, represent the confusion incident after a battle; and the richness of the spoil is expressed by the weight of a bag of money under which an ass is about to fall. One chief is receiving the salutation of a foot soldier; another, seated amidst the spoil, strings his bow, and a sutler suspends a water-skin on a pole which he has fixed in the ground. Below this, a body of infantry marches homewards; and beyond them, the king, attended by his fan-bearers, holds forth his hand to receive the homage of the priests and principal persons who approach his throne to congratulate his return. His charioteer is also in attendance; and the high-spirited horses of his car are with difficulty restrained by three grooms who hold them. The captives, below this, are doomed to be beaten, probably to death, by four Egyptian soldiers; while in vain, and with outstretched hands, they implore the clemency of their heedless conqueror.

"Upon the west tower is represented a battle in which the king discharges his arrows upon the broken lines and flying chariots of the enemy. . . . In a single compartment beyond these, he stands, armed with a battle-axe, about to slay the captives he holds beneath him.

"On the west face of the south-east wall, the king is represented pursuing an enemy, whose numerous chariots, flying over the plain, endeavour to regain the river, and seek shelter

the former [§ 37, (4)]. They agree in gender with the word which they represent.

Vous avez celui-ci, mais vous n'avez pas celui-là.	*You have this one (the latter), but you have not that one (the former).*

6. The pronouns ceci and cela are used absolutely, that is, without a noun, in pointing out objects.

Nous n'avons pas ceci, nous avons cela.	*We have not this, we have that.*
Ceci ou cela.	*This or that.*

Résumé of Examples.

Avez vous le livre de cet homme ?	*Have you that man's book?*
Je n'ai pas son livre, j'ai le mien.	*I have not his book, I have mine.*
Le cuisinier a-t-il ce parapluie ?	*Has the cook that umbrella?*
Il n'a pas ce parapluie-ci, il a ce parapluie-là (R. 3).	*He has not this umbrella, he has that umbrella.*
Avez vous celui de votre frère ?	*Have you your brother's?* i.e., *that of your brother.*
Je n'ai pas celui de mon frère, j'ai celui de ma sœur (R. 4).	*I have not my brother's, I have my sister's;* i.e., *that of my brother, that of my sister.*
Avez vous celui-ci ou celui-là ?	*Have you this one or that one?*
Je n'ai ni celui-ci ni celui-là.	*I have neither the latter nor the former.*
Quelle robe avez vous ? f.	*Which dress have you?*
J'ai celle-ci.	*I have this (one)*
Avez vous ceci ou cela (R. 6).	*Have you this or that?*

Exercise 17.

Ardoise, *f. slate.*	Lettre, *f. letter.*	Encrier, m. *inkstand.*
Balai, m. *broom.*	Malle, *f. trunk.*	Etranger, m. *stranger, foreigner.*
Bois, m. *wood.*	Parasol, m. *parasol.*	Lait, m. *milk.*
Bouteille, *f. bottle.*	Poulet, m. *chicken.*	Parapluie, m. *umbrella.*
Dame, *f. lady.*	Plomb, m. *lead.*	Volaille, *f. poultry.*
Fromage, m. *cheese.*	Plus, *no longer.*	
Jardinier, m. *gardener.*	Salière, *f. salt stand.*	

1. Votre frère a-t-il son encrier d'argent ? 2. Il ne l'a plus, il a un encrier de plomb. 3. Avons nous la lettre de l'étranger ? 4. Oui, Monsieur, nous avons celle de l'étranger [R. 4]. 5. Votre sœur n'a pas son ardoise, mais elle a son chapeau de satin. 6. Le menuisier a-t-il votre bois ou le sien ? 7. Il n'a ni le mien ni le sien, il a celui du jardinier. 8. Avez vous mon bon parapluie de soie ? 9. J'ai votre parapluie de soie et votre parasol de satin. 10. Avez vous ma bouteille ? 11. Je n'ai pas votre bouteille, j'ai la malle de votre sœur. 12. Le domestique a-t-il cette salière ? 13. Il n'a pas cette salière-ci, il a celle-là. 14. Avez vous le bon ou le mauvais poulet ? 15. Je n'ai ni celui-ci ni celui-là. 16. Quel poulet avez vous ? 17. J'ai celui du cuisinier. 18. Le boulanger a-t-il de la volaille ? [Sect. 4, R. 1.] 19. Le boulanger n'a pas de volaille, il a du lait [Sect. 5, R. 5]. 20. Avez vous votre fromage ou le mien ? 21. Je n'ai ni le vôtre ni le mien, j'ai celui du matelot. 22. Quelqu'un a-t-il faim ? 23. Personne n'a faim. 24. Avez vous quelque chose ? 25. Non, Monsieur, je n'ai rien.

Exercise 18.

1. Has your brother that lady's umbrella ? 2. My brother has that lady's umbrella ? 3. Have you this parasol or that one ? 4. I have neither this (one) nor that (one). 5. Have you the stranger's gold watch ? 6. No, Sir, I have the baker's. 7. Who has my slate ? 8. I have your slate and your brother's. 9. Has the cook a silver salt stand ? 10. The cook has a silver salt stand, and a silver dish. 11. Has the cook this poultry or that ? 12. He has neither this nor that. 13. Has he this bread or that ? 14. He has neither this nor that, he has the baker's good bread. 15. Have you my cotton parasol ? 16. I have not your cotton parasol, I have your silk parasol. 17. Has the gardener a leather trunk ? 18. The gardener has a leather trunk. 19. Who has my good cheese ? 20. Nobody has your cheese, but some one has your brother's. 21. Have you mine or his ? 22. I have neither yours nor his, I have the stranger's. 23. Has the cook this bottle or that broom ? 24. He has this bottle ? 25. Have you a lead inkstand ? 26. No, Sir, I have a china inkstand. 27. Has the stranger poultry ? 28. The stranger has no poultry, but he has money. 29. Your brother is hungry and thirsty, afraid and sleepy. 30. Is any one ashamed ? 31. No, Sir, nobody is ashamed. 32. Is your brother right or wrong ? 33. My brother is right, and yours is wrong. 34. Your sister has neither her satin hat nor her velvet hat.

Section IX.

Plural of Nouns (§ 8).

1. The plural in French is generally formed, as in English, by the addition of *s* to the singular.

Un homme, une femme.	*A man, a woman.*
Deux hommes, deux femmes.	*Two men, two women.*

The form *le* of the article becomes plural by the addition of *s*, and may be placed before plural nouns of either gender.

Les hommes, les femmes.	*The men, the women.*

2. 1st Exception to Rule 1. Nouns ending in *s*, *x*, *z*, remain unchanged for the plural.

Le bas, les bas.	*The stocking, the stockings.*
La voix, les voix.	*The voice, the voices.*
Le nez, les nez.	*The nose, the noses.*

3. 2nd Exception. Nouns ending with *au* and *eu*, take *x* for the plural.

Le bâteau, les bâteaux.	*The boat, the boats.*
Le lieu, les lieux.	*The place, the places.*

4. 3rd Exception. The following nouns ending in *ou*, take *x* for the plural, bijou, *jewel;* caillou, *pebble;* chou, *cabbage;* genou, *knee;* hibou, *owl;* joujou, *plaything.*

Les bijoux, les cailloux, les choux.	*The jewels, the pebbles, the cabbages.*
Les hiboux, les genoux, les joujoux.	*The owls, the knees, the playthings.*

5. 4th Exception. The following nouns ending in *ail* change that termination into *aux* for the plural : bail, *lease;* corail, *coral;* émail, *enamel;* soupirail, *air-hole;* sous-bail, *under-lease;* travail, *labour.*

Les baux, les coraux, les émaux.	*The leases, the corals, the enamels*
Les soupiraux, les travaux, les sous-baux.	*The air-holes, the labours, the under-leases.*

6. 5th Exception. Nouns ending in *al* form their plural in *aux.*

Le cheval, les chevaux.	*The horse, the horses.*
Le général, les généraux.	*The general, the generals.*

Bal, *ball;* carnaval, *carnival;* chacal, *jackal;* régal, *treat;* follow the general rule.

7. 6th Exception. Ciel, *heaven;* œil, *eye;* and aïeul, *ancestor,* form their plural irregularly.

Les cieux, les yeux, les aïeux.	*The heavens, the eyes, the ancestors.*

For further rules see § 8, § 9, and § 10 of the Second Part.

Resumé of Examples.

Les Anglais ont ils les chevaux du général ?	*Have the English the general's horses?*
Les généraux n'ont pas les bijoux.	*The generals have not the jewels.*
Les enfants ont ils les cailloux ?	*Have the children the pebbles?*
Les yeux de l'enfant.	*The child's eyes.*
Les tableaux de cette église.	*The pictures of that church.*
Avez vous les oiseaux de ce bois ?	*Have you the birds of that wood?*
Avez vous les encriers d'argent de ma sœur ?	*Have you my sister's silver inkstands*
J'ai les bijoux d'argent et d'or de l'étranger.	*I have the gold and silver jewels of the foreigner.*
Les rois n'ont ils pas les palais de marbre ?	*Have not the kings the marble palaces?*

Exercise 19.

Baril, m. *barrel.*	Général, m. *general.*	Meunier, m. *miller.*
Bas, m. *stocking.*	Gilet, m. *waistcoat.*	Morceau, m. *piece.*
Chocolat, m. *chocolate.*	Grand, adj. *large, great.*	Oiseau, m. *bird.*
Bijou, m. *jewel.*	Jardin, m. *garden.*	Petit, adj. *small.*
Chou, m. *cabbage.*	Joujou, m. *plaything.*	Paire, *f. pair.*
Dans, *in.*	Légume, m. *vegetable.*	Poivre, m. *pepper.*
Enfant, m. *child.*	Marchand, m. *merchant.*	Qu', que, *what.*
Fer, m. *iron.*	Maréchal, m. *blacksmith.*	Rien, *nothing.*
Fils, m. *son.*	Mauvais, e, *bad.*	

1. Avez vous les marteaux du charpentier ? 2. Nous avons les marteaux du maréchal ? 3. Les maréchaux ont ils deux marteaux de bois ? 4. Ils ont deux marteaux de fer. 5. Les

so many golden grains of science in full weight; but, scattered and dispersed, they serve at once to adorn and point out the path that leads to the holy ark of the covenant of divine mysteries and promises." Like a true philosopher, Moses made the mysteries of nature, whether hidden or revealed, subordinate to religion. He never separated nature from God, nor God from nature.

It does not appear that Sesostris used any means to keep in subjection the countries which he had once conquered; and, hence, no sooner had he withdrawn his arms from the field than his vast empire disappeared. Nor can we free our minds from the impression, that his successors must have sunk into all the sloth and apathy of an eastern life. Of these successors we know nothing. There is a mighty break in the history, which it is now impossible to fill up. Coming down to the time of the Trojan war, the reigning prince in Egypt was Cetes, or, as he is named by the Greek writers, Proteus, of whom it is reported that he was a magician, and that he could assume any shape he pleased, even that of fire. Of this fabled personage we are left in total ignorance, as also of his successors, till we come to Sesnouk, or Sesouchis—the Shishak of Holy Scripture—who was the first monarch of the twenty-second dynasty. He flourished about nine hundred and seventy years before Christ. In the fifth year of Rehoboam, the son and successor of Solomon in the throne of Israel, this Shishak, king of Egypt, came up against Jerusalem with twelve hundred chariots and threescore thousand horsemen, and people out of Egypt in numbers without number, besides Lybians and Ethiopians and Troglodytes, or dwellers in caves. With this mighty army he advanced, took the fenced cities of Judah, and continued his progress to Jerusalem itself, made vassals of all the people, from the highest to the lowest, reduced them to comparative slavery, entered the temple, took away the treasures of the house of the Lord, and the treasures of the king's house—he took all. He carried away also the shields of gold which Solomon had made, and whose place Rehoboam supplied with those of brass.

Though Shishak thus extended his dominion beyond the bounds of Egypt, and included a large portion of southern and western Africa within his empire, that empire soon afterwards shrunk to its former limits, and in the following century the Egyptian monarchy rapidly declined, and the kingdom was conquered by an Ethiopian invader. The name of the conqueror was Sabaco, who commenced his reign with the more than brutal act of committing to the flames the prince whom he had vanquished. It is thought that he did this cruel deed merely to establish himself more firmly on the throne; and that when he once found himself secure in the seat of supreme power, it is said that he changed his policy, and became distinguished for his wisdom and moderation and mercy. Tradition informs us that he was led to attempt the invasion of Egypt in consequence of a dream or vision, in which he was assured that he should hold the kingdom for fifty years. He succeeded in subduing the country, and in establishing his reign; but at the close of the fifty years he had another dream, in which the tutelar or presiding divinity of Thebes informed him that he could no longer hold the sceptre with safety and happiness, unless he put to death the whole body of the priesthood as he passed through them with his guard. Distressed and perplexed by the nature of the vision, and abhorring to hold the kingdom on such terms, he sent for the priests, and told them what he understood to be the will of the gods. The priests, however, concluded, more wisely, that it was the pleasure of the gods that Sabaco should remain no longer in Egypt, and, satisfied with their interpretation of the oracle, he immediately quitted the kingdom, and returned to Ethiopia. He is thought to have been the same with King So mentioned in Scripture, and who entered into a league with Hoshea, king of Israel, against Shalmaneser, king of Assyria.

Of Anysius, who was the immediate successor of Sabaco, there is no authentic record. After him, a priest of Vulcan, named Sethos or Sethon, assumed the government. It is said that he gave himself up to religious contemplation; and not only neglected the military caste or nobles of the country, but deprived them of their lands; which so incensed them that they refused to bear arms in his service. At this crisis, Sennacherib, king of Assyria, prepared to invade Egypt, and in the year B.C. 713, arrived before Pelusium with a powerful force. Deserted by his soldiers, Sethos now appealed to them in vain. They refused to march beneath his banner. He had recourse to the gods. While in the temple of Vulcan, he fell into a deep sleep, in which, it is said, he saw that god standing at his side, exhorting him to take courage, and promising him a victory over the Assyrians. Animated by this assurance, he armed a body of artificers and labourers, and with this undisciplined body advanced to meet the enemy. He was saved an engagement; for a pestilence in the Assyrian camp gave him such an advantage, that he committed the most fearful havoc in their ranks. After his death, a statue was erected to his memory in the temple of Vulcan. The kingdom was then shared among twelve princes or chiefs of the nobility. But this new form of government did not last long. These chiefs began to quarrel as to the limits of their respective territories. This was followed by war; and one of their number, Psammeticus, prince of Sais, having been driven into exile, levied an army of Greek and Carian dependants and pirates, and having overcome all his rivals, once more, and only fifteen years after its division into twelve principalities, united all Egypt into a single monarchy, of which Memphis was the capital, though Sais was usually the seat of government.

Questions for Examination.

Who was the mightiest prince of Egypt; and whither did he carry his conquests?
On whose tomb are his exploits recorded?
What proof is there that the Egyptians were not a warlike people?
What gave them their high intellectual eminence?
What do you mean by hieroglyphics and mysteries?
Describe the character of the princes who succeeded Sesostris.
What victory did Sesouchis achieve; and in what did it consist?
With what king mentioned in Scripture does he agree?
What led Sabaco to attempt the invasion of Egypt?
To what country did he belong? and why did he leave Egypt?
Under what name is he mentioned in Scripture?
Why was Sethos deserted by his nobles and his soldiers?
How did he supply their place?
What was the form of government after the death of Sethos?
How was Egypt again united in one single monarchy?

LESSONS IN FRENCH.—No. IV.

By Professor Louis Fasquelle, LL.D.

Section VIII.

1. The demonstrative adjectives ce, m. cette, f. *this* or *that*, are always placed before nouns; they agree in gender with these nouns [§ 20, (1)].

Avez vous ce parapluie? m.	*Have you this* or *that umbrella?*
Vous n'avez pas cette bouteille, f.	*Have you not this* or *that bottle?*

2. Before a word masculine singular, commencing with a vowel, or an *h* mute, *cet* takes the place of *ce* [§ 20, (1)].

N'avez vous pas cet argent?	*Have you not this* or *that money?*
Vous avez eu cet honneur.	*You have had this* or *that honour.*

3. When it is deemed necessary to express in French, the difference existing in English between the words *this* and *that*, the adverbs *ci* and *là* may be placed after the nouns [§ 20, (2)].

Je n'ai pas ce parasol-ci, j'ai ce parasol-là.	*I have not this parasol, I have that parasol.*

4. The demonstrative pronouns, celui, m. celle, f. *this* or *that*, are used to represent nouns, but are never joined with them like adjectives [§ 36, § 37, (1)].

J'ai mon parapluie et celui de votre frère.	*I have my umbrella and your brother's,* i.e., *that of your brother.*
Vous avez ma robe et celle de ma sœur.	*You have my dress and my sister's,* i.e., *that of my sister.*

5. The pronouns celui, celle, with the addition of the words *ci* and *là*, are used in the sense of *this one, that one, the latter,*

SOLUTIONS OF THE ARITHMETICAL QUERIES PROPOSED IN No. II.

1. If the first nine letters of any alphabet be made to represent the nine digits, or *units*, then the same letters marked with a single accent, thus *a*, may be made to represent *tens*; the same letters marked with a double accent, to represent *hundreds*; the same letters with a triple accent, to represent *thousands*; and so on, to any extent. In order to prevent the accumulation of accents, the letters might be marked with figures or letters denoting the number of accents; thus the labour of marking the different ranks of numbers would be greatly abridged. These marks or indices would plainly denote the successive powers of the root or base 10, in our decimal system of notation; but the same marks might be employed to denote the successive powers of any other root or base in a different system; and this is, in fact, what is done in algebra, in the general theory of equations.

2. In such a system of notation as the preceding, it is evident that there would be no need for the cypher to preserve the figures or characters in their proper places, their respective values being clearly and distinctly marked independently of position; so that they might be arranged in any order whatever without affecting their value.

3. Inasmuch as the number *a hundred thousand*, which is expressed by 1 followed by *five ciphers*, is greater than the next lower number which is denoted by *five nines*; it follows that whatever other figures be put in the place of the ciphers in the former, thereby increasing its value, much more must it be greater than the latter, whether we retain its *nines*, or replace them by other figures.

4. This number not being properly expressed in words according to the decimal scale of notation, will be found, except to the initiated, difficult to express by figures; in fact, if we adhere rigidly to the words, impossible. It was, therefore, proposed merely as a puzzle. The way to solve the difficulty is simply to put down each part of the number by itself in proper order; then to arrange them as we do numbers that are to be added, and perform the addition; the sum will give the right answer. Thus:—

Twelve thousand.....	12000
Twelve hundred.....	1200
Twelve	12
Answer: Thirteen thousand two hundred and twelve	13212

N.B.—The fifth exercise in Question 6, page 29, No. II., is another example of the same kind as the preceding. We must defer the solution of the geometrical problems till our next number.

CORRESPONDENCE.

To the Editor.

Having been engaged in teaching arithmetic from the works of various authors, and having never seen a proof of simple subtraction in any of them by the method of casting out the nines, although I had seen simple addition, multiplication, and division so proved, I was induced to think that subtraction might not be an exception. After two or three trials, I found that it was not, though there is something peculiar in the proof.

EXAMPLES.

(1)		(2)	
470168	8	4084108	2
184753	1	1768415	5
285415	7	2265693	6

(3)		(4)	
1408435	7	3014716	4
247156	7	1285647	6
1161279	0	1729069	7

In the first of the above examples, from the first line, we have 4+7=11, which gives 2 above 9; then, 2+1+6=9; and 8 remains; proceeding in the same manner, with the second line, we have 1 remaining. Then casting out the nines from the remainder or difference, we have 2+8=10, which gives 1 above 9; 1+5+4=10, which gives 1 above 9; and 1+1+5=7; this result agreeing with the difference of the results of the other two lines, or 8−1=7, shows that the answer is correct, unless there is a balance of errors. But in the 2nd and 4th examples, where, after casting out the nines, the figure in the second line exceeds that of the first line, instead of borrowing 10 (as is usual in subtraction), this method of proof, as might be expected, requires the borrowing of *nine*.—I am, Sir, your's, &c., JOSH. WEBSTER.

Bramley, April 10th, 1852.

ANSWERS TO CORRESPONDENTS.

R. CRANE.—We are disposed to put our negative on his supposition. We have felt, by experience, that in learning a language without a master, it was necessary to pronounce the words audibly, even to ourselves, and especially if we had to consult a dictionary; and since this is the state of the case, it is better to try to obtain the right pronounciation, even from rules, than to fall into the habit of pronouncing wrong.

F. G. (of Paris.)—We feel obliged to him for his kind offer, and we should be glad to notice the work he speaks of, but it has not reached us.

J. W.—Many thanks for his exertions on behalf of our journal. His suggestions will be attended to at the proper time.

P. Q.—A Series of Lessons on Practical Science will be given in the POPULAR EDUCATOR, with illustrations similar to those which have appeared in the New Series of the *Illustrated Exhibitor*, on the subjects of Kinematics, Hydrodynamics, Steam-engine, &c.

A. B.—The difference between a geometrical solid, and a physical or natural solid is this: the former is a mere idea or representation of the space which a body occupies, whether it be solid, liquid, or gaseous; the latter is the body itself, when the first of these three terms is properly applied to it. The geometrical solid possesses only three properties, length, breadth, and thickness, and no other; hence, it can exist only in idea; the physical solid has three properties, and others besides, without which it could not exist, namely, the usual properties which belong to matter of the kind of which it consists.

J. K.—The language spoken in Paradise, was most probably the ancient Hebrew; for this language, like others, has passed through various forms; but still it is one of the simplest of those which have come down to us, without being rude and inelegant like those of the South Sea islanders.

W. C. A.—As our pages are intended to convey useful information of all kinds, we must not omit Navigation; but we cannot do everything at once; it will come in its turn.

A. Y.—For English words, Richardson's; for technical words, Crabbe's or Craig's: the work of the latter is we believe the latest.

J. A. C.—THETA.—P. M. B.—We do intend to give lessons in all the modern languages, including Italian, Spanish, Portuguese, &c., in the order of demand.

M A.—A communication with real name and address will be attended to.

A. B. C.—We are greatly obliged by his suggestions.

SPEIGELBERG.—The German will be commenced very soon, and in preference to any other modern language.

W. F.—Σ.—The distinction between long and short syllables belongs strictly to Latin poetry. The Dr. speaks only of our mode of pronouncing Latin; we know not how the Romans pronounced it. In English, accented syllables are necessarily long, because it takes time to give the proper accent; of course, unaccented are short.

J. L. has fairly puzzled us about the letter A. We would recommend to him Lord Byron's conundrum: "'Twas whispered in heaven, 'twas muttered in hell," &c.

H. R.—We shall keep his suggestion before us.

Σ.—In *concurrence*, there is a mental *running together*, and that often produces corporeal. In *discourse* the tongue often *runs* too fast, and too *far* from the point.

J. V.—The answers to the arithmetical queries are given in this number.

J. V. (St. James's-street.)—Will be attended to.

TYRO.—The solutions of the geometrical questions will be given by ourselves, as soon as possible.

A NOVICE.—His suggestions will be attended to. A cover will be given with each monthly part.

*** Several correspondents have suggested the propriety of giving explanations of all the hard words or technical terms used in the POPULAR EDUCATOR; others earnestly request us to do so. In obedience to these repeated suggestions and solicitations, we shall adopt a systematic mode of giving these explanations in our next number.

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FEMALE EDUCATION.—No. I.

ADDRESSED CHIEFLY TO THE YOUNG WOMEN OF THE OPERATIVE CLASSES.

By Eliza Meteyard.

In the hope that I may do something towards the improvement of young women employed in factories, warehouses, shops, or at home in useful labours, I have undertaken to write this series of little papers. They will not refer so much to reading and writing, or grammar or accounts, as to such things as habits, manners, personal cleanliness, neatness and taste in dress, household management, and the care of children, which, though not classed under the name of education, are real proofs of it when practised, and of ignorance when neglected. On many of these points, particularly on those of taste and arrangement in dress, manners and deportment, nicety and elegance in homes, however humble, and to simple beauty brought from fields and woods for their adornment, too little has been written, and of that little nothing whatever has been addressed to the operative classes. It is, therefore, with some pride, and much pleasure, that I shall undertake this peculiar and novel portion of my task; and if thereby I shall be enabled to add one grace to humble life, I shall be fully rewarded: for it will expand itself, and lead to the cultivation of others, and thus fill up the blank of one of our great social needs—the power to recognise, make use of, bring into alliance with common daily life things of grace and beauty, by those connected, however humbly, with the operative arts of the country. This has been long a need. We have too long forgotten that the things and circumstances which surround the individual, and constitute his daily life, form him and make him what he is. The intellectual classes are so well aware of this as to regard with watchful though unobtrusive care each act, each circumstance and moment, in the lives of their children; and this, as seen in its result, constitutes, more perhaps than any mere book knowledge, the vast difference which exists between the several classes of society. For I quite deny that refinement, politeness, good habits, taste in dress, or general superiority, need be, or is, the especial privilege of any class. I do not for a moment think that a man has less cause to be refined, though he work with his hands for his bread, or a young woman less tasteful in dress, or admirable in manners, though she pass two-thirds of each week beside the power-loom, or in the warehouse or shop. But let me be understood. I mean nothing affected, assuming, or vain, or in that sense which often makes the refinement and gentility of the upper classes ridiculous in the eyes of the thoughtful and sober; but in their true worth and real meaning—that of man or woman striving to perform *all* duties connected with a good life in the most cheerful, truest, best, and noblest manner. A king or a duke, a queen or a countess, can do no more; and, apart from the advantages which fortune, position, and education confer, the best of the graceful acts of life lie open for all to attain to and practice.

It is from my belief that the operative classes of this country are making, and are destined to make, great advances in this direction, that I have been chiefly led to hold the young women of this class in view in writing these little papers; for, connected with labour which is not strictly servile, and of a kind often bearing a close relation to the most beautiful of the useful arts—trained by this very labour into a method which is not without its value, and possessing the immense advantage of some hours each day of independent leisure—I think the power is theirs, through self-improvement, of not only adding to their own well-being, but immensely to that of those around them. For, if we but stay a moment, we see how much Divine Providence, through the agency of great improvements and discoveries, has given, and is giving, of beauty and utility to the common people. The art of printing, travelling by steam, the discovery of plating metal by electricity, the wonderful improvements in pottery, the weaving and printing of cotton, the application of gutta percha to useful and ornamental purposes, are advances in the useful and beautiful arts which have brought refinement and all its innumerable consequences to the doors of the very humblest. And these things, like a chariot's ceaseless wheels, are rolling onward in their own grand way. A few years hence, and the working classes will, as a general rule, have better houses, and reap from their use all the advantages of such an accommodation. Still further improvements in the plating process I have spoken of, in pottery, in glass, and in many similar things, will give, and this cheaply, more comforts, elegancies, and luxuries to humble homes than two hundred years ago could be found in the halls of nobles or the palaces of kings. And it is that they may learn to use and to appreciate these advantages that I address myself to those on whom depends the future well-being of these homes, and the children that will be nursed and reared therein.

For I have unbounded faith in what a woman, however humble, can do for the improvement of home. On her acts and care depend, in a great degree, whether it is peaceful or riotous, sordid or thrifty, dirty or clean; and when we consider for a moment the effect of these for good or evil upon husband and children, we see this tremendous moral responsibility of woman in its true light. But the beginning of many improvements that will, I foresee, in another generation, greatly alter the mental, moral, and social condition of the working classes of this country, will be made principally by young women before the time of marriage. That ceremony does not bestow sudden virtues, though it does a husband; and a girl that has been in her unmarried state dirty, thriftless gossiping, and evil-tongued, has little prospect of either making a happy home or rearing good and intelligent children. But if she is otherwise, a new world opens itself to her offspring; for the moral worth and virtues thus fostered raise them as it were into a new class and condition of society, and the labour of the country is advanced by a new intelligence brought to bear upon it in countless beneficial directions. This growth in refinement, manners, and education, on the part of the women of the operative classes is, I believe, one of the greatest needs of the time. The beginning, made at home, lies at the root of all social progress, as without it the general worth and intelligence of husbands and brothers lose half their value; but with it all the many advantages which men have beyond women in regard to association, and the sort of public education which naturally arises therefrom, goes home with them, and has there a value of its own.

I think I need say little more on the immense importance of education and self-improvement to young women. Their intelligence in the humbler walks of life will go far to preserving the lives of two-thirds of the children that die under the age of five years—to rearing them in a way which shall insure straight limbs and sound bodies—to laying, through words of advice and good example, some of the nobler and brighter virtues of our being—to investing home with a cleanliness, order, and purity in act, of themselves lessons of priceless value, and in cases where womanly intelligence is of a higher kind, adding to these other lessons whereby great talents may be fostered, and through which a long generation shall be benefited and the country proud. Nay, more; let women make but homes as they should be, and half the inducements of the pot-house and the skittle-ground will cease to attract; let her aim at comeliness of person, and a self-respect in apparel and behaviour, and half the licentiousness complained of in the newspapers and in Parliament will pass away, and make the simple virtues of the people what they have always been, and always will be, the surest foundation of order and moral advance in the state. And where marriage is not the case, a self-improved intelligence will give woman the power to seek, through emigration, or through a change of work higher in its kind and better remunerated, means of a self-advance, which no laws or philanthropic associations can give, though they found Needlewomen's

Societies, or other charities for common benefit, and spread them across the breadth and length of the land.

I will speak of the improvement of the mind in a future chapter.

LESSONS IN ARITHMETIC.—No. V.

RULE OF SIMPLE SUBTRACTION.

THIS is the easiest rule in arithmetic, and consequently that in the practice of which one is most liable to commit mistakes. It is founded on a general principle, exactly similar to that of simple addition, viz.—*Like things can only be subtracted from like*; or, in other words, *if things are not alike, the one cannot be subtracted from the other*. For example, if the question were asked what is the difference between 12 apples and 5 pears? the answer would plainly be, we cannot tell; it is as impossible to answer this question as to tell the cook's name when the dimensions of the kitchen only are given. It is true that the difference between 12 and 7 is 5; but 5 is no answer to the question. In like manner, it is equally impossible to find the difference between units and tens, tens and hundreds, hundreds and thousands, &c., while we keep them in the same name: but if we reduce the tens into units, we can then take units from them; if we reduce hundreds into tens, we can then take tens from them; and so on, whatever be the difference in the ranks of the numbers. On the above principle, therefore, we have the following rule for the subtraction of numbers consisting of several ranks and periods.

RULE.—Arrange the number to be subtracted (which is called the *subtrahend*), under the number from which it is to be taken (which is called the *minuend*), in the same manner as numbers which are to be added together (see rule of simple addition, page 56, 2nd. col, No. IV.) Then draw a line under the subtrahend, and beginning at the units' column, subtract the units' figure in the subtrahend from the units' figure in the minuend, and place the difference under the line in its proper column or place of units; and proceed to do the same with the figures in the column of tens. If the figure in the *upper* number or *minuend* be the same as that in the *lower* number or *subtrahend*, their difference is 0, and, therefore, a cipher is put in the place of units. But if the figure in the units' column of the *upper* number or *minuend*, be less than the figure in the same place in the *lower* number or *subtrahend*, add ten units to the former, and then perform the subtraction, placing the difference in its proper place or units' column under the line; but remember *now* to diminish the tens' figure in the minuend by 1, *mentally*, before you perform the subtraction of the figures in the column of tens; or, which is the same thing, increase the tens' figure in the subtrahend by one, *mentally*, before you perform the said subtraction. The difference of the tens' figures, in either of these mental processes, will be the same; for the former process depends on the principle that *if you first add a certain number*, as 10, *to a given number, and afterwards take it away, you do not alter its value*; and the latter process depends on the principle, that *if you increase two given numbers by a third number*, as 10, *you do not alter the difference between them*. The second process is that which is commonly followed in practice, and the increasing of the *tens'* figure by 1, is called in the language of the schools, *carrying one*, as in addition; while the addition of *ten units* to the units' figure is called, in the same language, *borrowing ten*.

If it should so happen that the figure in the tens' column of the *upper* number, or *minuend*, is also less than the figure in the same place in the *lower* number, or *subtrahend*, add ten tens to the former, and then perform the subtraction, placing the difference in its proper place or tens' column under the line; but remember also to diminish the *hundreds'* figure in the minuend by 1, *mentally*, before you perform the subtraction of the figures in the column of *hundreds*; or, which is the same thing, increase the *hundreds'* figure in the subtrahend by 1, *mentally*, before you perform the said subtraction. These processes are founded on the same principles as those explained in reference to the *tens*, because *hundreds* stand in the same relation to *tens* that *tens* do to *units*, and the principles of operation may be expounded in the very same way. The exact same process may be continued in reference to the figures in the column or place of thousands, tens of thousands &c., in succession, until ultimately it is found that some figure in the upper number is equal to or greater than the corresponding figure in the lower number, and thus the subtraction will be rendered possible and complete. In all cases where the figure in any place of the upper number is the same as the corresponding figure in the lower number, or is rendered so by *carrying one*, it is necessary, as in the case of units, to put a cipher in that place under the line to indicate that the difference of the figures is nothing, and to preserve the other figures in their places. The same process indeed may be repeated several times in reference to the successive ranks or places of figures to be subtracted in large numbers, until at length the whole difference between any two given numbers be obtained. The application of this rule will be most clearly understood by a few practical examples.

EXAMPLE 1.—Subtract 123454321 from 343478987:—

Minuend	343478987
Subtrahend	123454321
Difference	220024666

MODE OF OPERATION.

Here, beginning with the figures in the units' place, you say, 1 from 7, and 6 remains, and put the difference (6) under the line in the place of units; then proceeding to the figures in the tens' place, you say 2 from 8, and 6 remains, and put the difference (6) under the line in the place of tens; and in like manner proceed to hundreds, thousands, tens of thousands, &c., putting down the differences in their respective places, until the whole difference be obtained. In the places of hundreds of thousands and millions in this example the differences are nothing, accordingly ciphers are put in these places in order that the other figures may be preserved in their own places, and that the want of figures in these places may be properly indicated. The whole difference here between the two given numbers is two hundred and twenty millions, twenty-four thousand, six hundred and sixty-six.

EXAMPLE 2.—Find the difference between 101010101010 and 4268010237.

Minuend	101010101010
Subtrahend	4268010237
Difference	96742090773

MODE OF OPERATION.

Here, beginning with the figures in the units' place, as before, you find that the units' figure in the upper number is 0, and that in the lower number is 7; therefore, borrowing 10 (which is equivalent to 1 in the tens' place), you say 7 from 10, and 3 remains, and put the difference (3) under the line in the units' place. Then, *carrying* 1 to 3, the tens' figure in the lower number, and adding it, which makes 4 tens, you *borrow* 10, and add it to 1, the tens' figure in the upper number, which makes 11 tens, and say 4 from 11, and 7 remains; and you put the difference (7) under the line in the *place of tens*. Again, remembering that the 10 which was *last borrowed* was *ten tens*, or a *hundred*, you *carry one* to 2, the hundreds' figure in the lower number, and add it, which makes 3; you then *borrow* 10, subtract 3 from it (as there is a cipher, or nothing, in this place, in the upper number), and put the difference (7) under the line in the place of *hundreds*. Now, remembering that the 10 which was *just borrowed* was *ten hundreds*, or a *thousand*, you *carry* 1 to 0, the thousands' figure in the lower number, which makes but 1, and subtract this 1 from 1, the thousands' figure in the upper number; the difference being nothing, you put a cipher, or 0, in the place of thousands below the line. As you did not borrow 10 in the last step of the operation, of course you do not carry 1 this time, to the next place of figures in the lower number, but continue the subtraction as at first.

Here, a practical suggestion may be given as to the easiest mode of carrying on this operation. In all cases where the figure, in any rank or place of the minuend, is less than the corresponding figure in the subtrahend, without formally, or even mentally, adding 10 (that is, technically, *borrowing* 10), just read the figure as if 1 stood on the left of it, and subtract the corresponding figure in the subtrahend at once. Then, without formally or even mentally adding 1 (that is, technically, *carrying* 1), to the next figure on the left in the subtra-

hend, just read it as if it were the next higher figure in order, and subtract as before. Thus, continuing the operation in the preceding example, from the place where it was stopt above, say 1 from 10, and 9 remains; 1 from 1, and 0; 8 from 10, and 2; 7 from 11, and 4; 3 from 10, and 7; 5 from 11, and 6; 1 from 10, and 9; putting down these remainders in their proper places as fast as they are uttered. In all this operation, however, never forget the principle, that in consequence of the tenfold manner of increase in the value of the digits or figures, according to the decimal scale of notation, to *borrow* 10 in any figure of the minuend, and to *carry* 1 to the *next higher* figure of the subtrahend, is just the same thing as to increase both numbers by 10 in the rank or place denoted by that figure of the minuend; and that this operation does not alter the value of the difference, while it renders the process of subtraction as easy as it could be made on any other principle.

To the general rule, it may be of use to add this direction: that when there are fewer figures in the subtrahend than in the minuend, the process of subtraction must be continued to the highest figure in the minuend, just as if ciphers were placed under each of its figures, where there are none in the subtrahend.

Proof of Subtraction.

The best and the easiest proof of subtraction is to add the *difference* to the *subtrahend*, and if the operation is correct, the sum of these two numbers must be equal to the *minuend*. The principle of this method of proof is self-evident; for, *if the difference between two numbers be added to the less number, the sum is equal to the greater number*. An ingenious method of proving subtraction by *casting out the nines*, as it is called, was supplied by a correspondent, and inserted in No. IV., page 64. The principles on which the four common rules of arithmetic are proved *by casting out the nines*, will be explained in a future number.

In connexion with the rules of Addition and Subtraction, there are two very useful theorems, which we subjoin for the advantage and practice of our readers. Take any two numbers, say 12 and 8, and find their sum and difference, namely, 20 and 4. Now observe, that if we add 20 and 4, we have 24, or twice the greater number, 12; and if subtract 4 from 20, we have 16, or twice the smaller number. Now these results would take place with any two numbers; and in order to satisfy yourself, try as many pairs as you please; but choose even numbers to avoid the trouble of fractions at present. The general theorems deducible from these invariable results, are—

1.—*If the sum of any two numbers be added to their difference, the result is double the greater number.*

2.—*If the difference of any two numbers be subtracted from their sum, the result is double the smaller number.*

Example:—The sum of two numbers is 1050, and their difference is 423, what are the numbers?

Here, 1050+428=1478, which is the double of 739; therefore 739 is the greater number.

Again, 1050−428=622, which is the double of 311; therefore 311 is the less number.

Proof. 739+311=1050, the sum; and 739−311=428, the difference.

Exercise.—At an election, the whole number of voters was 9068, and the successful candidate had a majority of 2784: how many persons voted for each candidate?

We now proceed to give a few questions for exercise.

Questions for Exercise on the preceding Lesson.

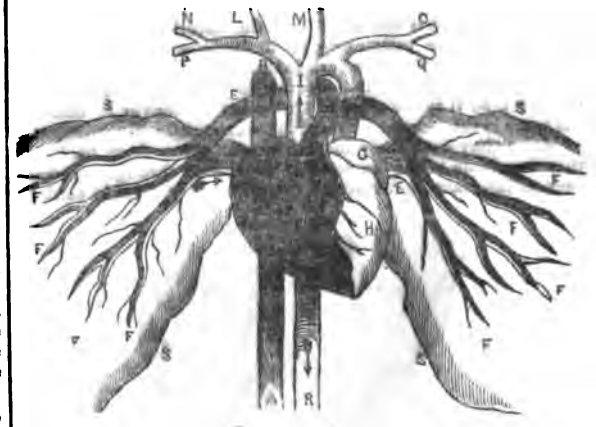
1. Subtract 12345678 from 123456789.
2. Subtract 1123344567 from 2468759768.
3. Find the difference between every two successive numbers in the square contained in question 6, on the Rule of Simple Addition, page 58, No. III., taking care always to place the larger number uppermost—that is, for the minuend.
4. —Find the difference between a million and a thousand and one?
5. —From 4850902 subtract 98998; from the remainder subtract the same number; and from every successive remainder, subtract the same number, until a remainder at last be obtained from which it cannot be subtracted; and then, tell how many times the subtraction has been performed.
6. What is the difference between a hundred thousand and ten millions one thousand, and a hundred millions ten thousand and one?
7. 1000000000—123456789; and, 142857142857—42857142858?

LESSONS IN PHYSIOLOGY.—No. III.

MAN.

Do you think that you are now so familiar with the bones and the muscles as to be ready for a third lesson? If so, then we are now going to take up a very interesting subject. It is the circulation of the blood. The building up of every part of the body is dependent on the material derived from the blood; and to find out how this precious fluid is conveyed to every part, is the object of the present lesson.

For this circulation the most beautiful provision has been made in the heart, the arteries, the veins, and the lungs. Some idea of the arrangement and connexion of those various parts may be obtained from the engraving.



REPRESENTATION OF THE HUMAN HEART, VESSELS, AND LUNGS.

A Vena cava ascendens.
B Vena cava descendens.
C Right auricle.
D Right ventricle.
E Pulmonary artery.
F Pulmonary veins.
G Left auricle.
H Left ventricle.
I Aorta ascendens and branches.
K Coronary arteries.
LM Carotid arteries.
NO Vertebral arteries.
PQ Subclavian arteries.
R Aorta descendens.
S S Outline of lungs.

The heart is divided into the right and the left sides; and each of these two sides is composed of two cavities, with muscular walls. These cavities are placed one above the other, and communicate the one with the other by means of a large opening. The superior cavity, which is called the auricle from its resemblance to the ear in shape, and whose walls are thinner and of a globular form, is in communication with a number of veins; while the inferior cavity, which is called the ventricle, from its sac or pouch-like appearance, and whose walls are thicker, and of the form of a cone or pyramid, is in communication with a large artery, which bears the name of the AORTA, and which, subdividing in its course, terminates in myriads of very minute ramifications closely interwoven with the texture of every living part.

The two sides of the heart are placed the one against the other—auricle in contact with auricle, and ventricle with ventricle, and united by elements common to the structure, and yet without any communication of their cavities with each other. That is to say, auricle does not communicate with auricle, or ventricle with ventricle, but the right auricle with the right ventricle, and the left auricle with the left ventricle.

If we look upon the heart as representing a root, and the aorta as the principal trunk rising from the left ventricle, we shall discover, how like two beautifully ramified trees, the vessels in which the blood flows gradually divide themselves into branches, and twigs, and minute ramifications finer than the hairs of our head, and terminate at the circumference of the body, the limbs, and the internal organs. The other trunk is named the PULMONARY ARTERY which arises from the right ventricle, and is extended through the lungs. We have thus two systems of arteries. We have the pulmonary artery which has its trunk in the right ventricle, and its extremities in the lungs or organs of respiration. We have also the aorta, which has its trunk in the left ventricle, and its extremities in every part of the body.

These arteries or tubes, by which the blood is distributed to

every part of the body, are composed of three membranes or coats, which receive other minute arteries in such a manner as to form a beautifully complicated mesh or network. This network of small vessels may be regarded as the minutest subdivisions of the veins and arteries between which it comes, and through which the blood has to travel from the one to the other. For not only do the arteries communicate with each, and this communication become more frequent as the arteries are distant from the heart, but the arteries deliver the blood into the capillary network, and from thence the veins receive it, because in that delicate network the veins seem to originate.

Distribution of capillaries or small blood-vessels at the surface of the skin of the finger.

As it is the office of the arteries to convey the blood from the heart, so it is the office of the veins to convey it back to the same great centre. From the extremities of the arteries in which they have their origin, we can trace them back till they terminate in the auricles of the heart, through the vena cava in the right, and through the pulmonary veins in the left.

The blood is returned from every part of the body, except the lungs, into the right auricle from the three following sources:—

The VENA CAVA SUPERIOR, which brings it from the head, neck, chest, and superior extremities.

The VENA CAVA INFERIOR, which brings it from the abdomen or belly, and the inferior extremities.

The CORONARY VEIN, which receives it from the coronary arteries of the heart.

You will now very naturally ask—and how is the blood from the lungs returned? After coming into contact with the atmospheric air in these organs of respiration, it is conveyed back by the pulmonary veins to the left auricle of the heart.

As we have two systems of arteries, so we have two systems of veins. The one has its minute divisions or roots in every part of the body, and terminates by the two principal trunks of the vena cava in the right auricle. The other has its roots or extremities in the organs of respiration, and terminates by means of the four trunks of the PULMONARY VEIN in the left auricle of the heart.

What, then, is the difference between an artery and a vein? During life, an artery is distinguished by its pulsation The pulse may be compared to a wave which commences in the heart, and travels onwards through the whole arterial system. When your doctor wants to feel your pulse he puts his finger upon your wrist as being more convenient; but the pulse is not confined to the wrist. There is another method of distinguishing an artery. It is this. If it be wounded, or if you cut it, the blood escapes by jets. But a vein does not pulsate, and its blood is of a much darker colour. The walls of veins are thin, and soft, and but slightly elastic, while those of the arteries are thick, and firm, and elastic in a high degree.

The direction of the blood in their arterial and venous vessels is constant; but relatively to the heart, which is their common centre, this direction is both centripetal and centrifugal. In the venous system it is centripetal—the blood being conveyed from all parts of the body to the right auricle through the vena cava, and from the lungs to the left auricle by the pulmonary veins. In the arterial system it is centrifugal—the blood being carried from the right ventricle to the surface of the lungs or respiratory organs through the medium of the pulmonary artery, and from the left ventricle to every part of the body through the medium of the aorta. Such is the wondrous mechanism which determines and directs the circulation of the blood.

In the course of its circulation the blood is found to be in two entirely different conditions—it is partly arterial, and partly venous. It is the blood, as it exists in the arteries, which only is capable of affording nourishment, and of supporting life. What, then, becomes of the blood in the veins? On arriving at the right auricle of the heart, the auricle contracts,

and sends the blood into the right ventricle; this again is stimulated to contraction, and the blood is propelled into the pulmonary artery, out of which, by a similar contraction, it is forced into the smaller branches of the artery, and these bring it into contact with the inspired air in the lungs. On reaching the lungs, the blood is of a dark red hue approaching to purple, but leaves them of a bright florid colour approaching to scarlet. This change is due to the elimination or discharge of carbonic acid gas, and the imbibing of oxygen from the air. Having thus lost its superfluous carbon, and having its capacity much increased for receiving and entering into combination with the caloric or heat generated in the lungs, the blood is conveyed back by the pulmonary veins to the left auricle of the heart, which being stimulated to contraction propels the blood into the left ventricle, which in its turn also contracts, and forces the fluid into the aorta, which, as we have seen, divides and subdivides in its course, and ultimately terminates in a multitude of thread-like branches, which become interwoven with the very texture of every living part. In these minute vessels the veins have their origin. These veins gradually coalesce and form larger trunks, till at last they terminate in two, and by these two the whole current of the venous blood is brought back in a direction contrary to that of the arterial blood, again passes into the lungs to undergo the same purifying process as before, and is again conveyed to the

left side of the heart to be put in circulation. The time occupied in this circulation may be eighty, a hundred, or a hundred and twenty seconds of time.

Each of the cavities of the heart presents alternately two opposite states—one of dilatation, and the other of contraction. During the relaxation, the walls permit the cavity to be filled and distended by the introduction of the blood; but during the contraction, the walls diminish in their length, energetically approach each other till they come close together, force out all the blood, and leave no cavity whatever. Let us try to understand this. Let us suppose that the left auricle is filled and distended by the flowing in of arterialised blood from the four pulmonary veins; it suddenly and energetically contracts, and by expelling the blood ceases to present a cavity: it so happens that at the very same instant the left ventricle is in a state of relaxation, and its walls offering no resistance to the introduction of the blood, the blood by means of a free opening which enables the cavity of the ventricle to communicate with the cell of the auricle, briskly flows into the ventricle and fills it.

But how is the blood which has thus passed into the ventricle prevented from flowing back into the auricle if there be a free passage between those two cavities? To provide against this there exists in the heart itself a beautiful little apparatus which hermetically seals this opening at the very same moment that the ventricle contracts. If you will carefully examine the two engravings (see page 68) you will the better be able to discover how this little apparatus works. In the engraving to the left you have the ventricle laid open, and you trace a ring composed of strong tendon, very tough and without extension, whose superior border (*a*) surrounds the free passage between the ventricle and the auricle, and whose inferior border plunges into the cavity of the ventricle itself. This inferior border gives attachment to two series of firm, yet strong cords, the one (*b*) anterior, and the other (*c*) posterior, and which are seen to fix themselves in the summit of two muscular columns (*d f*) detached from the anterior and posterior walls of the cavity. Each of these two columns exhibits two juttings or projections, separated by a little gutter. Look now at the engraving on the right, and you will see that at the moment of contraction those two columns (*d f*) approach each other till they come into contact, and embrace each other in such a manner, that the right projection of the anterior column fills up the gutter of the posterior column, and the left projection of the posterior column fills up the gutter of the anterior column. The two columns are now seen to make but one. The cords, bent by the abridgment or shortening of the columns, have been drawn out, and with them the inferior edge of the tendonous ring, in such a manner that the cords have become vertical, the ring drawn together, folded and knit, and closed like the mouth of a purse.

But this is not all. To this tendonous ring, which encircles the orifice or opening between the auricle and ventricle, there is fixed the base of a valve, which in the left division of the heart is called the mitral valve, from its likeness to a bishop's mitre. This valve is brought into action at the moment in which the ventricle begins to contract. As the contracting walls of the ventricle press on the blood, the valve is pressed up by it towards the opening between the two cavities of the auricle and the ventricle, and completely closes it. Or, if possible, to put it in yet simpler words, the flaps of the valve, which are completely thrown back during the rush of blood from the auricle to the ventricle, are now drawn into a position to allow the blood to get behind them and bring them together, so as completely to close the passage.

The walls of the left ventricle are considerably thicker than those of the right, and their power of contraction is greater. This difference, which is as three to one, is required by the force necessary to drive the blood into the aorta, and through this large artery into every part of the body. It requires but little force to send the blood into the pulmonary vessels.

We have seen that the heart has four distinct cavities. Now each of these cavities is nearly equal in capacity—each of them in the full-sized heart holding about two ounces of fluid. This, therefore, is the quantity of blood which is sent forth at each successive contraction of the ventricles. The whole quantity of blood seems to be about one-fifth of the entire weight of the body. Suppose a man to weigh one hundred and sixty pounds, he would have in his body two-and-thirty pounds of blood; and if we allow seventy-five pulsations to a minute, then if we multiply these seventy-five pulsations by the two ounces of blood propelled at each contraction of the ventricles, we shall find that at least one hundred and fifty ounces of blood must pass through each ventricle of the heart in that short space of time. At this rate it would require more than three minutes and a half to perform the entire circulation. It may, however, be effected in one-third of that time.

We have something more to say of the blood—of its composition and its use—but we must reserve it for our next lesson.

Questions for Examination.

What provision do we find in the body for the circulation of the blood?

How is the heart divided, and of how many cavities does it consist?

How are these cavities situated in relation to each other, and what are their names?

Why is the superior cavity called an auricle, and the inferior cavity a ventricle?

Do these cavities communicate with each other, and in what way?

What great artery arises from the left ventricle, and whither does it reach in its ramifications?

What artery arises from the right ventricle, and to what does it extend?

Give the two systems of arteries in their origin and progress.

In what do the arteries terminate and the veins begin?

What is the office of the arteries and the veins?

From what three sources is the blood returned from every part of the body to the heart?

How is the blood returned from the lungs?

Give the two systems of veins in their origin and progress.

What is the difference between an artery and a vein?

When is the direction of the blood centripetal, and when centrifugal?

What are the two conditions in which the blood is found to exist in the human body?

What becomes of the venous blood?

Describe the circulation.

Has each cavity of the heart the power to dilate and contract?

What takes place during these two opposite states?

How is the blood prevented from flowing back after it has emptied itself from one cavity into another?

Why are the walls of the left ventricle thicker than the right?

What is the capacity of each cavity of the heart?

What is the quantity of blood in the body?

How long does it require for the blood to perform an entire circulation?

LESSONS IN LATIN.—No. IV.

By John R. Beard, D.D.

NOUNS, SUBSTANTIVE AND ADJECTIVE—*Continued.*

We now pass on to the several declensions. By declension, you know, is meant the manner of forming the cases of noun.

First Declension.

Sign ae *in the Genitive Singular*

Case-endings with the English Signs.

Cases.	*Singular.* Latin.	English.	*Cases.*	*Plural.* Latin.	English
Nom.	-a	(subject)	Nom.	-ae	(subject)
Gen.	-ae	*of*	Gen.	-arum	*of*
Dat.	-ae	*to* or *for*	Dat.	-is	*to* or *for*
Acc.	-am	(object)	Acc.	-as	(object)
Voc.	-a	*O!*	Voc.	-ae	*O!*
Abl.	-a	*by, with,* or *from*	Abl.	-is	*by, with,* or *from*

Here you may remark that in the *singular* two case-endings are the same—namely, those of the nominative and the vocative, both being *a*; and that in the *plural* taken with the singular, four case-endings are the same—namely, in the plural those of the nominative and the vocative; in the singular, the genitive and the dative. This undoubtedly is a defect in the language. By practice only can you learn in reading to ascertain which, in any particular instance, the writer intended; the difficulty, however, is not so great as you might imagine.

This form and other similar forms I advise you to learn by heart in three ways; first vertically, that is from top to bottom; you will thus see the identity in form of the adjective with the corresponding noun. Then learn it from the left hand to the right; thus amplus, ampla, amplum; learning the singular first and then the plural. Finally learn the case-endings in the same two ways; thus N. G. D. Ac. V. Ab. *us, i, o, um, e, o*; and N. *us, a, um, &c.* You cannot bestow too much pains in making yourself perfectly familiar with each declension, each example, each form, as you go forward. There is a good Latin maxim which says "festina lente," literally *hasten slowly*, or as the English proverb says "slow but sure." In grammatical studies the observance of the proverb is very serviceable.

The adjective liber, *free*, is declined like the noun puer. The adjective pulcher, *fair* or *beautiful*, is declined like the noun ager. Liber in the feminine gender is libera, and libera is declined like mensa. In the neuter gender, it is liberum, and liberum is declined like bellum. I will give you the forms in full of both liber, libera, liberum, and pulcher, pulchra, pulchrum.

ADJECTIVES OF THREE TERMINATIONS.

EXAMPLE:—Liber, *free*.

	Singular.			*Plural.*		
N.	liber	libĕra	libĕrum	libĕri	libĕræ	libĕra
G.	libĕri	libĕræ	libĕri	libĕrorum	libĕrarum	libĕrorum
D.	libĕro	libĕræ	libĕro	libĕris	libĕris	libĕris
Ac.	libĕrum	libĕram	libĕrum	libĕros	libĕras	libĕra
V.	libĕr	libĕra	libĕrum	libĕri	libĕræ	libĕra
Ab.	libĕro	libĕra	libĕro	libĕris	libĕris	libĕris

EXAMPLE:—Pulcher, *fair*.

	Singular.			*Plural.*		
D.	pulcher	pulchra	pulchrum	pulchri	pulchræ	pulchra
G.	pulchri	pulchræ	pulchri	pulchrorum	pulchrarum	pulchrorum
D.	pulchro	pulchræ	pulchro	pulchris	pulchris	pulchris
Ac.	pulchrum	pulchram	pulchrum	pulchros	pulchras	pulchra
V.	pulcher	pulchra	pulchrum	pulchri	pulchræ	pulchra
Ab.	pulchro	pulchra	pulchro	pulchris	pulchris	pulchris

N.B.—The *ch* is pronounced like *k*, thus, pul*k*er, pul*k*ra, pul*k*rum, &c.

EXERCISES.—Form, according to the models just given, pulcher hortus, *a beautiful garden*; femina bona, *a good woman*; exemplum bonum, *a good example*; vir magnus, *a great man*; ovum magnum, *a large egg*; ager fecundus, *a fruitful field*; liber puer, *a free boy*; scriba bonus, *a good writer*.

Filius, *a son*, makes in the vocative singular fili, and meus in the vocative singular makes *mi*, as, O mi fili! *O my son!* but filia, *a daughter*, makes in the vocative singular filia, and meum in the neuter makes meum, as, O mea filia! *O my daughter!* O meum officium! *O my duty!*

Proper names ending in *ius* have *i* in the vocative singular, as Tullius, O Tulli; Virgilius, O Virgili; Mercurius, O Mercuri; Antonius, O Antoni.

Deus, *God*, has in the vocative singular deus; in the plural it is thus declined: N. dii, G. deorum, D. diis, Ac. deos, V. dii, Ab. diis.

VOCABULARY.

Equus, -i, m., *a horse*; fecundus, -a, -um, *fruitful*; frumentum, -i, n., *corn*; granum, -i, n., *a grain*; juba, -æ, f., *a mane*; musca, -æ, f., *a fly*; molestus, -a, -um, *troublesome*: varius, -a, -um, *various*; vireo, 2, *I become green*, or *I become strong*; colo, 3, *I cultivate, I honour*, or *I worship*; committo, 3, *I intrust*; curro, 3, *I run*; hinnio, 4, *I neigh*; celeriter, *swiftly*; longus, -a, -um, *long*; rego, 3, *I guide*, or *I rule*; templum, -i, n., *a temple*.

LATIN-ENGLISH.

Equus hinnit; juba equi est pulchra; muscæ sunt molestæ; sunt ne muscæ molestæ? boni discipuli non sunt molesti; longa bella sunt molesta; equi celeriter currunt; vir regit equum; equus regitur a viro; equo pulchro delector; agri sunt fecundi; herbæ agrorum sunt variæ; agricŏla committit agris grana frumenti; agricŏla colit agros; quam pulchre virentur agri? in agris florent variæ herbæ.

ENGLISH-LATIN.

The field is fruitful; are the fields fruitful? wars are not fruitful; fields are cultivated; you honour (worship) the gods; the gods are honoured by Tully (Tullius); the horse and the mare are guided by the man; boars run swiftly; do goats run swiftly? flies are (there are flies) in the beautiful garden; thou intrustest the horse to the field; good scholars are honoured. O my son, temples are intrusted to the gods and goddesses; O, Antony, the gods and goddesses are worshipped in temples; O good God! thou art worshipped in the fruitful fields; good men are honoured by their sons and their daughters.

QUESTIONS FOR EXAMINATION.

What English words are formed from the Latin words employed in this lesson? For what Latin words, employed in this lesson, are the following English words?—namely, *cultivate; agriculture; variety; liberal; amplify; scholar; master; amicable; epistolary; horticulture; puerile; loud; nautical; error; poetical; ancillary; vituperation; copiousness; exemplary*. Ascertain by the aid of the Latin the exact meaning of each of these English words. What is the gender of the nouns of the first declension? State the exceptions. What is the gender of nouns ending in *us*,* and nouns ending in *um*? When is the instrument after a passive verb accompanied by the preposition *a*? and when does it stand without that preposition? Why do you find in this lesson such forms as bonæ nautæ, and bono nautæ? What is the meaning of *est mihi*? What is the vocative singular of *filius* and of *deus*?

LESSONS IN BOTANY.—No. II.

FLOWERS.

FLOWERS are among the most exquisite objects of the vegetable world. How various their forms, how beautiful their tints, how delightful their perfumes. No two are exactly alike, even when they are of the same species, and grow on the same stalk. Then flowers do not all unfold at once, but appear in a wisely-ordered succession; and thus, short-lived as they are, we have them almost all the year round. First comes the snow-drop, which presents its modest milk-white flower to our notice early in February; next the crocus appears, but in its timidity, keeps close to the earth; then rises the violet, arrayed in beauty and breathing fragrance, with the polyanthus and auricula as her courtly attendants; afterwards rainbow-headed tulips spring forth richly, and anemonies follow in their train; while the ranunculus, the lily, the carnation, and the queen-like rose, with others too numerous to be told, close the gay and lovely procession.

Flowers are not only the last, but the most elaborated organs of the vegetable system. Whether we contemplate the beauty of their forms, the splendour of their colours, or the delicious fragrance they everywhere breathe around us; or whether, penetrating beneath the surface, we survey the delicacy of their structure, and investigate the peculiar functions they perform, we cannot but feel the greatest admiration of the skill with which, in a compass so small, and by means apparently so simple, such a series of actions, terminating in results so varied and important, can at once be combined and regulated.

Man alone, of all sentient beings, appears peculiarly formed to derive pleasure from a sense of the graceful and beautiful, and from inhaling a delicious perfume. Flowers, therefore, seem to be almost exclusively formed for his benefit, considering them as a mere source of innocent gratification. It is true that the eyes of other creatures are often more acute than those of the human species in distinguishing between what is beautiful or nutritious in their food; while to the same objects their olfactory nerves are remarkably alive. But, whatever enjoyment flowers may yield them, there are delicate sensations connected with the mental faculties, and heightened by agreeable associations, arising from the brilliancy and harmony of colours, from elegance of form, and from sweetness of odour, to which they must be insensible.

In addition, however, to the pleasures thus yielded by flowers to the human faculty, these lovely and curious pro-

* There are a few exceptions to the rule as given in the text; but in this general outline they are not given, in order that the student's mind may not be confused. Those who wish to enter more minutely into the subject may find the information in Zumpt's Latin Grammar, translated by Schmitz. See also the author's "Latin Made Easy," fourth edition (just ready), price 3s. 6d. The work contains copious examples, with a Latin-English and an English-Latin vocabulary of all the words, as well as a general index of subjects, forming a complete introduction to the reading and writing of Latin prose. It is published by Simpkin, Marshall, and Co., of London and may be procured through any respectable bookseller.

ductions are made to subserve some highly-important functions as respects the economy of the plants themselves, as well as in reference to the animal world. And, in this point of view, they are now, more particularly, to receive our attention.

The *calyx*, or flower cup, forms a covering to shelter and defend the bud before it expands. It consists of several parts which resemble small leaves both in form and colour, and probably act in the same manner. This part varies, so that in the hemlock it is a *fence;* in the hazel, a *catkin;* in the daffodil, a *sheath;* in the oat and the grasses, a *husk;* in mosses, a *veil;* in mushrooms, a *curtain;* and in the polyanthus a *cup*.

Above the calyx rises the *corolla*, or blossom, the coloured part of the flower. It consists of several *petals*, distinct or separate, or else forming a corolla of one single piece, in which case the flower is called *monopetalous*. When the petals first expand, they serve to protect the delicate organs in the centre, and also to reflect the sun's rays on them, thus aiding that orb in its genial influence. When they are full-grown, this heat is no longer necessary; and as light and air are now beneficial, the petals expand, leaving these delicate parts to enjoy their full power. In fig. 1, a portion of the calyx and petals is removed, showing the *stamens* and *pistil*.

The *stamens* are little bodies, having yellow heads mounted on long stalks, which are seen around, but not in the centre of the flower. These stalks are called *filaments;* whilst the heads are called the *anthers* (fig. 2). In the flower of the almond (fig. 3), the petals and the stamens are united to the calyx, while the pistil is free.

Fig. 1.

Stamen and Pistil.

Fig. 2.

Filament and Anther.

Fig. 3.

Almond Flower.

In the Aralia spinosa (fig. 4), the calyx, petals, and stamens, are united to the pistil, and the two latter appear to arise from the point where the calyx joins the upper part of the pistil. These varied arrangements of parts have given rise to certain divisions in classification, to which we must hereafter particularly allude.

Some corollas are irregular. The most marked of these occur among the pea tribe, in which there are five petals: one

Fig. 4.

Aralia Spinosa.

Fig. 5.

Sweet Pea.

Fig. 6.

Salvia pratensis.

turned next to the axis, usually larger than the rest, (*e* fig 5), and folded over them, called the *standard;* two lateral, *a*, the *alæ* or *wings;* two partially or completely covered by the alæ, and often united slightly by their lower margins, so as to form a single piece, *b*, called the *keel*, which embraces the essential organs. Such apparent irregularities result from the unequal development of the different parts of the same shoot, and from the adhesion of these parts to each other in various ways; so that the whole form of the flower sometimes appears completely changed, and there is only one direction in which it can be divided into halves.

Among these irregular corollas may be marked the labiate, or *lipped* (fig. 6), having two divisions of the part in the form of lips, from a fancied resemblance to a mouth; the upper one composed usually of two pieces, and the lower of three, separated by a hiatus or gap. When the lower lip is pressed against the upper, so as to leave only a chink between them, the corolla is said to be masked, as in Snapdragon, Frogsmouth (fig. 7), and some other plants.

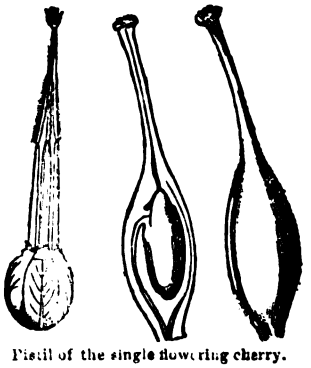
The *pistil* (fig. 8.) occupies the centre, or axis of the flower, and is surrounded by the stamens and floral envelopes when these are present. It is composed of three parts: the *germen*, the *style*, and the *stigma*. The germen, varying in form in different plants, is always placed below the style, and contains the embryo seeds. The style is placed on the germen, and, like the stigma, has a variety of forms. In many plants the pistil and stamens are in the same flower, as here described; but in other plants one flower contains the pistil, and another the stamens, while in a third class, the pistils are in one plant and the stamens in another, as in the nettle, the male and female plants growing in adjoining patches.

Like the other organs, the pistil consists of one or more modified leaves, which, in this instance, are called *carpels*, from the Greek word for fruit. There are many points of resemblance between them and leaves. When a pistil consists of a single carpel, it is *simple;* when it is composed of several carpels, it is called *compound*. In the double flowering cherry no

Fig. 7.

Frogsmouth.

Fig. 8. Fig. 9.



Pistil of the single flowering cherry.

fruit is produced, and the pistil consists usually of several leaves. But when the single flowering cherry is examined, it is found that, in place of folded leaves, there appears a single body, called the *ovary*, and containing a single *ovule* (fig. 9); which shows also the section of a pistil.

Compound, or more properly, aggregate flowers, invite our attention, and may be easily observed. Each blossom of the daisy, for example, is composed of between two and three hundred other flowers, or florets, all of them perfect, each having all the parts that constitute a flower, and, therefore, as complete as a lily or a hyacinth. Each of the flower leaves, usually white above and crimson underneath, forming a kind of circular coronet around the flower, though they appear to be no more than little petals, are in reality complete flowers, as well as each of the small yellow things within this coronal circle, which a young botanist might mistake for stamens.

When, however, a little experience has been acquired, with the aid of a good microscope the truth of this statement may easily be verified. For example, if he pull out one of the white coronal flowers from the circumference of the circle, he will at first think it is flat from one end to the other, though, on looking carefully at the end by which it was fastened into

the rim of the disk, he may perceive that it is not flat, but round and hollow, in the form of a tube, while a little thread, ending in a curved fork, like two horns, arises out of the tube. This is the pistil of the floret, which is only flat at its outer extremity, and the same holds true of each of the white flower leaves all round the coronal circle.

If now the young botanist examines the central or yellow part of the disk, which rises in a sort of cone within the circle of white florets, if the blossom be sufficiently advanced, he will see each of the yellow florets open in the middle, and cut into several parts; this, when examined by means of a microscope, or a small pocket magnifying-glass, will exhibit a pistil surrounded with anthers, not unlike in form to the larger flowers. When the yellow florets of the centre are closed at top with a round, smooth bulging, they are not yet expanded, and may be considered as similar to flower-buds. They begin to expand successively from the circumference towards the centre.

We may now look, in concluding this lesson, at the ends which the various parts of the flower are designed to answer in the perpetuation of the plant. The anther, as seen surmounting the filament (fig. 2), is a kind of box or bag, containing a yellow dust, which is called *farina* or *pollen*. The grains, or particles of pollen, are very numerous. Hassall says that a single head of dandelion produces upwards of 240,000, each stamen of a peony 21,000, a bulrush 144 grains by weight. Other instances are still more remarkable. A single plant of *Wisteria sinensis* is stated to have produced 6,750,000 stamens, and these, if perfect, would have contained 27,000,000,000 pollen grains. In evergreens, such as firs, the quantity of pollen is enormous. When, therefore, the anther is ripe it opens, and scattering the pollen grains, they are absorbed by the pistil, and reaching the germens, they fructify the seed, which, without this process, would be imperfect and barren. The stamens, pistil, and corolla having thus performed their respective offices, decline and wither, making room for the seed-bud, which daily increases until it attains its perfect state.

LESSONS IN ENGLISH GRAMMAR.—No. V.

NOUNS *(continued)*.—GENDER.

GENDER is another property of nouns. By gender is meant *the distinction of sex*, or the absence of sex. Genders are usually divided into *three* classes, the masculine, the feminine, and the neuter, or neither sex.

Nouns of the MASCULINE gender are those which signify *males*; as, *man, father, son, brother; king, prince, duke; lion, tiger, horse.*

Nouns of the FEMININE gender are those which signify *females*; as, *woman, mother, daughter, sister; queen, princess, duchess; lioness, tigress, mare.*

Nouns of the NEUTER gender are those which signify *things without life*; as, *book, stone, money, house, tree, &c.*

Many nouns are said to be of the *common gender*, when they are used to denote persons who may be *either male or female*; as *relation, parent, child, cousin, friend, neighbour, &c.*

Gender is distinguished in various ways:—

1. By placing another noun before or after the word, or by prefixing the pronoun *he* or *she*; as,

Masculine.	*Feminine.*	*Masculine.*	*Feminine.*
A man-servant	A maid-servant	A cock-robin	A hen-robin
A male child	A female child	A he-bear	A she-bear

2. By the use of different words, as,

Masculine.	*Feminine.*	*Masculine.*	*Feminine.*
Man	Woman	Monk	Nun
Husband	Wife	Wizard	Witch
Father	Mother	Beau	Belle
Boy	Girl	Bullock	Heifer
Son	Daughter	Buck	Doe
Brother	Sister	Colt	Filly
Bridegroom	Bride	Drake	Duck
King	Queen	Stag	Hind
Lord	Lady	Hart	Roe
Earl	Countess	Bull	Cow
Landlord	Landlady	Ram	Ewe

3. By a different ending of the word, as *widower*, masculine, rendered *widow* in the feminine. Many nouns masculine form the feminine by *the addition of ess*; as,

Masculine.	*Feminine.*	*Masculine.*	*Feminine.*
Author	Authoress	Mayor	Mayoress
Baron	Baroness	Patron	Patroness
Count	Countess	Peer	Peeress
Dauphin	Dauphiness	Poet	Poetess
Deacon	Deaconess	Priest	Priestess
Giant	Giantess	Prophet	Prophetess
Heir	Heiress	Shepherd	Shepherdess
Host	Hostess	Tutor	Tutoress
Jew	Jewess	Viscount	Viscountess
Lion	Lioness		

The feminine of some nouns is formed by *changing the masculine, of, er, or or, into ess, or ress*; as,

Masculine.	*Feminine.*	*Masculine.*	*Feminine.*
Abbot	Abbess	Enchanter	Enchantress
Actor	Actress	Governor	Governess
Adulterer	Adulteress	Hunter	Huntress
Ambassador	Ambassadress	Idolater	Idolatress
Benefactor	Benefactress	Marquis	Marchioness
Chanter	Chantress	Protector	Protectress
Conductor	Conductress	Sorcerer	Sorceress
Director	Directress	Tiger	Tigress
Elector	Electress	Traitor	Traitress
Emperor	Empress		

It will be observed that in a few of the above words, the ending of the masculine is slightly altered in forming the feminine.

In the following words the difference is more marked:—

Masculine.	*Feminine.*	*Masculine.*	*Feminine.*
Czar	Czarina	Margrave	Margravine
Duke	Duchess	Lad	Lass
Hero	Heroine	Master	Mistress
Seamer	Seamster	Landgrave	Landgravine
Singer	Songster	Sultan	Sultana

Some of the masculine nouns change the termination into *ix* to form the feminine; as, masculine, *administrator*; feminine, *administratrix*; masculine, *testator*; feminine, *testatrix*; masculine, *executor*; feminine, *executrix*. These are Latin words, which retain their original form.

Nouns in which certain things or attributes are spoken of as if they were persons, are considered as *feminine*; the following are of this class:—

Virtue	Religion	The soul	Hibernia
Vice	Faith	The church	France
Wisdom	Hope	The earth	Ship
Folly	Charity	The moon	Vessel
Nature	Temperance	Britannia	Gun
Fortune	Patience		

Many instances, however, occur in which the *neuter* gender is employed in speaking of these things.

For masculine nouns, we substitute the pronouns *he, his*, or *him*; for feminine nouns, *she, hers*, or *her*; for neuter nouns, the pronouns *it* or *its*. In the plural number the pronoun, *they, theirs, them*, has no distinction to mark gender.

In speaking figuratively, as a general rule, we attribute the *masculine* gender to objects where power, force, or activity is exhibited; the *feminine* gender to those where beauty, delicacy, goodness, fruitfulness, or any object of affection is described; and the *neuter* gender to those where smallness, feebleness, or helplessness are meant to be expressed.

The following remarks may be borne in mind as to the use of the masculine and feminine genders. The *masculine* term has a general meaning, including both male and female; it is always employed when the office, occupation, profession, &c., and not the sex, of the individual is chiefly to be expressed; and the *feminine* term is used in those cases only in which it is necessary that the particular sex should be expressly named. To illustrate this:—if we say, "The poets of this age are distinguished more by correctness of taste than grandeur of conception;" we clearly include in the term *poets* both male and female writers

of poetry. If we say, "She is the best *poetess* in this country," we assign to her of whom we speak the superiority over those only of her own sex. But if we say, "She is the best *poet* in this country," we pronounce her superior to all other writers of poetry, *both* male and female. When distinction of sex is necessary, for the sake of clearness, or where the *sex* rather than the general idea implied by the term is the chief object, the feminine noun must be employed to express the female, thus; "I hear that some *authoresses* are engaged in this work;" here the feminine term is plainly necessary.

QUESTIONS ON THE FOREGOING LESSON.

What is meant by gender?
Into how many classes are genders of nouns usually divided?
How do you describe the genders? Masculine? Feminine? Neuter? What is meant by common gender?
How are the genders distinguished?
Give an example of each mode.
What is the gender of nouns which are personified?
What are the particular qualities of things spoken of figuratively, which should guide you as to the use of the different genders of nouns?

BIOGRAPHY.—No. II.

GEORGE STEPHENSON.

THE subject of our memoir was born in a small and lone cottage, between Close-house and Wylam, in Northumberland, in the colliery district, and within nine miles of Newcastle. He was set to work to earn a livelihood at a very early age; and his first wages were only twopence a-day. He had to ride on a horse to his work at an hour in the morning when most children are asleep; and to lead this animal at the plough, when scarcely old enough to stride the furrow. A change in his early employment was to pick "bats and drops" from the coal, as he took his place at the heap; and he often hid himself when the overseer went his rounds, lest he should be thought too little to earn his living among others. Like too many children of the poor, he had to work hard before he had learned to read and write; and considering his unpromising beginning, how little might be augured concerning his future condition!

Shortly after the age of thirteen, George Stephenson worked as "breaksman" for Waterrow-pit, on the tramway between Wylam and Newburn; his father having removed to Walbottle. It has been jocosely said that he "now set up his *first servant*," which was a great dog that he employed to fetch his dinner daily from Walbottle colliery to the tramway. Another removal of his father's family brought him to Killingworth, where there is a colliery belonging to Lord Ravensworth and his partners. Here George was put out as a stoker to a colliery engine; and he was often obliged to get up to work at one or two o'clock in the morning, and remain working in the coal-pit to a late hour at night, his wages being then only one shilling a day. He thought, at a later period, that his fortune was made when his wages were raised to twelve shillings a week.

It was when a stoker, that George gave his mind to vigorous and careful thought. It is no unusual thing for a man to feel a lively interest even in the implements with which he works. The bricklayer has his favourite trowel, the carpenter his favourite saw, and the artisan his favourite tool, which he values beyond any price that could be given for it. "I would not take half a sovereign for this tool," he says, when perhaps its original cost was only a shilling. Even the sailor says, "he would like to see" the vessel that would "take the shine" out of the one to which he belongs. Such a feeling as this, may be well entertained towards a steam-engine. It is more like a living thing than a machine; it works not by an outward, but an inward power. Its action may be so regulated as to render it applicable to the finest and most delicate manufactures; while its power may be so increased as to set weight and solidity at defiance. The trunk of an elephant, that can pick up a pin, or rend an oak, is as nothing to it. It can engrave a seal, or crush a mass of iron. It can draw out a filament, without breaking, as fine as gossamer, and lift a ship of war in the air. It can embroider muslin, and forge anchors, cut steel into ribands, and impel loaded vessels against the fury of the wind and waves.

Young Stephenson, while a stoker, had his wages raised to seventeen shillings a week, and added to his earnings a little more for piecework, or overtime. When he had reached manhood, he was sober, upright, and laborious, enjoying the confidence of his employers, and the goodwill of his fellow-labourers. While at Killingworth, he saw that the sheaves over which the rope worked at the pit were much fretted, and that they, therefore, wore quickly away, causing much trouble to the workpeople and a great outlay to the owners. Many had tried to remedy this evil, but failed in so doing. Stephenson, however, set to work and put the sheaves to rights, so that a rope was saved in two or three months. He gained at this time also other materials for thought, for a fellow-workman, named Wood, gave him a knowledge of numbers, and of writing.

In the year 1800 there was much, unhappily, to depress the labouring man. The scourge of war, with famine in its wake, was passing through Europe; wages were low, and food was dear: he was liable to serve in the militia, and, if drawn, could only escape from it by providing a substitute at a large cost; besides, a press-gang might hurry him away from his home to the strife, the wounds, the maimings, and the death of battle. No wonder that the artisan at that period often thought of going to America, although a voyage thither was a far more difficult thing than it is now. George Stephenson, like many others, contemplated going to New England; but overwhelmed with the difficulties that beset him, he knew not what to do. With a keen and painful recollection of these circumstances, he said, afterwards, to one who knew him, "You know the road from my house at Killingworth to such a spot; when I left home and came down that road I wept, for I knew not where my lot would be cast."

Passing a newly sunk pit as he went every morning to his work, he saw, time after time, the overseers and engineers trying in vain to draw the water. One day he stopped and remarked to those around, that if they would let him, he could remove the difficulty; they laughed at him at first, but at length they gave him his own way, and he accomplished the task in which they had failed. He was now known among his neighbours as a skilful man; and his credit was increased by making a large condensing engine act well, which could not previously pump the water required.

When his hopes of obtaining a livelihood increased, he gave up the idea of emigration, married when at the age of twenty-two, and in 1803 rejoiced in the birth of Robert, his only child. He now tried his hand at most kinds of work, laid down some tram-ways, or wagon-ways as they are called in the north, and was favourably circumstanced for making his way as a mining engineer. Though not fond of reading, he was not satisfied without gaining a thorough acquaintance with whatever he wished to understand, or engaged to undertake. He had too frequently noticed the miscalculations of hundreds of engineers for want of studying the laws of mechanics; and knowing that a pound could only weigh a pound, he by a diligent and careful study of these laws effectually guarded against a continuance of their errors. "I was, however," he said, when alluding to this period, "a poor man;" and referring to his own want of learning, and his determination that his son should have it, he added, "How do you think I did? I betook myself to mending my neighbours' clocks and watches at night, after my day's work was done, and thus I got the means of bringing up my son."

Meanwhile, a patent had been taken out by Trevithick and Vivian for the application of high-pressure steam to carriages, and by which the weight of the engine was greatly reduced. It was one of several schemes invented to diminish the great draught of coal on the tramways, an operation both laborious and fatal to horses. An engine of this kind having been seen by Stephenson at Wylam, he set himself to contrive one which should work much better, as the irregular action of the cylinder made such jerks in the working as continually tended to shake it in pieces. So great was the confidence which Lord Ravensworth and the Killingworth owners put in him, that they supplied him with the money to make a locomotive engine; and in the month of July, 1814, it was tried on the tramway, and in the following year he obtained a patent.

In 1829 a premium of £500 was offered by the new Liverpool and Manchester Railway Company for the best locomotive engine. One, called by mistake the "Perseverance," intended also to travel on turnpike-roads, was withdrawn. Two others, "The Novelty" and the "Sans Pareil," broke down; while Mr. Stephenson's "Rocket" surpassed the requirements of the directors, ran at the average speed of fifteen miles an hour, won the prize, and ushered in the greatest mechanical revolution effected since the invention of the steam-engine by Watt.

At the opening of the Newcastle and Darlington Railway, in 1844, he mentioned many of the incidents of his life, and among them the following:—"My son became my assistant and companion. He got an appointment as under-viewer; and at nights we worked together at our engineering. I got leave to go from Killingworth to lay down a rail-way at Hetton, and next to Darlington; and after that, I went to Liverpool, to plan a line to Manchester. I there pledged myself to attain a speed of ten miles an hour. I said I had no doubt the locomotive might be made to go much faster, but we had better be moderate at the beginning. The directors said I was quite right: for if when they went to Parliament, I talked of going at a greater rate than ten miles an hour, I would put a cross on the concern. It was not an easy task for me to keep the engine down to ten miles an hour; but it must be done, and I did my best. I had to place myself in the most unpleasant of all positions—the witness-box of a Parliamentary committee. Some one inquired if I was a foreigner? and another hinted that I was mad."

Strange as such a statement seems now-a-days, it was too true. In this opinion concerning the engineer, many of the shareholders fully concurred. They became alarmed at the "mad" scheme of this "Watt run wild;" and "in order," says a recent writer, "to prevent his no less mad steam engines from being let loose upon their cherished horse trot railway project, they got two 'eminent engineers' to act as commissioners of lunacy, and to report. The 'eminent engineers' accordingly investigated the subject; and in 'a very able document,' proved most clearly that Mr. Stephenson's project was practically and commercially inexpedient! Talent and enterprise, however, prevailed, and the horse-plan was abandoned." Mr. Stephenson added, "I put up with envy and rebuff, and went on with my plans, determined not to be put down. Assistance gradually increased, improvements were made every day; and to-day a train which started from London in the morning has brought me in the afternoon to my native soil, and enabled me to take my place in this room, and see around me many faces which I have great pleasure in looking upon."

Mr. Stephenson now took the lead in railway engineering, became an extensive locomotive manufacturer at Newcastle, a railway contractor, and a great colliery and ironwork owner, particularly at Claycross. It is recorded of him, that on one occasion, in reply to the curiosity of a stranger lady, he replied—"Why, madam, they used to call me George Stephenson; I am now called George Stephenson, *Esquire*, of Tapton-house, near Chesterfield; and, further, let me say, that I've dined with princes, peers, and commoners—with persons of all classes, from the humblest to the highest—I've dined off a red-herring, when seated in a hedge-bottom, and have gone through the meanest drudgery. I've seen mankind in all its phases, and the conclusion I have arrived at is this, that if we were all stripped there is not much difference!"

Above all his engineering and other titles, he was created, for his railway services, a knight of Leopold of Belgium. He was a fellow of the Royal Society, but is said especially to have esteemed his title of Founder and First President of the Society of Mechanical Engineers. One highly favourable fact remains still to be mentioned. He employed in his collieries upwards of a thousand men, and his attention to their physical and mental improvement is said to have been unremitting. He died on the 12th of August, 1848, at the age of sixty-eight, after having been useful to the world to an amazing extent, in his day and generation; and affording an addition to the many brilliant examples which this country has witnessed, of genius rising out of obscurity, by dint of strong perseverance and unwearied industry, and reaching an eminence in society which it would have been impossible to foresee, and difficult to imagine, even in more favourable circumstances.

LESSONS IN FRENCH.—No. V.

By Professor Louis Fasquelle, LL.D.

Section XI.

AGREEMENT OF ADJECTIVES—FEMININE OF ADJECTIVES.

1. The adjective in French, whatever may be its place,* agrees in gender and number with the noun which it qualifies [§ 15 (1) (2)].

2. Adjectives ending with *e* mute, i.e. not accented, retain that termination for the feminine.

Un garçon aimable,	*An amiable boy.*
Une fille aimable,	*An amiable girl.*

3. Adjectives not ending in *e* mute, take *e* for the feminine.

Un garçon diligent,	*A diligent boy.*
Une fille diligente,	*A diligent girl.*

4. Exceptions. Adjectives ending in *el, eil, en, et, on, as,* and *os,* double the last consonant and take *e* for the feminine.

Mas.	*Fem.*		*Mas.*	*Fem.*	
Essentiel,	essentielle,	*essential.*	Sujet,	sujette,	*subject.*
Vermeil,	vermeille,	*vermillion.*	Bon,	bonne,	*good.*
Ancien,	ancienne,	*ancient.*	Bas,	basse,	*low.*

5. Adjectives ending in *f* change the *f* into *ve*; those ending in *x* change that letter into *se* for the feminine.

Un habit neuf,	Une robe neuve,
A new coat.	*A new dress.*
Un homme heureux,	Une femme heureuse,
A happy man.	*A happy woman.*

6. The adjectives, beau, *handsome;* fou, *foolish;* mou, *soft;* nouveau, *new;* vieux, *old;* become bel, fol, mol, nouvel, and vieil, before a noun masculine commencing with a vowel or an *h* mute; the last consonant of the latter form is doubled, and *e* added for the feminine, Ex.: belle, folle, nouvelle, vieille.

7. Additional rules and exceptions will be found, § 15 of the Second Part.

8. Conjugation of the Present of the Indicative of Etre, to Be.

Affirmatively.		*Interrogatively.*	
Je suis,	*I am.*	Suis-je?	*Am I?*
Tu es,	*Thou art.*	Es-tu?	*Art thou?*
Il est,	*He is.*	Est-il?	*Is he?*
Elle est,	*She is.*	Est-elle?	*Is she?*
Nous sommes.	*We are.*	Sommes nous?	*Are we?*
Vous êtes,	*You are.*	Etes vous?	*Are you?*
Ils sont, m.	*They are.*	Sont ils?	*Are they?*
Elles sont, f.	*They are.*	Sont elles?	*Are they?*

Résumé of Examples.

Avez vous un garçon diligent et une fille diligente?	*Have you a diligent boy and a diligent girl?*
Mon garçon est diligent, mais ma fille est paresseuse [R. 5].	*My boy is diligent, but my daughter is idle.*
Cette coutume est elle ancienne?	*Is this custom ancient?*
Cette coutume n'est pas ancienne, elle est nouvelle [R. 6].	*This custom is not ancient, it is new.*
Votre plume *f.* est elle bonne ou mauvais?	*Is your pen good or bad?*
Ma sœur est très vive [R. 5].	*My sister is very lively.*
Votre maison est elle meilleure que la mienne?	*Is your house better than mine?*
La maison de ma sœur n'est pas si bonne que la vôtre.	*My sister's house is not so good as yours.*

Exercise 23.

Beau, bel, belle, *handsome.*	Fille, *f. daughter.*	Parasol, m. *parasol.*
Bon, m. *good.*	Habit, m. *coat.*	Petit, -e, *small.*
Content, -e, *pleased.*	Heureux, -se, *happy.*	Paresseux, -se, *idle.*
Cravate, *f. cravat.*	Ici, *here*	Porcelaine, *f. china.*
Dame, *f. lady.*	Meilleur, -e, *better.*	Que, *than.*
Encrier, m. *inkstand.*	Neuf, -ve, *new.*	Vieux, vieille, *old.*
Excellent, -e, *excellent.*	Parapluie, m. *umbrella.*	Vif, vive, *quick, lively.*

1. Cette dame est elle contente? 2. Non, Monsieur, cette dame n'est pas contente. 3. Votre fille est elle vive? 4. Mon fils est trés vif et ma fille est paresseuse. 5. N'a-t-elle pas tort? 6. Elle n'a pas raison. 7. Votre cousine est elle heureuse? 8. Oui, Madame, elle est bonne, belle, et heureuse.

* For the place of adjectives see Sect. 13, and Rule 5, Sect. 6.

9. A-t-elle des amis? 10. Oui, Monsieur, elle a des parents et des amis. 11. A-t-elle une robe neuve et de vieux souliers? 12. Elle a de vieux souliers et une vieille robe. 13. Votre frère n'a-t-il pas un bel habit [R. 6]? 14. Il a un bel habit et une bonne cravate. 15. Avez vous de bonne viande, Monsieur? 16. J'ai de la viande excellente. 17. Cette viande-ci est elle meilleure que celle-là? 18. Celle-ci est meilleure que celle-là. 19. Votre ami a-t-il le bel encrier de porcelaine? 20. Son encrier est beau, mais il n'est pas de porcelaine. 21. Quelqu'un a-t-il faim? 22. Personne n'a faim. 23. Les généraux sont ils ici? 24. Les généraux et les maréchaux sont ici. 25. J'ai vos parasols et vos parapluies, et ceux de vos enfants.

Exercise 24.

1. Is your little sister pleased? 2. Yes, Madam, she is pleased. 3. Is that little girl handsome? 4. That little girl is not handsome, but she is good. 5. Have you good cloth and good silk? 6. My cloth and* silk are here. 7. Is your sister happy? 8. My sister is good and happy. 9. Has that physician's sister friends? 10. No, Madam, she has no friends. 11. Is your meat good? 12. My meat is good, but my cheese is better. 13. Has the bookseller a handsome china inkstand? 14. He has a fine silver inkstand and a pair of leather shoes. 15. Have you my silk parasols? 16. I have your cotton umbrellas? 17. Is your brother's coat handsome? 18. My brother has a handsome coat and an old silk cravat. 19. Have you relations and friends? 20. I have no relations, but I have friends. 21. Is that handsome lady wrong? 22. That handsome lady is not wrong. 23. Have you handsome china? 24. Our china is handsome and good. 25. It is better than yours. 26. Is not that little girl hungry? 27. That handsome little girl is neither hungry nor thirsty. 28. What is the matter with her? 29. She has neither relations nor friends. 30. Is this gold watch good? 31. This one is good, but that one is better. 32. Have you it? 33. I have it, but I have not your sister's. 34. I have neither yours nor mine, I have your mother's.

Section XII.

Agreement of Adjectives—Plural of Adjectives.

1. An adjective qualifying a plural noun, or two or more singular nouns of the same gender, assumes the gender of the noun or nouns, and is put in the plural.

Les arbres et les fruits sont beaux.	*The trees and fruits are fine.*
Les fleurs et les plantes sont belles.	*The flowers and plants are fine.*
Vos jardins sont très beaux.	*Your gardens are very fine.*

2. An adjective qualifying two or more nouns of different genders is put in the plural masculine [§ 18].

Mon frère et ma sœur sont contents.	*My brother and sister are pleased.*
Le canif et la plume sont bons.	*The penknife and pen are good.*

3. The plural of the feminine of adjectives is *invariably* formed by the addition of an *s*.

Vous avez de jolies maisons.	*You have pretty houses.*
Ces demoiselles sont attentives.	*Those young ladies are attentive.*

4. The plural of the masculine of adjectives is *generally* ormed by the addition of an *s*,

Ces écoliers sont attentifs.	*Those scholars are attentive.*
Vos bois sont magnifiques.	*Your woods are magnificent.*

5. The terminations *s* and *x* are not changed for the plural masculine.

Nos fruits sont mauvais.	*Our fruits are bad.*
Vos oiseaux sont hideux.	*Your birds are hideous.*

6. To the termination *eau*, *x* is added for the plural masculine.

Vos champs sont très beaux.	*Your fields are very fine.*

7. The termination *al* is generally changed into *aux* for the plural masculine [§ 17 (3)].

Les hommes sont égaux.	*Men are equal.*

8. For more explicit rules and for exceptions, see § 17 Second Part.

* The article, the possessive and the demonstrative adjective are repeated before every noun. Mon frère et ma sœur, *my brother and sister.*

9. Present of the Indicative of Etre, to Be.

Negatively.		*Negatively and Interrogatively.*	
Je ne suis pas,	*I am not.*	Ne suis-je pas?	*Am I not?*
Tu n'es pas,	*Thou art not.*	N'es tu pas?	*Art thou not?*
Il n'est pas,	*He is not.*	N'est il pas?	*Is he not?*
Elle n'est pas,	*She is not.*	N'est elle pas?	*Is she not?*
Nous ne sommes pas,	*We are not.*	Ne sommes nous pas?	*Are we not?*
Vous n'êtes pas,	*You are not.*	N'êtes vous pas?	*Are you not?*
Ils ne sont pas, m.	*They are not.*	Ne sont ils pas? m.	*Are they not?*
Elles ne sont pas, f.	*They are not.*	Ne sont elles pas, f.	*Are they not?*

Résumé of Examples.

Avez vous des écoliers attentifs?	*Have you attentive scholars?*
Mes écoliers et mes écolières sont très attentifs et très studieux.	*My scholars (male and female) are very attentive and very studious.*
Ces demoiselles sont elles studieuses?	*Are those young ladies studious?*
Elles ne sont pas très studieuses.	*They are not very studious.*
Ces règles sont elles générales?	*Are those rules general?*
Ces principes sont généraux.	*Those principles are general.*
Leurs habillements sont superbes.	*Their clothes are superb.*
Avez vous peur de ces chevaux rétifs?	*Are you afraid of those restive horses?*
Vos montres d'or sont excellentes.	*Your gold watches are excellent.*
Les miennes sont elles meilleures que les vôtres?	*Are mine better than yours?*
Les vôtres sont meilleures que les miennes.	*Yours are better than mine.*

Exercise 25.

Agréable, *agreeable.*	Mauvais, –e, *bad.*	Souvent, *often.*
Aîné, –e, *elder.*	Mule, *f. mule.*	Travail, m. *labour.*
Allemande, *f. German.*	Oisif, –ve, *idle.*	Très, *very.*
Jamais, *never.*	Pantoufles, *f. slippers.*	Utile, *useful.*
Indulgent, –e, *indulgent.*	Personne, m. *nobody.*	Velours, m. *velvet.*
Laine, *f. wool, woollen.*	Rétif, –ve, *restive.*	Vif, –ve, *quick, lively.*
Maroquin, m. *morocco.*		

1. Les chevaux de notre ami sont ils rétifs? 2. Ses chevaux ne sont pas rétifs mais ses mules sont très rétives. 3. Les chevaux et les mules de votre frère son excellents. 4. Vos sœurs sont elles très vives? 5. Mes frères et mes sœurs sont très vifs. 6. Sont ils souvent oisifs? 7. Non, Monsieur, mes sœurs ne sont jamais oisives. 8. Avez vous peur de votre frère? 9. Non, Monsieur, je n'ai peur de personne. 10. Ne sommes nous pas indulgents? 11. Vous êtes indulgents, et vous avez raison. 12. Ai-je vos livres? 13. Vous ne les avez pas, vous avez ceux de mon frère aîné? 14. Ne les avez vous pas? 15. Je ne les ai pas. 16. Avez vous une bonne paire de bas de laine? 17. J'ai une belle paire de bas de soie. 18 Avez vous les bonnes maisons ou les mauvaises. 19. Je n'ai ni les bonnes ni les mauvaises, j'ai celles de ma cousine. 20. Le travail est il agréable? 21. Le travail est utile et agréable. 22. Avez vous mes beaux souliers de maroquin? 23. Je n'ai pas vos beaux souliers de maroquin, j'ai vos belles pantoufles de velours. 24. Avez vous les pantoufles de votre sœur, ou les miennes? 25. Je n'ai ni les vôtres ni celles de votre sœur, j'ai celles de l'Allemande.

Exercise 26.

1. Are your brothers and sisters very (*bien*) quiet? 2. My brothers are quick, but my sisters are not quick. 3. Have you not two restive horses? 4. No, but I have a restive mule. 5. Have you not two good pairs of silk gloves? 6. I have a good pair of cotton gloves, and two pairs of silk gloves. 7. Are you not afraid of your friends? 8. No, Sir, I am never afraid of my friends. 9. I am afraid of nobody. 10. Are you right or wrong? 11. I am right. 12. Have you my beautiful leather slippers, or my old satin slippers? 13. I have your old leather shoes and your velvet slippers. 14. Are those ladies pleased? 15. Those ladies are pleased, and they are right. 16. Has the German lady your father's shoes or mine? 17. She has neither his nor yours, she has my sister's. 18. Has your elder brother good houses or bad? 19. His houses are better than yours and than mine.* 20. Are his houses old? 21. His houses are old, but they are

* *Que* meaning *which*, and *que* conjunction, are never understood in French, they must be repeated before every noun, pronoun, and verb [Sect. 17, R. 1].

good. 22. Have you them? 23. No, Sir, I have them not, I have no houses. 24. Have you my brother's or my sister's? 25. Your sister has hers and my mother's. 26. Are your scholars attentive? 27. My scholars are very attentive and very studious. 28. Are those German ladies studious? 29. They are very studious and very attentive. 30. Are you often wrong? 31. Yes, Sir, I am often wrong. 32. Is labour agreeable? 33. Yes, Sir, labour is agreeable and useful. 34. We have them and you have them not.

Section XIII.

Place of the Adjectives.—Relative Pronoun En.

1. The adjective in French follows the noun much more frequently than it precedes it [§ 85 (1)].

Vous avez des amis fidèles.	*You have faithful friends.*
Ma sœur a des livres instructifs.	*My sister has instructive books.*

2. Those adjectives which generally precede the nouns have been mentioned [Sect. 6, R. 5], and will be found [§ 85 (11)].

Nous avons de belles maisons.	*We have beautiful houses.*
Votre jolie petite fille est studieuse.	*Your pretty little girl is studious.*

3. The adjectives which are placed after nouns are:—1st, All participles, present and past, used adjectively.

Nous avons une histoire intéressante.	*We have an interesting history.*
Vous avez des enfans polis.	*You have polite children.*

4. 2nd, All such as express form, colour, taste; such as relate to hearing and touching; such as denote the matter of which an object is composed; as also such as refer to nationality, or to any defects of the body [§ 85 (4) (5) (6) (7).]

Nos parents ont des chapeaux noirs.	*Our relations have black hats.*
Vous avez des pommes douces.	*You have sweet apples.*
Voilà de la cire molle.	*There is soft wax.*
Cette dame espagnole a un enfant boiteux.	*That Spanish lady has a lame child.*

5. 3rd, Almost all adjectives ending in *al*, *able*, *ible*, *ique*, and *if*.

Ces hommes libéraux sont aimés.	*Those liberal men are loved*
Voilà un esprit raisonnable.	*That is a reasonable mind.*
Voilà un esclave fugitif.	*That is a fugitive slave.*

6. Some adjectives have a different meaning according to their position before or after the noun [§ 86].

Un brave homme, *a worthy man.*	Un homme brave, *a brave man.*

7. *En* is used for the English words *some* or *any*, expressed or understood, but not followed by a noun; *en* has also the sense *of it*, *of them*, *thereof*, generally understood in English sentences, particularly in answers to questions [§ 39 (17), § 104, § 110, (2) (3)].

Avez vous des souliers de cuir?	*Have you leather shoes?*
J'en ai.	*I have some, I have (of them).*
Votre fils en-a-t-il?	*Has your son any?*

8. An adjective used substantively, and having a partitive signification (in a sentence containing the pronoun *en*), must be preceded by the preposition *de* in the same manner as if the noun were expressed [see R. 4, Sect. 6].

Avez vous de bonnes plumes?	*Have you good pens?*
Non, mais j'en ai de mauvaises.	*No, but I have bad ones.*

Résumé of Examples.

Avez vous de beaux jardins?	*Have you fine gardens?*
Oui, j'en ai de beaux [R. 7].	*Yes, I have fine ones.*
Votre frère n'a-t-il pas des souliers noirs?	*Has not your brother black shoes?*
Il n'en a pas, mais ma sœur en a.	*He has none, but my sister has some.*
N'a-t-elle pas aussi une robe blanche?	*Has she not also a white dress?*
Oui, elle en a une.	*Yes, she has one.*
Non, elle n'en a pas.	*No, she has none.*
Qui en a une?	*Who has one?*
Qui n'en a pas?	*Who has none?*
Le boucher n'a-t-il pas de la viande fraîche?	*Has not the butcher fresh meat?*
Il en a, il n'en a pas.	*He has some, he has none.*
Il en a beaucoup.	*He has much (of it).*
Il n'en a guère.	*He has but little (of it).*
Il en a deux livres.	*He has two pounds (of it).*

Exercise 27.

Amusant, –e, *amusing.*	Bijou, m. *jewel.*	Laine, f. *wool.*
Américain, –e, *American*	Blanc, –he, *white.*	Mademoiselle, f. *Miss.*
Anglais, –e, *English.*	Brave, *brave, worthy.*	Monsieur, m. *Sir, Mr., Gentleman.*
Arabe, *Arabian.*	Châle, m. *shawl.*	Parent, m. *relation.*
Aubergiste, m. *innkeeper.*	Couteau, m. *knife.*	Soldat, m. *soldier.*
Beaucoup, *much, many.*	Français, –e, *French.*	Terre, f. *land.*
Belge, *Belgian.*	Guère, *little, but little.*	
	Guitare, f. *guitar.*	

1. Avez vous une bonne guitare? 2. Oui, Monsieur, j'ai une guitare excellente. 3. Avez vous de bons habits? 4. Oui, Madame, j'ai de bons habits noirs et de belles robes blanches. 5. Votre mère n'a-t-elle pas un châle de soie? 6. Oui, Mademoiselle, elle en a un de soie et un de laine. 7. L'aubergiste a-t-il de bons chevaux anglais? 8. L'aubergiste a des chevaux anglais, français, et arabes. 9. Il en a de superbes. 10. L'ami de votre frère a-t-il des bijoux d'or? 11. Oui, Monsieur, il en a. 12. A-t-il aussi des bijoux d'argent? 13. Il en a aussi. 14. En a-t-il beaucoup? 15. Non, Monsieur, il n'en a guère. 16. Votre ami a-t-il des parents? 17. Oui, Monsieur, il en a. 18. Ce Monsieur a-t-il une bonne plume d'acier ou une belle plume d'or? 19. Il en a une d'acier et nous en avons une d'or. 20. Le général n'a-t-il pas de bons soldats? 21. Il en a de très braves. 22. Les Américains n'ont ils pas de bonne terre? 23. Ils en ont d'excellente. 24. Le marchaud a-t-il des couteaux anglais ou français? 25. Les couteaux du marchand ne sont ni anglais ni français, ils sont belges.

Exercise 28.

1. Has your brother Arabian horses? 2. Yes, Sir, he has some. 3. Has he handsome ones? 4. Yes, Sir, he has handsome ones. 5. Are the good Americans wrong? 6. No, Miss, they are not wrong, they are right. 7. Have you a French shawl? 8. Yes, Sir, I have one, I have a handsome French shawl. 9. Has your innkeeper your silver knife or mine? 10. He has neither yours nor mine, he has his sister's handsome steel knife. 11. Has the Belgian a good guitar? 12. He has an excellent French guitar. 13. He has an excellent one. 14. Has the gentleman amusing books? 15. Yes, Sir, he has two. 16. Has the general French or Arabian horses? 17. He has neither French nor Arabian horses, he has English horses. 18. Who has Arabian horses? 19. The Arabian has some. 20. Has the Englishman any? 21. The Englishman has some. 22. Has your friend's sister a good steel pen? 23. My friend's sister has one, but my relations have none. 24. Are you not wrong, Sir? 25. Yes, Madam, I am wrong. 26. Are those knives English? 27. No, Sir, they are Belgian. 28. Have you relations? 29. I have two, and they are here (*ici*). 30. Has the English butcher meat? 31. Yes, Sir, he has much. 32. Has he much money? 33. He has but little. 34. Has the Belgian general brave soldiers? 35. Yes, Sir, he has good ones.

GLOSSARY.

Though our aim is to convey our instruction in the most clear and intelligible terms, we find that we have occasionally employed words which, though perfectly plain and familiar to ourselves, may not at once be understood by all our readers. For the sake of such we give a brief explanation of what some term "hard words," so far as we may have used any hitherto. Most of the *technical* phrases are explained in the lessons in which they are employed so that their meaning may be at once obtained from the definition given at the time, or gathered from the connexion in which they stand. Where this is not the case, we shall endeavour to supply the deficiency as we proceed. That we may be clearly understood at the very outset, let us explain the meaning of the word we have placed at the head of this column—"Glossary." A glossary is a kind of dictionary, or explanation of difficult and of obscure words.

s., substantive; *s. pl.*, substantive plural; *v. a.*, verb active *a.*, adjective.

Achie'ye, *v a.* to perform; to obtain.
Assim'ilate, *v.a.* to make things like each other.
Biog'raphy, *s.* a history, or writing, of lives.
Calca'reous, *a.* relating to lime.
Cal'culus, *a.* stony, gravelly, hard, gritty.
Cap'illary, *s.* a small blood vessel; *a.* fine, minute; resembling a hair.
Car'bon, *s.* the pure basis of charcoal; burnt wood, coal, &c.

CAROU'SAL, *s.* a feast, a festival, drinking bout.
CEL'LULAR, *a.* made up of cavities or cells; hollow.
CHRONOL'OGY, *s.* the art of computing time.
CLASS'ICAL, *a.* relating to authors of the first rank; learned; elegant.
COSMOG'RAPHY, *s.* the science which describes the general system of the world.
DEVEL'OPMENT, *s.* the unfolding of latent powers.
DIAG'ONAL, *s.* a line drawn from angle to angle, or from corner to corner.
DY'NASTY, *s.* a power, government, or sovereignty.
E'RA, *s.* a point of time.
FILM, *s.* a thin skin.
FIL'AMENT, *s.* a slender thread, a fibre.
FLUX'IONS, *s.* (in mathematics) the analysis of flowing quantities.
HEXAG'ONAL, *a.* having six sides and angles.
HIEROGLY'PHICS, *s. pl.* the symbolical characters used by the ancient Egyptians.
HORIZON'TAL, *a.* parallel to the horizon; level.
HY'DROGEN, *s.* a rarefied and inflammable air or gas.
IRK'SOME, *a.* tedious, wearisome.
LOCOMO'TION, *s.* the act of changing place.
MEM'BRANE, *s.* a web having many fibres.
MIN'ERAL, *s.* matter dug out of mines.
MUL'TIPLE, *s.* any number that contains another number several times.
NAU'TICAL, *a.* pertaining to ships or sailors.
NI'TROGEN, *s* the principle of nitre in a state of gas.
NO'TATION, *s.* the act of noting, or marking by signs. In *mathematics*, the expressing of numbers and quantities by figure and signs disposed according to a certain scale. In *music*, the manner of expressing or representing by characters the different sounds in music.
ORGAN'IC, *a.* instrumental; produced by, or possessing organs, or natural instruments and functions.
ORIEN'TAL, *a.* eastern, placed in the east; *s.* an inhabitant of the east.
OS'SIFIED, *a.* changed into bone.
OX'YGEN, *s.* a gas, the most important principle in nature, existing in the air, of which it forms the part we breathe.
PEREN'NIAL, *a.* perpetual; *s.* any plant that lives above two years.
PHRENOL'OGY, *s.* a modern science which professes to discover the characters of persons from the outward marks visible on the skull.
PHYSIOG'NOMY, *s.* the art of judging the natures, tempers, &c. of men, by their features, bodies, movements, &c.
PYR'AMIDAL, *a.* in the form of a pyramid. A pyramid is a solid figure, whose sides are bounded by plane triangles, and ending in a point at the top, the base whereof may be a triangle, square, &c.
QUO'TIENT, *s.* the number produced by the division of two given numbers.
RES'ERVOIR, *s.* a large vessel, or store, of water.
SPIR'AL, *a.* turning round like a screw; twisted.
SUBTERRA'NEAN, *a.* lying under the earth; placed below the surface.
THEOC'RACY, *s.* divine government, that where God alone is king, or where his supposed ministers assume both temporal and spiritual power.
TIS'SUE, *s.* a fine texture, or material; a very thin kind of paper.
TRANS'VERSE, *a.* being in a cross direction.
VAS'CULAR, *a.* consisting of vessels.
VER'TEBRÆ, *s.* joints in the back bone.
VER'TICAL, *a.* relating to the *vertex*, or zenith, the point over head. It is used simply to signify *up and down*; as a *vertical* motion is an *up and down* motion.
UNI'SEXUAL, *a.* (in botany) of one sex; flowers in which both sexes are united in one flower.

SOLUTION OF THE GEOMETRICAL PROBLEMS PROPOSED IN No. II.

5. To arrange three points, so that they shall be equally distant from each other, it will be sufficient to place them on the three angular points of an *equilateral triangle*; see fig. 9, page 26, No. II. The next inquiry is, how is an equilateral triangle to be constructed? The answer to this is given in the first proposition of the first book of Euclid's Elements. As many of our readers may not be acquainted with that immortal work, we shall tell them how to effect this problem. Determine the position of two of the points by fixing on the distance at which they are to be placed, and draw a line between these points; then with a pair of compasses opened to this distance, draw a circle, having one of the points for its centre, and the straight line for its radius; then draw another circle, having the other point for its centre, and the same straight line also for its radius; next, from either of the points where the circumference of these circles intersect (or cross) each other, draw straight lines to the extremities of the common radius, that is, to the two centres or fixed points, and you will have an equilateral triangle, and the three equidistant points required. The reason is plain, because all the radii of two equal circles are equal to one another; see definitions to fig. 7, page 25, No. II. By help of a string or cord kept stretched, and having one end fixed in the ground at any place, a circle may be traced by a pointed instrument, fastened at its other end, on the ground; and thus, two circles may be traced at the same distance on the ground as well as on paper. Hence, three trees may be planted in a garden, at the same distance from each other.

6. To arrange four points so that they shall be equally distant from each other, it will be sufficient to place them on the four angular points of a *tetrahedron*, see fig. 1. A tetrahedron, as defined by Euclid in the eleventh book of his Elements, is a solid figure, contained (that is, bounded) by four equal and equilateral triangles. The way to construct a pasteboard model of this solid is to draw an equilateral triangle in the middle of a square piece, and then on its three sides to draw equilateral triangles; you will then have four equilateral triangles. Now, cut away all the rest of the pasteboard but these triangles; mark the middle one for the base of the tetrahedron, and cut the piece of pasteboard on the straight lines which form the sides of the middle triangle, half through the thickness of the pasteboard; then turn up the other three triangles on the other side of the pasteboard, till their vertices all meet in a point above the middle triangle or base, and you will have the *tetrahedron*, as shown in the figure. The four corners of this figure will be found to be all equally distant from each other. In fig. 2, which is intended to represent a collection of equilateral triangles, you will see four triangles, arranged in the manner just described. Select a particular *white* one, and you will find three *black* ones drawn on its sides; or, select a *black* one, and you will find three *white* ones drawn on its sides. This is rather a curious problem, and not a little amusing to many, as most people attempt to solve it by marking the four points on a flat surface. Indeed, every one is quite sure *at first* that the four points of a square will satisfy the conditions of the problem; but they are soon convinced of their mistake. Many years ago, we had the pleasure of dining at Glasgow, with the minister of St. Kilda, the farthest west island of the Hebrides, or western islands of Scotland. He greatly interested us by his account of the simple manners of the people, and their desire to learn and study curious mathematical problems, although living in such a remote corner of the world, far from society, and in a state of comparative indigence and suffering. To them, a piece of oaten cake, or wheaten bread, was the greatest luxury imaginable, as they lived upon nothing but sea-birds and their eggs, which they were obliged to search for on the rocky cliffs which surrounded their isle, and which at one place is 1,300 feet high. The minister was accustomed to teach them as he best could by the natural means placed within their reach. In teaching geography, for instance, he had to select a fine large round stone to represent the globe, and to trace the different countries on its surface. He requested us to give him some mathematical problems to amuse them when he went home. We gave him the problem of the *four points* equidistant from each other, but we have never heard whether or not they had discovered the solution. Indeed, the communication with the island of St. Kilda used to be so seldom, that when the late king died, the minister continued to pray for him, without, of course, knowing the fact, for a period of six months after he was laid in the grave!

Fig. 1.

Tetrahedron.

Fig. 2.

Equilateral triangles.

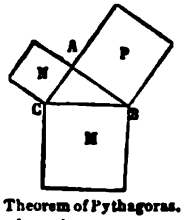
In order to plant four trees at equal distances from each other, it would be necessary to raise a mound on an equilateral triangle, so that the top of it, where the fourth tree should be planted, might be equally distant from the three angular points of the triangular base. This could be most easily effected by a calculation, as follows:—Suppose the side of the equilateral triangle, or the distance between any two trees, was to be 100 yards. By the application of the theorem of Pythagoras, we find the length of the perpendicular of the equilateral triangle to be 86·6 yards; for as the square on the side is equal to the sum of the squares on the perpendicular and base or half the side, it follows that the square on the perpendicular is equal to the difference of the squares on the side and the half side; that is, $100\times100=10000$, and $50\times50=2500$; whence $10000-2500=7500$, the square of the perpendicular; now the square root of 7500 is 86·6 yards, which is the length of the perpendicular. Taking two-thirds of this length we obtain 57·73 yards, the distance of the central point of the triangle from each of its angles; and immediately above this point must be raised the top of the mound. To find the height above this point,

we have another right-angled triangle whose perpendicular must be found, and whose side is 100 yards, and base 57·73 yards. On the same principle, therefore, as before, we have 100×100=10000, and 57·73×57·73=3333 nearly; whence 10000—3333=6667, the square of the perpendicular required; and the square root of 6667 is 81·65 yards, which is the length of the perpendicular, and the height to which the mound must be raised at top to meet the conditions of the problem, viz., that is to admit of the four trees being planted at equal distances from each other. We do not, of course, expect all our readers quite to understand this solution; but we have given it, in order that they may have something in geometry to think about, and to talk about with one another. Another useful end will be served by this solution; it will show the great utility of the theorem of Pythagoras, and give some idea of the vast number of applications of which it is capable. The ancient discoverer of the theorem is reported to have offered a sacrifice of a *hecatomb* or a hundred oxen to the gods on account of its discovery. If this were true, it falls infinitely below its value to thousands who have no conception of its utility, and who may be unawares availing themselves of its use and application in their daily avocations.

7. To construct an isosceles triangle, such that each of its legs shall be double the base or third side, on the principles of Euclid, is not quite so easy as some persons may think. The mere construction of such a problem by rule and scale, is perhaps easy enough; but the demonstration on the principles of the Greek Geometry, is the thing intended, and in the solution it is required that no principles beyond the definitions, postulates, and axioms, and the first proposition of the first book of Euclid's Elements are to be allowed. With these restrictions, we repeat the problem for the sake of more advanced readers, as we have received no solution yet worthy of notice.

8. As to the theorem of Pythagoras, we have received a very ingenious and correct solution from J. L. N., of Dublin, showing that the assertion respecting it, in one of the latest and best editions of Euclid's Elements, *is not true*. Our Irish brethren turn out very excellent mathematicians, when they set their minds to study, of which our late highly-esteemed and much-lamented friend, Dr. James Thomson, professor of mathematics in the University of Glasgow, was a striking example. We wonder much that no memoir of this eminent man has reached us. He rose from one of the humblest ranks of life to the high post which he occupied, solely by his own merit and talents. His works on mathematical subjects hold a high place, in our estimation, for ingenious trains of original thought, and for great clearness of expression and felicity of illustration. They were spoken of in Parliament in terms of great commendation, and as having produced a moral revolution among the lower classes in Ireland, by drawing them from the ale-house and the whisky-shop to the private study and the workshop, and by interesting them in the solution of problems, as a glorious substitute for the gratification of the mere sensual appetites. We shall give our own solution in an early number, as being somewhat shorter than what we have received, unless we find that some of our correspondents have anticipated us, when we shall be happy to give them the credit of the solution. We repeat the question more distinctly. In fig. 3, the triangle BAC is right angled at A; and squares M, N, and P, are described on its three sides *exteriorly* to the triangle. Now Euclid, as every student of geometry knows, has proved that the square M, described on the side BC, which is opposite to the right angle, is equal in *area* to the squares N and P, described on the other two sides. The question is, can this be proved when the squares are described *interiorly* to the triangle BAC.

Fig. 3.



Theorem of Pythagoras.

PROBLEMS AND QUERIES.

1. How is addition proved by *casting out the nines?*

2. What is the reason that, in proving subtraction by this method, we are sometimes obliged to borrow *nine*, as remarked by our correspondent in the last page of No. 4?

3. What is the reason that in the multiplication table the sum of the figures in the product of *nine* by any of the nine digits is always equal to *nine*?

NOTE.—This question suggests a curious mode of remembering the products of nine. It is this. *Take one from the number of times nine you wish to know;* the remainder will be the *tens* of the product. Then take this remainder from *nine*, and the next remainder will be the *units* of the product. Thus, if you wish to know what 7 times 9 make, take 1 from 7, and the remainder 6 will be the *tens* of the product; then take 6 from 9, and the remainder 3 will be the *units* of the product; hence 7 times 9 make 63

ANSWERS TO CORRESPONDENTS.

H. KING.—A WELL-WISHER.—In mastering the lessons in the POPULAR EDUCATOR, a great deal *does* depend on method. Young men who are desirous of learning might greatly assist each other by forming themselves into a class, taking one, two, or three subjects, on fixed evenings in the week, and studying them together, making the oldest the chairman, and the most learned in any branch they are studying the master for the evening, under the control of the chairman. Let him endeavour to instruct the rest, to the best of his ability, according to the rules laid down in the POPULAR EDUCATOR, and while he is so doing he will be sure to instruct himself. A desire to teach others is the most praiseworthy feeling in the world, and is sure to be rewarded; the very effort humanises a man, and renders him *ipso facto* a superior being.

Of the Problems and Queries proposed in No. 2, we have received a variety of solutions, some correct, and some incorrect. Of the arithmetical queries, some correct solutions were received from J. L. N., Dublin; J. K. and W. C., Knaresborough, &c. Of the Geometrical Problems some correct solutions were received from J. V., St. James-street; J. L. N, Dublin; J. K., Knaresborough, &c.

*** We have been repeatedly asked whether Latin or French should be learned first. If the inquirers have time and opportunity they should learn *Latin first*, as it is the foundation of many of the modern living (spoken) languages, although it be a dead (not spoken) language itself. If they have not the advantages above-mentioned they should at once study French, as it is, with, perhaps, the exception of German, the most universally spoken on the continent of Europe. This will be an answer to H. F., I. J. G., B. C. D., and others.

W. H. M. should finish his other difficult studies first, if he has begun them, before he meddles with Latin; if not, let him take his choice.

S. S. T.—Study Mr. Curwen carefully; do what he bids, and read and learn with a friend: two heads are better than one. As to spelling, do it on the pictorial system; consider every word a picture, and when you want to spell it, conjure up its printed appearance.

GARLAND P.—We are preparing for the "German Lessons," and as soon as possible they will be begun.

L. W. A.—We advise him to sell his Hamiltonian books, and stick to the "POPULAR EDUCATOR."

ORION.—He is in the main correct; but let him avoid such words as "circumcursation" and "transcur."

ROBICHON.—Messrs. B. and W. of Leicester, and others, seem to forget two things; that we have many thousands to please; and that WE are the editor.

WILLIAM LAWTON.—We can only repeat Dr. Samuel Johnson's advice to him: "He who would acquire a pure, correct, and elegant style, must give his days and nights to the volumes of Addison." The most popular writers of the present day, are far from being the most correct, either as to excellence of style or purity of diction.

JNO. DENNIS.—Our arrangements on the subject he mentions are completed. If he chooses to volunteer anything really ingenious, it will be inserted among our correspondence.

JOSEPH ARCHER.—We strongly recommend him to stick to the "Lessons in Latin," given in the "POPULAR EDUCATOR."—There are a number of serious errors in the exercise he has sent us. Let him follow Dr. Johnson's advice given above.

G. A. S.—Thanks for his suggestions; they shall be attended to in course.

A SUBSCRIBER.—According to Dr. Johnson, "a *gap* is an opening in a broken fence." *Gapping at a hedge* will therefore signify making an opening in the same. *Gaping*, on the contrary, is the present participle of the verb *to gape*, that is, *to open the mouth wide*.

W. H. F—L—DN.—The duty on books, according to Sir Robert Peel's tariff, is as follows:—1. On books printed before 1801, £1 per cwt. 2. On books printed since 1801, £5 per cwt. 3. On books in the foreign living languages, printed since 1801, £2 10s. per cwt.

J. C., J. C., and JOHN PARKER.—The subjects of Phonography and Phrenology will be taken up in their proper order, and as opportunity permits; as also Entomology.

HUMILIS.—Præsenti tibi, maturos largimur honores, *On those which present, we bestow timely honours.* In the number of lessons on any subject we must be partly guided *by their completeness in themselves, and by the public demand for them.*

*** Several subscribers have suggested the propriety of issuing a Portfolio for preserving the numbers of the POPULAR EDUCATOR, till they reach a volume, and can be bound. Such Portfolios may be procured at our office, price 1s. 6d each.

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LESSONS IN ANCIENT HISTORY.—No. III.

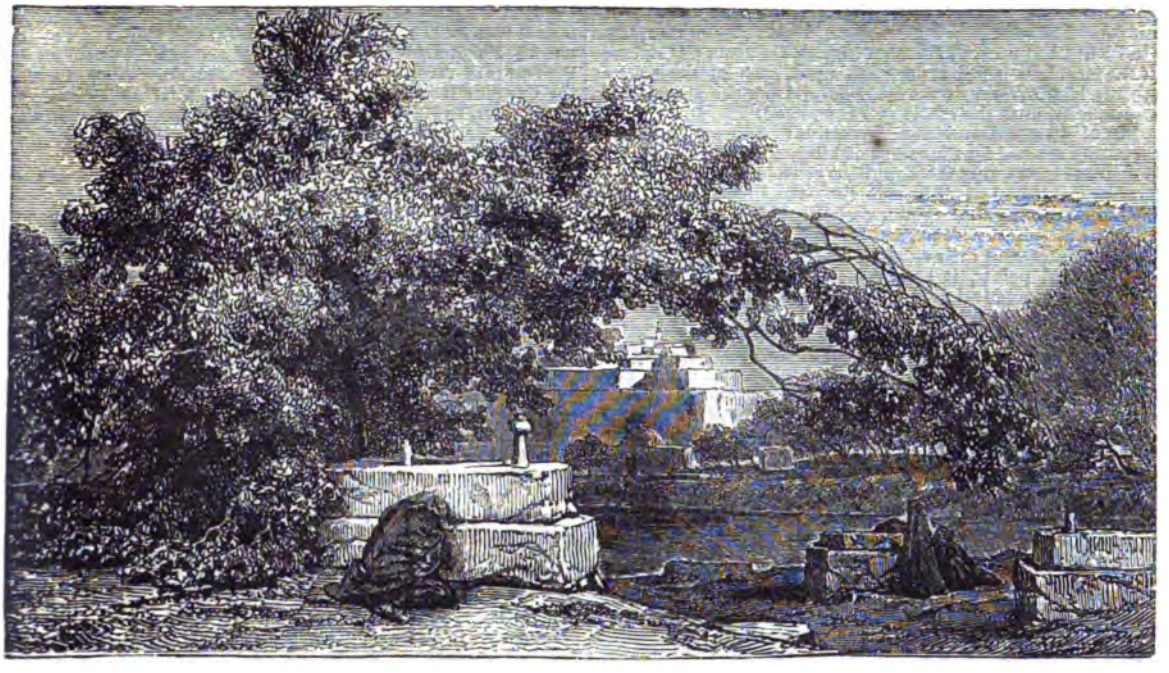
By Robert Ferguson, LL.D.

We left Psammetichus on the throne of Egypt. He was a man not without spirit and enterprise. He endeavoured to extend his dominions by making war on his neighbours, and earnestly applied himself to the advancement of commerce. For several reigns, the grand object of Egyptian policy was to obtain possession of the commercial cities of Syria and Phenicia, by securing all the routes between the Indian Ocean and the Mediterranean Sea; not so much for their vast and accumulated wealth, as for the trade between Europe and Asia. Though his subjects, to the number of two hundred thousand or more of the caste of warriors, offended with the favour which Psammetichus had shown to those foreign auxiliaries to whom he owed his crown, left their country in a body, and settled in Ethiopia, Psammetichus was in nowise discouraged. Relying on his foreign succours, he laid siege to Azotus, a frontier city in Syria, and though it held out for a period of twenty-nine years against the whole strength of the kingdom, he persevered in his efforts and his attacks, until he had accomplished his object. A wider commerce was now established. He opened his ports to all strangers, whom he encouraged and caressed. New opinions were imported, new institutions sprang up. The political influence of the priesthood declined, the manners and tastes of the people were improved by intercourse with the Greeks and other foreigners, and the whole policy of the kingdom was changed.

It is recorded of this prince, that he attempted to find out the most ancient nation in the world, by the following experiment:—Having procured two newly-born children, he had them brought up in such a manner that they should never hear the sound of a human voice, imagining that they would naturally speak the original language of man. At ten years of age, they uttered the Phrygian word BACCOS, which signifies BREAD, or some sound like it, and he at once concluded that the Phrygians were the most ancient people in the world.

The same prince is said to have made an effort to discover the source of the Nile; and that he was the first king of Egypt that indulged in the use of wine. For these accounts we have nothing higher and nothing surer than the authority of tradition.

Of Memphis, which became the second capital of Egypt under Psammetichus, not a vestige now remains to mark with certainty the spot where it stood. It contained the celebrated temple of PHTHA (the Vulcan of the Greeks), a temple to Osiris, in which was kept THE SACRED OX, and one to Serapis, with an avenue lined with sphinxes on either side. According to Strabo, there were many palaces situated along the side of a hill, stretching down to lakes and groves, about forty stadia from the city. But the destruction of these once famous temples and palaces is more than compensated by those magnificent pyramids which stand in what is supposed to be the immediate neighbourhood of the ancient Memphis. About thirty of these pyramids still exist, and there are traces of many more. The three which are situated at Geez or Djiza, nearly opposite to Grand Cairo, and are named from their founders—CHEOPS, CHEPHREN, and MYCERINES—are the largest and the most impressively imposing, and are looked upon by every traveller with wonder and astonishment. That of Cheops, which is the



VIEW OF THE FORTRESS OF CAIRO, BUILT BY SALADIN, TAKEN FROM THE CEMETERY OF BAB-EL-NASS.

most stupendous, is four hundred and forty-eight feet in height, and seven hundred and twenty-eight feet on each side of the base. It is ascended by an uninterrupted series of steps, gradually diminishing from four to two and a half feet high in approaching the top. The breadth of each step is equal to its height. Upon the top there is a platform of thirty-two feet square, consisting of nine large stones, each of which is nearly a ton weight. The other stones vary from five to thirty feet long, and from three to four feet high. This platform commands a wide and interesting view, and places at your feet other pyramids and monuments, and the remains of a former grandeur. Cheops was built between three and four thousand years ago; and such was the number of men employed in its erection, that it is said to have cost a quarter of a million of our money to supply them during the time with garlic and onions alone! This pyramid covers twelve acres of ground.

Herodotus tells us, that the pyramids were formed by distinct courses of stone, which successively diminished in size as the proportions of the structure required it. Each course was so much within that immediately below it, as to make each front of the pyramid form a sort of stair. And this agrees with the account given by modern travellers.

But how were these huge stones raised? It appears that a very simple machine was placed upon the first course, by which the stones were raised for the construction of the second course. The second being finished, a machine of the same kind was fixed upon it, and so on for all the rest; one or more of the machines being always left upon each of the courses already laid, to serve successively for raising the stones from step to step, until the whole was completed.

But of what use were these pyramids? Some suppose that they were erected for the tombs of kings and conquerors; and Herodotus states, that the Egyptians considered the pyramidal form as emblematical of human life—the broad base on the earth representing the beginning of life, and the tapering to a point, its close. These pyramids being constructed on scientific principles, and their sides being correctly adapted to the four cardinal points, it has been conjectured that they were built for astronomical purposes. Others maintain that they

THE PYRAMIDS OF GIZEH (EGYPT).

were constructed as a permanent memorial of the proper length of the cubit, of which, it is said, that all their dimensions contain a certain number of multiples. Another class will have it, that they were meant for altars to the gods, their tapering form aptly representing a flame, and fire being an object of worship among the Persians and some other nations of antiquity. In opposition to all this, it is asserted that "they were originally intended to remedy the disadvantages of the Delta, and particularly of Upper Egypt, by attracting the clouds, and eliciting a discharge of rain;" that this "may be considered as in some measure sanctioned by the enormous sphinx found in their vicinity, and its relation to the fertilizing of Egypt by the waters of the Nile—the sphinx (composed of the head and bosom of a woman, with the body of a lion) being designed to symbolise the annual inundation which takes place when the sun passes through the signs of the zodiac denominated the Virgin and the Lion."

So much for conjecture and assertion respecting these splendid monuments of human skill and industry. But whatever was their original design—whether they ever served any higher or nobler purpose than to gratify the vanity of their founders and builders—certain it is that they "harmonise admirably with a dewless heaven, a sandy waste, a people that have been! There is now a sublimity in their uselessness. Standing on the same earth which has entombed so many thousand generations, pointing to the same sky which heard the cry of the oppressed when they were building, they no longer belong to Cheops or Sesostris, Pharaohs or Ptolemies, Mamelukes or Turks, but to the imagination of mankind." And what play for the imagination in the midst of these sublime and mysterious erections! "The humblest pilgrim pacing the Libyan sands around them, while he is conscious that he walks in the footsteps of many mighty and renowned men, imagines himself to be for an instant admitted into their illustrious conclave. Persian satraps, Macedonian heroes, Grecian bards, sages and historians—all of every age, and nation, and religion, have participated, in common with him, the same feelings, and have trodden the same ground."

Psammetichus was succeeded on the throne, B.C. 616, by his son NECHOS, the Pharaoh-necho of Scripture, and whose genius was alike enterprising by land and by sea. In the beginning of his reign, he formed the idea of connecting the Mediterranean and the Red Sea by cutting through the Isthmus of Suez; but after losing above a hundred thousand men in the attempt, he was compelled to give up the enterprise. It was afterwards completed by Darius Hystaspes; but owing to the dangerous nature of the navigation in the northern part of the Red Sea, this canal was never of much practical use. It is said that Necho manned a ship with some expert and courageous Phenicians, and sent them on a voyage of discovery to the coasts of Africa. Having discovered the passage around the Cape of Good Hope, they returned, after an absence of three years, to Egypt, through the Atlantic ocean, the Straits of Gibraltar, and the Mediterranean, but their relation was deemed too marvellous to be generally believed.

The record of the most remarkable wars in which this prince was engaged, is to be found in the Inspired Writings. He first turned his arms against the king of Assyria, directing his march towards the Euphrates, and purposing to besiege Carchemish. This Carchemish is to be regarded as probably the same with the Circesium or Cercusium of the Greek and Roman writers, and was situated in the angle formed by the junction of the Chebar and the Euphrates, and was deemed a fortress extremely secure. In his march, he was met by Josiah king of Judah, who endeavoured to check his progress. Nothing daunted, Necho sent ambassadors to remonstrate with Josiah. Speaking in their royal master's name, they said to Josiah—"What have I to do with thee, thou king of Judah? I come not against thee this day, but against the house wherewith I have war; for God commanded me to make haste. Forbear thee from meddling with God, who is with me, that he destroy thee not." Josiah disregarded this friendly remonstrance, and was resolved to come to an engagement. Josiah was in possession of the whole land of Israel, and probably held the northern parts of it as a grant from the king of Babylon, with whom he was in alliance, and whose frontiers he was bound to defend against all hostile invaders. Through this territory, Necho was marching his army contrary to the expressed will of Josiah, and therefore Josiah came out to oppose his progress. So far he might seem justified in the line of conduct which he pursued. His error lay in not hearkening unto the words of Necho from the mouth of God; and having pushed his opposition to an engagement, he fell in battle in the valley of Megiddo. Having reached the Euphrates, we learn that Necho captured and garrisoned the city of Carchemish, and on his return to Egypt became master of Jerusalem, whose monarch, Jehoahaz, he took captive, and placed Jehoiakim upon the throne, on whom he imposed an annual tribute of an hundred talents of silver and one talent of gold.

On the fall of the Assyrian empire, the Chaldean dynasty rose into power, and Nebuchadnezzar, king of Babylon, having resolved on the conquest of western Asia, first attempted to force the Egyptians from their stronghold in Carchemish. Having turned his arms against Necho, the Egyptian monarch nothing daunted by the formidable appearance of the enemy, tried to check their progress, and pushed his chances to an open battle, in which he was defeated with great slaughter, while Nebuchadnezzar carried his victory to the very gates of Pelusium. The whole scene connected with this engagement is described by the prophet Jeremiah in a composition as remarkable for its majesty and eloquence as for its truthfulness;

—"The word of the Lord which came to Jeremiah the prophet, against the Gentiles, against Egypt, against the army of Pharaoh-necho, king of Egypt, which was by the river Euphrates in Carchemish, which Nebuchadnezzar king of Babylon smote in the fourth year of Jehoiakim, the son of Josiah, king of Judah:—Order ye the buckler and shield, and and draw near to battle. Harness the horses; and get up, ye horsemen, and stand forth with your helmets; furbish the spears, and put on the brigandines. Wherefore have I seen them dismayed and turned away back; their mighty ones are beaten down, and are fled apace, and look not back; for fear was round about, saith the Lord. Let not the swift flee away, nor the mighty man escape; they shall stumble and fall toward the north, by the river Euphrates. Who is this that cometh up as a flood, whose waters are moved as the rivers? Egypt riseth up like a flood, and his waters are moved like the rivers, and he saith—I will go up, and will cover the earth; I will destroy the city and the inhabitants thereof. Come up, ye horses; and rage, ye chariots; and let the mighty men come forth; the Ethiopians and the Libyans that handle the shield; and the Lydians that handle and bend the bow. For this is the day of the Lord God of hosts—a day of vengeance that he may avenge him of his adversaries; and the sword shall devour, and it shall be satiate and made drunk with their blood; for the Lord God of hosts hath a sacrifice in the north country by the river Euphrates."* How vivid is this picture! The prophet sees the mighty preparations, but nothing can save the Egyptians from their impending doom. Their monarch is represented as marching with all the confidence of victory, like a river overflowing its banks, and threatening all around with its inundations. He is heard animating his troops to battle, and the prance of the horsemen falls audibly upon the ear. In a moment they are scattered, and the sword of heaven is bathed in their blood. So complete is the overthrow and the slaughter, that the virgins of Egypt are depicted in an agony of grief for the fate of their heroes.

Questions for Examination.

What was the character of Psammetichus on his accession?
What measures did he adopt to extend his dominion?
Can you name any important commercial city which he took?
What were the effects of his establishing a freer and wider commerce?
What discoveries did he attempt?
Are there any remains to mark where Memphis stood?
What remarkable buildings belonged to that famous city?
Is there anything to compensate for the loss of these temples and palaces?
Can you name the three largest pyramids?
Give the dimensions of Cheops, and how it is ascended.
By what means were the huge stones composing these pyramids raised?
Of what supposed use were those stupendous erections?
Who succeeded Psammetichus on the throne of Egypt?
What great undertaking did Necho contemplate at the beginning of his reign?
What passage did he discover?
In what writings do we find the record of his wars, and by what name is he known in Scripture?
What victories did he achieve?
For what reason did Josiah oppose his progress?
By whom was Necho overcome, and to what extent?
Which of the prophets describes this great conquest, and whom does he represent as weeping over the fall of the Egyptian heroes?

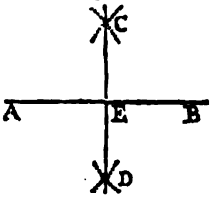
* Jeremiah xlvi. 1—12.

LESSONS IN GEOMETRY.—No. III.

PROBLEMS IN PRACTICAL GEOMETRY.

1. *To bisect a straight line—that is, to divide it into two equal parts.*—Let A B, fig. 1, be the straight line to be bisected. From the two extremities A and B, with a radius of any length greater than half of the line, describe (draw) arcs of circles intersecting (crossing) each other at the point C, above the straight A B, and at the point D, below it. Then, from the point of intersection C, draw a straight line to the point of intersection D; and the straight line A B will be bisected by the straight line C D, at the point E; that is, A B is divided into two equal parts A E, E B, at the point E. In the Elements of Euclid, Book I., this forms Proposition X.; but his construction (mode of drawing) of the problem is different, being founded on the properties of the equilateral triangle, and the method of bisecting an angle.

Fig. 1.

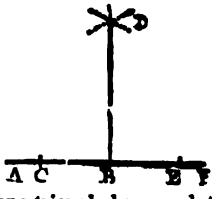


By this method of construction, a straight line may be divided into any number of equal parts, denoted by the series 2, 4, 8, 16, 32, 64, 128, &c.

It is not necessary in the above construction that the two arcs at D be drawn with the same radius as the two arcs at C; but it is necessary that *each pair* be drawn with the same radius; that is, practically speaking, without shifting the legs of the compasses.

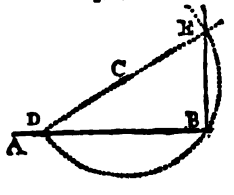
2. *To draw a perpendicular to a straight line from a point in it.* Let A F, fig. 2, be the straight line to which the perpendicular is to be drawn, and B the point in it. From the point B, with any convenient radius, less than B A or B F, cut off, or measure off equal parts of the straight lines B A, B F,—namely, B C, B E; and from the points C, E, with any radius greater than C B or E B, describe arcs of circles intersecting each other at the point D. Then join D B, that is, draw a straight line from the point D to the point B, and B D will be perpendicular to A F. This problem forms Prop. XI., Book I. of Euclid's Elements, and his mode of construction is very similar to the above, with this difference that the radius of the arcs is limited to the straight line C B, and the demonstration rests on the properties of the equilateral triangle, and his eighth proposition, which amounts to this, that if three sides of one triangle be equal to the three sides of another triangle, each to each, then their three angles must be equal to one another,—namely, those to which the equal sides are opposite.

Fig. 2.



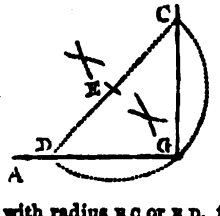
3. *To draw a perpendicular to a straight line from one of its extremities.* Let A B, fig. 3, be the straight line, and B one of its extremities, from which the perpendicular is to be drawn. Take any point C, at a convenient distance from B, and nearly over the middle of the straight line A B; then with C as a centre, at the distance C B as radius, describe the arc D B E, so that it shall be greater than a semicircle: from the point D, draw through the point C, the straight line D C E, to meet the arc in the point E; and join E B, that is, draw a straight line from the point E to the point B, and B E will be perpendicular to A B, at the extremity of B, as required. This problem is considered as merely a case of the preceding one; because, in Theoretical Geometry, all given straight lines are by the 2nd postulate (demand or supposition) of Euclid's Book I., allowed to be produced (that is, extended) to any length in a straight line.

Fig. 3.



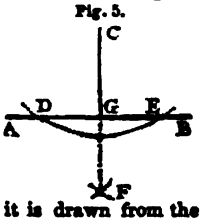
The demonstration of this proposition is founded on Proposition XXXI. of Book III. of Euclid's Elements, which states that the angle contained in a semicircle is a right angle. This fact, indeed, is well known to intelligent workmen, who are accustomed to make use of the F or the T square; for they try the accuracy of that instrument by this property of the circle. Thus, if in fig. 4, A G C were an angle drawn by means of an F or a T square, in order to test its accuracy, and consequently that of the instrument, they join any two points in the legs of the angle, say D C, by drawing the straight line D C; they bisect it in E by means of the arcs shown in the figure, as explained in the first problem; and then, with radius E C or E D, they describe the semicircle D G C; if the arc of this semicircle passes exactly through the point G, the angle and the instrument are correct; if not, they are incorrect, and the instrument must be adjusted.

Fig. 4.



4. *To draw a perpendicular to a straight line from a point without it.*—Let A B, fig. 5, be the straight line, and C the point from which the perpendicular is to be drawn. From the point C as a centre, with any radius sufficient to extend beyond the straight line A B, describe an arc of a circle D E, intersecting the straight line A B in the points D, E; then, from these points as centres, with any radius greater than half the straight line D E, describe arcs intersecting each other in the point F; then join C F; that is, draw a straight line from C to F, cutting A B in the point G; then C G is perpendicular to A B, and it is drawn from the point C, as required.

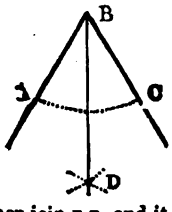
Fig. 5.



This problem forms Proposition XIII. of Euclid's Book I., but his method is somewhat different; instead of drawing the arcs at F, he merely says bisect the straight line D E in G. The preceding process, however, is more simple in practice.

5. *To draw a perpendicular to a straight line at or near one of its extremities, from a point without it.* Let A G (fig. 4) be the straight line, G one of its extremities, and C the point without it, from which the perpendicular is to be drawn. Take any point D in A G, and join D C; bisect it in E; and from the point E, as a centre, with radius E D or E C, describe the semicircle D G C; then join G C, and it will be perpendicular to A G. It is evident, from the remarks made on Problem 3, that C G is perpendicular to A G, and it is drawn from the point C, as required. Observe, that unless the point happens to be exactly in the vertical line above the point G, the semicircle will not pass exactly through G, but will pass through a point either nearer to or farther from the point A. In the latter case, the straight line A G must be produced till it meet the arc of the semicircle. This problem is considered as merely a case of the preceding problem, although the construction be different.

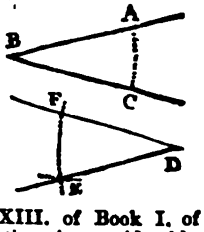
Fig. 6.



6. *To bisect a rectilineal angle, that is, to divide it into two equal parts.* Let A B C (fig. 6), be the rectilineal angle to be bisected. From centre B, with any convenient radius B A, describe the arc A C, and from the points A, C, as centres, describe arcs intersecting each other in D; then join B D, and it will bisect the angle A B C, that is, it will divide it into the two equal angles A B D, C B D, as required.

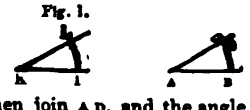
7. *To draw an angle equal to a given rectilineal angle, at a point in a given straight line.*—Let A B C, fig. 7, be the given rectilineal angle, D F the given straight line, and D the point in it. From the point B, as a centre, with any convenient radius, B A, describe the arc A C; from the point D, in the straight line D E, draw the indefinite arc E F, with the same radius; and from the point F, as a centre, with radius equal to the distance A C, describe an arc intersecting the arc E F, in the point E; then, through the points D E, draw the straight line D E; and the angle E D F will be equal to the given angle A B C.

Fig. 7.



This problem forms Proposition XXIII. of Book I. of Euclid's Elements; but his construction is considerably different, requiring first the construction of two triangles equal to one another. If any of our students should not see the preceding construction clearly, we add the following one. Let L K I (fig. 8) be the given angle, A B the given straight line, and A the point in it. From the point K as a centre, with any radius K L, describe the arc L I; from the point A as a centre, with the same radius, describe the indefinite arc B D; draw the chord L I, and with the point B as a centre, with radius equal to the chord L I, describe an arc intersecting the arc B D, in the point D; then join A D, and the angle B A D is the angle required; that is, equal to the given angle L K I.

Fig. 1.



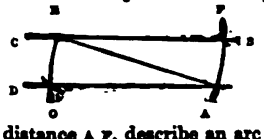
If the chord B D be drawn, then the two triangles L K I, D A B are two equal isosceles triangles. Hence, if an isosceles triangle L K I be given, this construction shows how to make an isosceles triangle D A B equal to the given one.

8. *To draw a triangle equal to a given triangle;* or in other words, *to describe a triangle of which the three sides are given.* In fig. 8, suppose the triangle L K I to be scalene, or, that the three straight lines L K, K I, and I L, are all unequal, and that a triangle is to be drawn, having its three sides equal to these three straight lines. Draw a straight line A B equal to K I, and from the points A, B, as centres, with radii respectively equal to the straight lines K L, I L, describe arcs intersecting each other in the point D; then join A D, B D; and the triangle A B D is the triangle required; that is, it has its three sides equal to the three given straight lines K I, K L, and I L; or, it is equal to the triangle K L I. Of course, in the figure as we have thus referred to it, the arcs I L and D B are unnecessary in this construction.

This problem forms Prop. XXII. of Book I. of Euclid's Elements, and his construction is virtually the same as ours. He adds a restriction, however, which is absolutely necessary to his mode of treating the problem; viz., that when the three straight lines are given in length, without being exhibited in the form of a triangle, *any two of these straight lines must be greater than the third.* The reason of this restriction is plain, when we consider that he had previously proved in his Prop. XX., Book I. that *any two sides of a triangle are together greater than the third.* This, however, is manifest without demonstration, if we adopt Archimedes's definition of a *straight line*, that it *is the shortest distance between any two points.*

9. *To draw a straight line through a given point, that shall be parallel to a given straight line.* Let B C (fig. 9) be the given straight line, and A the given point, through which a parallel is to be drawn. Take any point E in the straight line B C, join E A; and with the point E, as centre, and radius E A, draw the arc A F, cutting B C in F. Then from the point A, as a centre and radius A E, draw the indefinite arc E O; and from the point E as centre, with radius equal to the distance A F, describe an arc cutting the arc E O, in the point D; then join A D, and it will be parallel to B C, as required.

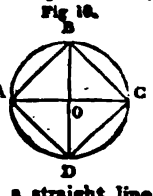
Fig. 9.



This problem forms Prop. XXXI., Book I. of Euclid's Elements; his construction, though differently worded, being virtually the same as the above. The demonstration is founded on the fact that *when a straight line meets two other straight lines, and makes the alternate angles equal, these two straight lines are parallel.* The proof of this fact forms Prop. XXVII., Book I. of the Elements.

Another mode of constructing this problem, which is very useful, may be inserted here. Let A B (fig. 10) be the given straight line, and C the given point, through which the parallel is to be drawn. Take any point O, at a convenient distance from the straight line A B, but nearer to it than to the point C; join O C, and from O as centre, with radius O C, describe the circle C B A D, intersecting the straight line A B, in the points A, B; then from A, as a centre, with radius or distance equal to B C, describe an arc cutting the circle A B C D in the point D; and through the points C, D, draw the straight line C D, and it will be the parallel required. The proof of this is founded on a proposition not given in Euclid's Elements, but easily deduced from one in his third book,—namely, that *the straight lines which intercept equal arcs of the same circle are parallel.*

Fig 10.



There are various other ways of drawing a straight line parallel to a given straight line, by means of the single ruler and compasses; but these are about the easiest. But parallel straight lines are most easily drawn by means of the parallel rulers described in our last lesson, page 49, No. IV. Such instruments, however, are not always at hand; hence the utility of knowing how to work the preceding problem.

The only exercises or questions that could be given on the preceding lesson, would be simply to desire the student to draw all the figures above described according to the rules of construction laid down in the different problems, which we earnestly advise our self-educating students to do accordingly, by means of the single ruler and compasses.

LESSONS IN FRENCH.—No. VI.

By Professor Louis Fasquelle, LL.D.

Section XIV.

Plan of the exercises in composing French.

Hitherto the student has been occupied exclusively in acquiring facts, forms, and principles, and in *translating*, by the aid of these, French into English, and again English into French. Following still the plan of the work, let him now undertake the higher business of endeavouring to *compose* in French. With this intent, let him take some of the words given for this purpose in the following lists, and seek to incorporate them in sentences entirely his own. The words taken from the lists are to be used merely as things suggestive of thought. The *form* which, in any given case, the sentence may assume, should be determined by the models found in the Lessons preceding; for, every sentence which the pupil has once mastered in the regular course of the Lessons, is or should be to him a *model*, on which he may at pleasure build other constructions of his own. Indeed, this constructing sentences according to models, that is, shaping one's thoughts according to the forms and idioms peculiar to a foreign tongue, is the true and only secret of *speaking and writing* that language well. The pupil, therefore, as he passes along in the ordinary course of the Lessons, should frequently be found applying his knowledge in the way of actually composing independent sentences. In this way, he will soon acquire a facility and accuracy in the language, which is hardly otherwise attainable at all.

List of words for exercises in composing.

The words in the following lists are given as *suggestive* of thought. In conducting the exercise a particular word is selected, as *Relieur* (Bookbinder), and the student is required to compose a French sentence containing this term. He is duly notified, that he is at liberty to take *any* thought suggested by the word, and to produce a sentence of *any* form found in any of the Sections: regard being had all along to all the Rules, Notes, Exceptions, &c., that may bear upon th case. Thus, adopting as a model the sentence, *Votre marchand est bien obligeant* (Sect. 15, Résumé), or, *Le Danois a-t-il quelques pommes?* (Sect. 16, R. 7), &c. &c., let him endeavour to produce others of the like kind.

A little practice will render the exercise both easy and interesting. It will soon come to be easy to incorporate not only *one*, but *two*, *three*, or more of the words taken from the lists.

I.—Professions et Metiers.	Professions and Trades.
Acteur, m. *actor*	Gantier, m. *glover*
Apothicaire, m. *apothecary*	Graveur, m. *engraver*
Artiste, m. *artist.*	Horloger, m. *clock and watch maker*
Aumonier, m. *chaplain*	Instituteur, m., Institutrice, f., *schoolmaster, mistress*
Auteur, m. *author*	Imprimeur, m. *printer*
Barbier, m. *barber*	Joaillier, m. *jeweller*
Bijoutier, m. *jeweller*	Maçon, m. *mason, bricklayer*
Blanchisseuse, f. *washerwoman*	Maître d'école, m. *schoolmaster*
Boucher, m. *butcher*	Manouvrier, m. *day-labourer*
Brasseur, m. *brewer*	Marchand-de-chevaux, maquignon, m. *horse-dealer*
Brodeuse, f. *embroiderer*	Maréchal ferrant, m. *farrier, shoeing-smith*
Charbonnier, m. *coal-man*	Maréchal, m. *blacksmith*
Charlatan, m. *quack*	Moissonneur, m. *reaper*
Charretier, m. *cart-man*	Musicien, m. *musician*
Chaudronnier, m. *coppersmith*	Naturaliste, m. *naturalist*
Chirurgien, m. *surgeon*	Orateur, m. *orator*
Cordier, m. *ropemaker*	Orfèvre, m. *gold and silver smith*
Corroyeur, m. *currier*	Pape, m. *pope*
Coutelier, m. *cutler*	Pâtre, m. *shepherd, herdsman*
Couturière, f. *seamster*	Perruquier, m. *hairdresser*
Couvreur, m. *slater, tiler*	Philosophe, m. *philosopher*
Curé, m. *vicar*	Poissonnier, m., Poissonnière, f. *fishmonger*
Dentiste, m. *dentist*	Prédicateur, m. *preacher*
Drapier, m. *draper*	Prêtre, m. *priest*
Ecclésiastique, m. *clergyman*	Raffineur de sucre, de sel, *refiner of sugar, of salt*
Epicier, m. *grocer*	Ramoneur de cheminées, m., *chimney-sweeper*
Evêque, m. *bishop*	Relieur, m. *bookbinder*
Faucheur, m. *mower*	Savetier, m. *cobbler*
Fripier, m. *fripperer*	Sculpteur, m. *sculptor*
Fruitière, f. *fruit-woman*	Sellier, m. *saddler*
	Serrurier, m. *locksmith*
	Tapissier, m. *upholsterer*
	Teinturier, m. *dyer*
	Tisserand, m. *weaver*
	Tonnelier, m. *cooper*
	Vitrier, m. *glazier*

II.—L'Homme.	Man.
Ancêtres, m.p. *ancestors*	Futur, m. *bridegroom*
Arrière-petit-fils, m. *great grandson*	Future, f. *bride*
Beau-fils, m. *son-in-law, step son*	Gendre, m. *son in-law*
Beau-frère, m. *brother-in-law*	Grand-père, m. *grandfather*
Beau-père, m. *father-in law, stepfather*	Grand'mère, f *grandmother*
Belle-fille, f. *daughter-in-law, stepdaughter*	Jeune homme, m *young man*
Belle-mère, f. *mother-in-law, stepmother*	Jeune fille, f. *young woman, girl*
Belle-sœur, f. *sister-in law*	Jeunesse, f. *youth*
Bisaïeul, m. *great grandfather*	Jumeau, m., jumelle, f., *twin*
Bru, f. *daughter-in-law*	Marraine, f. *godmother*
Descendants, pl. *descendants*	Mari, m. *husband*
Enfance, f. *childhood*	Naissance, f. *birth*
Epoux, m. } *consort*	Nourrice, f. *nurse*
Epouse, f. }	Nouveau marié, *bridegroom*
Famille, f. *family*	Nouvelle mariée, *bride*
Femme, f. *woman, wife*	Orphelin, m., orpheline, f., *orphan*
Fiançailles, f p. *betrothing*	Parrain, m. *godfather*
Fiancé, m., fiancée, f. *betrothed*	Petit-fils, *grandson*
	Petite-fille, *grand-daughter*
	Veuf, m. *widower*
	Veuve, *widow*
	Vieillesse, f. *old age*

III.—Le corps humain.	The human body.
Artère, f. *artery*	Membre, m. *limb*
Barbe, f. *beard*	Menton, m. *chin*
Bouche, f. *mouth*	Moëlle, f. *marrow*
Bras, m. *arm*	Moustache, f. *moustache, moustachio*
Cervelle, f. *brain*	Muscle, m. *muscle*
Chair, f. *flesh*	Nerf, m. *nerve*
Cils, m.p. *eyelashes*	Nez, m. *nose*
Cœur, m. *heart*	Ongle, m. *nail*
Corps, m. *body*	Orteil, m. *toe*
Côté, m. *side*	Os, m. *bone*
Côte, f. *rib*	Palais, m. *palace*
Cou, m. *neck*	Paupière, f. *eyelid*
Coude, m. *elbow*	Peau, f. *skin*
Crâne, m. *skull*	Pouce, m. *thumb*
Cuisse, f. *thigh*	Poumon, m. *lungs*
Doigt, m. *finger*	Prunelle, f. *pupil of the eye*
Dos, m. *back*	Rate, f. *spleen*
Epaule, f. *shoulder*	Reins, m.p. *loins*
Epine (du dos), f. *spine*	Sang, m. *blood*
Favoris, m.p. *whiskers*	Sein, *bosom*
Foie, m. *liver*	Sourcils, m.p. *eyebrows*
Front, m. *forehead*	Squelette, m. *skeleton*
Gencives, f.p. *gums*	Talon, m. *heel*
Genou, m. *knee*	Teint, m. *complexion*
Gorge, f. *throat*	Tempes, f.p. *temples*
Hanche, f. *hip*	Trait, m. *feature*
Jambe, f. *leg*	Veine, f. *vein*
Joue, f. *cheek*	Visage, m. *face*
Langue, f. *tongue*	
Lèvre, f. *lip*	

IV.—Maladies, Infirmites, &c.	Maladies, Infirmities, &c.
Attaque, f. *attack, fit*	Fièvre scarlatine, f. *scarlet fever*
Baume, m. *balsam*	Guérison, f. *cure*
Bégaiement, m. *stammering*	Goutte, f. *gout*
Blessure, f. *wound*	Hydropisie, f. *dropsy*
Cécité, f. *blindness*	Indisposition, f. *indisposition*
Chancre, m. *cancer*	Louche, adj. *squinting*
Cicatrice, f. *scar*	Malaise, m. *indisposition*
Colique, f. *colic*	Mutisme, m. *dumbness*
Contusion, f. *bruise*	Ordonnance, f. *prescription*
Crampe, f. *cramp*	Onguent, m., pommade, f., *salve*
Dislocation, f. *dislocation*	Petite-vérole, f. *small-pox*
Emétique, m. *emetic*	Pulmonie, f. *consumption*
Enflure, f. *swelling*	Remède, m. *remedy*
Enroument, m. *hoarseness*	Rhume, m. *cold*
Entorse, f. *sprain*	Rougeole, f. *measles*
Epilepsie, f. *epilepsy*	Surdité, f. *deafness*
Evanouissement, m. *fainting*	Toux, f. *cough*
Fièvre, f. *fever*	Ulcère, m. *ulcer*
Fièvre nerveuse f. *nervous fever*	Vertigo, m. *dizziness*

V.—Habiliments. — Articles of Dress.

Agrafe, *f. clasp*
Aiguille, *f. needle*
Aiguille de cheveux, *f. hair-pin*
Bague, *f. ring*
Bas, *m. stocking*
Basin, *m. dimity*
Batiste, *f. cambric*
Bijouterie, *f. jewelry*
Bonnet, *m. cap*
Boucle, *f. buckle*
Boucle, *f. lock of hair, curl*
Boucles d'oreilles, *f.p. ear-rings*
Bourse, *f. purse*
Bracelet, *m. bracelet*
Bretelles, *f.p. braces, suspenders*
Brosse, *f. brush*
Brosse-à-dents, *f. tooth-brush*
Caleçon *m.s. drawers*
Ceinture, *f. sash, belt, band*
Chaussons, *m.p. socks.*
Cirage, *m. blacking*
Ciseaux, *m.p. scissors*
Coiffure, *f. head-dress*
Collet, *m. collar*
Collier, *m. necklace*
Coton, *m. cotton*
Cravate, *f. cravat*
Crêpe, *m. crape*
Diamant, *m. diamond*
Dentelle, *f. lace*
Doublure, *f. lining*
Ecrin, *m. casket, jewel-box*
Epée, *f. sword*
Eperons, *m.p. spurs*
Epingle, *f. pin*
Etui, *m. needle-case*
Eventail, *m. fan*
Flacon, *m. smelling bottle*
Fourrure, *f. fur*
Frac, *m. dress coat*
Frange, *f. fringe*
Garniture, *f. trimming*
Gilet, *m. vest, waistcoat*
Grenat, *m. garnet*
Guêtres, *f.p. gaiters*
Habit, *m. coat*
Ivoire, *f. ivory*
Linge, *m. linen*
Lunettes, *f.p. spectacles*
Manche, *f. sleeve*
Mousseline, *f. muslin*
Pantalon, *m. sing., pantaloons*
Parapluie, *m. umbrella*
Parasol, *m. parasol*
Peigne, *m. comb*
Pendants-d'oreilles, *m.p. ear-pendan's*
Perle, *f. pearl*
Poche, *f. pocket*
Pommade, *f. pomatum*
Redingote, *f. g. eat-coat*
Robe, *f. dress, robe*
Robe de chambre, *f. dressing-gown*
Satin, *m. satin*
Soie, *f. silk*
Tablier, *m. apron*
Taffetas, *m. taffeta*
Velours, *m. velvet*
Veste, *f. vest*
Voile, *m. veil*

VI.—La Ville, La Maison, &c. — Town, House, &c.

Antichambre, *f. antechamber*
Ardoise, *f. slate*
Arsenal, *m. arsenal*
Banc, *m. bench, seat*
Barrière, *f. gate*
Bibliothèque, *f. library*
Bourg, *m. borough, small town*
Bourse, *f. exchange*
Brique, *f. brick*
Capitale, *f. capital city, metropolis*
Carrillon, *m. chime of bells*
Caserne, *f. barrack*
Cave, *f. cellar*
Chambre, *f. chamber, room*
Chambre à coucher, *f. bedroom*
Chapelle, *f. chapel*
Château, *m. country house, villa*
Chaumière, *f. hut, cottage*
Chaux, *f. lime*
Cheminée, *f. chimney*
Cimetière, *m. burying-ground, churchyard*
Cloche, *f. bell* (large), *church bell, &c.*
Clocher, *m. church steeple*
Clochette, *f. small bell*
Cloître, *m. cloister*
Cour, *f. yard, court*
Couvent, *m. convent*
Cuisine, *f. kitchen*
Douane, *f. custom-house*
Ecurie, *f. stable*
Environs, *m.p. environs, neighbourhood*
Etage, *n. m. story, floor*
Escalier, *m. stairs*
Faubourg, *m. suburb*
Ferme, *f. farm*
Fontaine, *f. fountain, well*
Four, *m. oven*
Gouttière, *f. gutter*
Grand chemin, Grand'route, *m. highway*
Grange, *f. barn*
Grenier, *m. garret*
Haie, *f. hedge*
Hameau, *m. hamlet*
Hôpital, *m. hospital*
Hôtel-de-ville, *town house, city house, guildhall, city hall, town hall*
Meuble, *m. piece of furniture*
Meubles, *m.p. furniture*
Monnaie, *f. mint*
Mortier, *mortar*
Mur, *m.* Muraille, *f.* *wall*
Palais, *m. palace*
Paroisse, *f. parish*
Pavé, *m. pavement*
Pépinière, *f. nursery of trees*
Persienne, *blind, open shutters*
Plafond, *m. ceiling*
Planche, *f. board*
Plancher, *m. floor*
Poêle, *m. stove.*
Pompe, *f. pump.*
Pont, *m. bridge*
Porte, *f. door, gate*
Poste, *f. post, post office*
Poutre, *f. beam*
Prairie, *f.* Pré, *m.* *meadow*
Prison, *f. prison*
Puits, *m. well*
Quartier, *m. quarter*
Rampe (d'escalier), *balustrade of a staircase*
Rez-de-chaussée, *m. ground floor*
Sacristie, *f. vestry*
Salle, *f. parlour, sitting-room*
Salon, *m. drawing-room, hall*
Serre, *f. conservatory*
Serre-chaude, *f. hot-house*
Serrure, *f. lock*
Sonnette, *f. bell*
Théâtre, *m. theatre*
Toit, *m. roof*
Tour, *f. tower*
Tuile, *f. tile*
Verger, *m. orchard*
Verrou, *m. bolt*
Vestibule, *m. hall, entry*
Vigne, *f.*, vignoble, *m. vineyard*
Village, *m. village*
Volet, *window-shutter*
Voute, *f. vault*

VII.—Meubles. — Furniture

Allumette, *n.f. match*
Allumette chimique, *f. friction-match*
Amadou, *m. tinder*
Armoire, *f. cupboard*
Baril, *m. cask, barrel*
Bassin, *m. bowl, wash-bowl*
Bassinoire, *f. warming-pan*
Berceau, *m. cradle*
Boite-à-fusil, *f. tinder-box*
Bougie, *f. taper*
Bouilloire, *f. kettle*
Briquet, *m. fire-steel*
Cadre, *m. frame*
Candélabre, *m. chandelier*
Casserole, *f. saucepan*
Cassette, *f. box, casket*
Chandelle, *f. candle*
Charbon de bois, *m. charcoal*
Charbon de terre, *stone coal*
Chaudière, *f. boiler*
Coffre, *m. chest*
Commode, *f. chest of drawers*
Corbeille, *f. basket*
Crible, *m. sieve*
Cruche, *f. pitcher*
Cuvier, *m. tub*
Drap, *m. sheet*
Ecumoire, *f. skimmer*
Entonnoir, *m. funnel*
Essuie-main, *m. towel*
Fer à repasser, *m. iron*
Fourgon, *m. poker*
Foyer, *m. hearth*
Lampe, *f. lamp*
Lanterne, *f. lantern*
Lit, *m. bed*
Lit de plume, *m. feather bed*
Lumière, *f. light*
Lustre, *m. sconce*
Marchepied, *m. footstool*
Mouchettes, *f.p. snuffers*
Mortier, *m. mortar*
Moutardier, *m. mustard-pot*
Nappe, *f. tablecloth*
Oreiller, *m. pillow*
Panier, *m. basket*
Paravent, *m. screen*
Peinture, *f. painting, picture*
Pelle, *f. shovel*
Pierre à fusil, *f. flint*
Pincettes, *f.p. tongs*
Poêle, *m. stove*
Poêle, *f. frying-pan*
Poivrière, *f. pepper-box*
Pot, *m. kettle*
Pupitre, *m. desk.*
Salière, *f. salt-cellar*
Savon, *m. soap*
Seau, *m. pail*
Serviette, *f. napkin*
Sofa, *m. sofa*
Soufflet, *m. bellows*
Soupière, *f. soup-tureen*
Sucrier, *m. sugar-dish*
Tableau, *m. picture*
Tablette, *f. shelf*
Tapis, *m. carpet*
Tire-bouchon, *m. cork-screw*
Tirior, *m. drawer*
Traversin, *m. bolster*
Ustensiles de cuisine, *m.p. kitchen utensils*
Verre, *m. glass*

VIII.—Plats, &c. — Dishes, &c.

Bœuf, *m. beef*
Bouilli, *m. boiled beef, boiled meat*
Bouillon, *m. broth*
Confitures, *f.p. preserves*
Cotelette, *f. cutlet*
Gigot de mouton, *m. leg of mutton*
Jambon, *m. ham*
Mouton, *m. mutton*
Œuf, *m. egg*
Omelette, *f. omelet*
Porc, *m. pork*
Refraichissements, *m.p. refreshments*
Rôti, *m. roast meat*
Saucisse, *f. sausage*
Soupe, *f. soup*
Soupe maigre, *f. vegetable soup*
Tarte, *f. tart*
Veau, *m. veal*
Vermicelli, *m. vermicelli*
Volaille, *f. fowl*

IX.—Legumes, Grain, &c. — Vegetables, Grain, &c.

Ail, *m.*, pl. aulx or ails, *garlic*
Asperge, *f. asparagus*
Avoine, *f. oats*
Betterave, *f. beet*
Blé, *m. wheat*
Carotte, *f. carrot*
Céleri, *m. celery*
Champignon, *m. mushroom*
Chou, *m. cabbage*
Choufleur, *m. cauliflower*
Concombre, *m. cucumber*
Cresson, *m. cress*
Epinards, *m. pl. spinage.*
Fève, *f. bean*
Grain, *m. kernel*
Herbe, *f. herb*
Lentille, *f. lentil*
Mais, *m. maize*
Millet, *m. millet*
Navet, *m. turnip*
Ognon, *m. onion*
Orge, *f. barley*
Oseille, *f. sorrel*
Panais, *m. parsnip*
Persil, *m. parsley*
Plante, *f. plant*
Pois, *m. pea*
Racine, *f. root*
Radis, *m. radish* (*turnip*)
Rave, *f. radish* (*long*)
Ris, *m. rice*
Sauge, *f. sage*
Seigle, *m. rye*
Thym, *m. thyme*
Truffe, *f. truffle*

X.—Arbres fruitiers, Fruits. — Fruit Trees, Fruits.

Abricot, *m. apricot*
Abricotier, *m. apricot tree*
Amande, *m. almond*
Amandier, *m. almond tree*
Ananas, *m. pineapple*
Aveline, *f. filbert*
Châtaigne, *f. chesnut*
Citron, *m. citron, lemon*
Coing, *m. quince*
Datte, *f. date*
Figue, *f. fig*
Fraise, *f. strawberry*
Framboise, *f. raspberry*
Groseille, *f. gooseberry, currant*
Melon, *m. melon*
Mure, *f. mulberry*

Nèfle, f. *medlar*
Noisette, f. *hazel-nut*
Noix, f. *nut*
Orange, f. *orange*
Pêche, f. *peach*
Poire, f. *pear*
Poirier, m. *pear-tree*

Pomme, f. *apple*
Pommier, m. *apple tree*
Prune, f. *plum*
Prunier, m. *plum tree*
Raisin, m. *grape*
Vigne, f. *vine*

XI.—Arbres Forestiers.

Bouleau, m. *birch*
Chêne, m. *oak*
Ecorce, f. *bark*
Erable, m. *maple*
Frêne, m. *ash*
Hêtre, m. *beech*
Mélèse, m. *larch*
Orme, m. *elm*

Forest Trees.

Peuplier, m. *poplar*
Rameau, m. *bough*
Sapin, m. *pine*
Saule, m. *willow*
Tilleul, m. *linden tree*
Tremble, m. *aspen*
Tronc, m. *trunk*

XII.—Fleurs, &c.

Auricule, f. *auricula*
Chardon, m. *thistle*
Chèvre-feuille, m. *honeysuckle*
Giroflée, f. *gillyflower*
Jasmin, m. *jessamine*
Lis, m. *lily*
Marguerite, f. *daisy*
Mauvaise herbe, f. *weed*
Myrte, m. *myrtle*
Œillet, m. *pink*

Flowers, &c.

Ortie, f. *nettle*
Pavot, m. *poppy*
Pensée, f. *forget-me-not*
Pied d'alouette, m. *larkspur*
Primevère, f. *cowslip*
Rose, f. *rose*
Tournesol, m. *sunflower*
Tulipe, f. *tulip*
Violette, f. *violet*

XIII.—Oiseaux.

Aigle, m. *eagle*
Aile, f. *wing*
Alouette, f. *lark*
Autour, m. *hawk*
Autruche, f. *ostrich*
Bec, m. *beak*
Bécasse, f. *woodcock*
Bécassine, f. *snipe*
Bergeronnette, f. *wagtail*
Caille, f. *quail*
Canard, m. *duck*
Canari, m. *canary-bird*
Chardonneret, m. *goldfinch*
Chauve-souris, f. *bat*
Cigogne, f. *stork*
Colombe, f. *dove*
Corbeau, m. *raven*
Corneille, f. *crow*
Coucou, m. *cuckoo*
Cygne, m. *swan*
Dindon, m. *turkey*
Faisan, m. *pheasant*

Birds.

Geai, m. *jackdaw*
Grive, f. *thrush*
Héron, m. *heron*
Hirondelle, f. *swallow*
Linotte, f. *linnet*
Merle, m. *blackbird*
Oie, f. *goose*
Oiseau de proie, m. *bird of prey*
Paon, m. *peacock*
Passereau, m. *sparrow*
Perroquet, m. *parrot*
Perdrix, f. *partridge*
Pie, f. *magpie*
Pigeon, m. *pigeon*
Poule, f. *hen*
Poulet, m. *chicken*
Roitelet, m. *wren*
Rossignol, m. *nightingale*
Rouge-gorge, m. *redbreast*
Serin, m. *canary-bird*
Tourterelle, f. *turtle-dove*
Vautour, m. *vulture*

XIV.—Quadrupèdes.

Agneau, m. *lamb*
Blaireau, m. *badger*
Castor, m. *beaver*
Cerf, m. *stag*
Chamois, m. *chamois, wild-goat*
Chèvre, f. *goat*
Chevreuil, m. *roebuck*
Ecureuil, m. *squirrel*
Furet, m. *ferret*
Hérisson, m. *hedgehog*
Lapin, *rabbit*

Quadrupeds.

Lièvre, m. *hare*
Lion, m. *lion*
Loup, m. *wolf*
Mule, f. *mule*
Ours, m. *bear*
Poulain, m. *colt*
Pourceau, m. *hog, swine*
Renard, m. *fox*
Singe, m. *monkey*
Taupe, f. *mole*
Tigre, m. *tiger*

XV.—Poissons.

Anguille, f. *eel*
Baleine, f. *whale*
Brochet, m. *pike*
Carpe, f, *carp*
Chevrette, f. *shrimp*
Ecrevisse, f. *crayfish*
Esturgeon, m. *sturgeon*
Hareng, m. *herring*
Hareng saur, *red herring*
Homard, m. *lobster*

Fishes.

Merlan, m. *whiting*
Morue, f. *codfish*
Perche, f. *perch*
Requin, m. *shark*
Saumon, m. *salmon*
Sole, f. *sole*
Tanche, f. *tench*
Tortue, f. *turtle*
Truite, f. *trout*
Turbot, m. *turbot*

XVI.—Insectes, &c.

Abeille, f. *bee*
Araignée, f. *spider*
Chenille, f. *caterpillar*
Cigale, f. *grasshopper*
Couleuvre f. *adder*
Grenouille, f. *frog*
Guêpe, f. *wasp*
Lézard, m. *lizard*
Limaçon, m. *snail*
Mouche, f. *fly*
Papillon, m. *butterfly*
Puce, f. *flea*

Insects, &c.

Cousin, m. *gnat*
Crapaud, m. *toad*
Escarbot, m. *beetle*
Fourmi, f. *ant*
Grillon, m. *cricket*
Punaise, f. *bug*
Sangsue, f. *leech*
Sauterelle, f. *locust*
Serpent, m. *serpent*
Teigne, f, *moth*
Ver, m. *worm*
Vipère, f. *viper*

XVII.—Outils.

Alène, f. *awl*
Balance, f. *scale*
Bêche, f. *spade*
Brosse, f. *brush*
Brouette, f. *wheelbarrow*
Cachet, m. *seal*
Carabine, f. *rifle*
Charrue, f. *plough*
Chevalet, m. *easel*
Cire, f. *wax*
Cognée, f. *hatchet*
Colle, f. *glue*
Compas, m. *compasses*
Echafaudage, m. *scaffold*
Echelle, f. *ladder*
Enclume, f. *anvil*
Etau, m. *vice*
Faucille, f. *sickle*
Faux, f. *scythe*
Fléau, m. *flail*
Fusil, m. *gun*

Tools.

Hache, f. *ax*
Hameçon, m. *fish hook*
Herse, f. *harrow*
Houe, f. *hoe*
Ligne, f. *line*
Lime, f. *file*
Meule, f. *grindstone*
Pain à cacheter, m. *wafer*
Pelle, f. *shovel*
Pince, f. *crowbar*
Pinceau, m. *brush, pencil*
Poulie, f. *pulley*
Rabot, m. *plane*
Rouleau, m. *roller*
Sablière, f. *sand-box*
Scie, f. *saw*
Serrure, f. *lock*
Tenailles, f. p. *pincers*
Truelle, f. *trowel*
Vis, f. *screw*

LESSONS IN NATURAL HISTORY.—No. I.

ANIMALS are among the earliest objects of interest to man even in infancy; the names given to them by children are included among the first sounds to which they give utterance; pictures of animals, and books relating to them, are in great request then, as they frequently are in after days; and the feeling which they excite is not only general, but lasting. We therefore commence, in this number, a series of papers on natural history.

The first grand division of the animal kingdom is that of VERTEBRATE *(jointed)* animals,—namely, those which are distinguished by a skeleton, or bony framework, which gives to the body solidity and support. The body of these animals is composed of a head, trunk, and limbs. The head consists of the skull, enclosing and defending the brain; and of the face, which includes the senses of sight, hearing, taste, and smell. The head rests on, or is attached to, the vertebral column; composed of a number of moveable bones, and serving as a canal for the spinal marrow. The limbs are in pairs, and never exceed four; but sometimes one pair, and at others both are wanting. The blood is always red.

The first class of this grand division is formed of MAMMALIA *(giving suck)*,—namely, the animals that suckle their young; a class of animals most interesting in themselves, and most essential to our immediate welfare. As this class contains groups of animals, presenting common agreements in form and structure, and common dissimilarities form other groups, they are thrown into sections which are called *orders*. As, too, in each order thus constituted there are numerous but minor points of difference by which various classes may be mutually distinguished, they are separated into *genera (races)*; these genera include *species*, each having some special characteristic. According to this arrangement, then, we proceed with our lessons in a most attractive and instructive department of science.

THE LION.

[The lion belongs to the *order* CARNIVORA, or *flesh-eating* animals; and to the *genus* FELIS, or *the cat tribe*.]

In ancient times the lion was common in Syria and the adjacent country, as well as in the mountains of Macedonia and Thrace; but as population increased, and civilisation advanced, his range became greatly contracted. From Greece, as well as from the whole of Asia Minor, which once were alike exposed to his ravages, he has been utterly dislodged and extirpated. In the sandy deserts of Arabia, and in some of the wilder jungles of Hindostan, he still maintains a precarious footing; while in Africa, where his tribe are most

numerous, he has been driven from the coast, and roams only in places occasionally visited by the traveller and the hunter, and where the colonist has yet to pitch his tent as the precursor of a more stable dwelling.

In contemplating, then, this noble animal, let us first look at him *at home*—the circumstances in which he is portrayed in the engraving.

His general form is stronger in front than the proportions of animals of the same genus; his chest is broad, his shoulders are capacious, his neck is thick, his forelimbs are remarkable for their strength and firmness, and the jaws exhibit a corresponding power. His mane is long, rank, and shaggy, sometimes sweeping the ground, and has a very dark or a golden-yellow hue. The mane is not attained by the lion until he has reached his third year. At first it is of a yellowish colour; in the prime of life, it acquires its blackness; and when the animal has numbered many years, though still in the enjoyment of power, it assumes a yellowish grey, or pepper-and-salt colour. The mane and the tuft at the end of the tail pitch when two or three strange troops of lions approach a fountain, to regale themselves at the same water. Commonly, however, the sighing moans commence as the shades of evening are spreading over the forest; the roaring continues during the night; and when the morning is bright and sunny, it has been heard until nine or ten o'clock. During the day, the lion lies concealed beneath the shade of some spreading tree, or wide-stretching bush, either in the level forest or on the mountain side; he likes, also, the vegetation that fringes the banks of rivers, nor is he less partial to the lofty reeds, or the long, rank, yellow grass, which grows freely in low-lying valleys.

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The lion has often been seen *at home* in different parts of the United Kingdom. At a distant period in the history of this country, curious animals presented to the sovereign, were

committed on their arrival to the Tower of London, where they remained under the charge of a keeper, specially appointed to that office. Lions and leopards are supposed to have been the only beasts kept there for many ages, except a white bear and an elephant, in the reign of Henry III. Within the memory of the fathers of the present generation, one of the fool-games of the first of April was to send persons not over-burdened with sagacity, "to see the lions washed at the Tower." Menageries have since presented such quadrupeds to public view in greater variety; and the Zoological Gardens, to which many royal presents have been transmitted, afford every advantage for inspecting these noble animals. In such circumstances, the cubs have been visited by thousands, as well as the lion and the lioness. For the first month they are easily reared and remarkably playful; but at the shedding of their milk-teeth many of them have been lost. Their strength soon unfits them for playmates, and their dangerous qualities are not slow in appearing. In one of the menageries, they exhibited, for a short time, all the playfulness of kittens, but to show his teeth, and in other ways to do what was required, he appeared perfectly aware of what he had to do, and walked composedly round, when two young men, in fancy dresses, entered the spacious cage. He was now made to jump over a rope held at different heights; next through a hoop and a barrel, and again through these covered with paper. All this he did freely, compressing himself to go through the narrow space, and alighting gracefully. Other feats were required of him which he evidently disliked, but with some coaxing he went through them. When even his food was taken away the only resistance was a short clutch and a growl; but his countenance had lost its previous serenity, and the spectators who were surprised at his allowing himself to be tampered with thus far, felt, naturally enough, some anxiety as to the consequences.

Let us now consider the lion in far different circumstances; for in his native plains or forests, he leaves his home at night; and more especially does he prowl *abroad* during nocturnal tempests, amidst the intense lightnings that flash and glare

THE LION ABROAD.

there was a sufficient warning of evil when a cardina. grosbeak was dragged between the wires of their cage and devoured in the temporary absence of their nurse. In their riotous play, the unintentional protrusion of their claws produced sensations that proved the power would soon be possessed to tear, and that severely, whatever they pleased.

Nero, a lion of Wombwell's, was of a remarkably mild disposition, and allowed his keeper to take every liberty with him. Strangers were frequently admitted into his den, and he even allowed them to sit and ride on his back. He preserved a look of magnanimous composure during these performances, and when a new visitor entered or left his den, he would merely look round. Since that time, a morbid curiosity has been gratified by the feats of those who have styled themselves "lion-kings;" the fearful death of the "lion queen," which occurred not long ago, suggests an impressive lesson against all such darings of an unwarrantable and unwise temerity.

A lion, seen in a travelling menagerie at Amsterdam, displayed extraordinary docility. After being pulled about, made around, and the rain that descends in torrents. Other animals are thrown into confusion and disorder by the conflicting elements, but they seem to give to him a courage and daring which, at other times, he seldom displays.

For the pursuit and capture of prey he is peculiarly prepared. The vision of the eyes which glow like balls of fire, is fully adapted to the chase. As the opening of the ear is directed both forwards and outwards, the power of hearing is perfect. Each of the long, stiff hairs of his whiskers is connected with the nerves of the lip, serving as organs of touch, and indicating any obstacle that may present itself to the passage of the body through narrow places. The sole of each of his four paws is padded with a soft spungy cushion of fat; while there is a similar but smaller one on the base of each toe, that his tread may be so noiseless as not to disturb the quick-eared prey, and that when he falls on it there may be no jar or concussion of his body. At play with his mate or his cubs, he uses an unarmed paw, which the upper engraving exhibits, showing one of the toes with the claw sheathed, the hair being

a little thrown back, so as to leave the point visible, which would otherwise be quite covered. But it becomes a formidable weapon when the claw is unsheathed, as in the act of

THE LION'S CLAW, SHEATHED AND UNSHEATHED.

striking, as it is represented in the lower engraving, for by a single blow the lion can rip up the side of a horse or a buffalo. The engravings show also the pads with which the toes are furnished; and as, to preserve the points of the claws constantly sharp, it is necessary they should not rub on the surface of the ground, they are always directed with their points upwards, and sunk in the hair on the upper surface of the toes. The bones of the fore-limbs are remarkable for their strength and firmness, and the muscles are singularly large and dense. Those of the jaws and neck are equally powerful. The upper surface of the tongue is covered with sharp and strong points, and there are teeth to cut as well as to crush.

The lion has no objection, as he roams abroad during the night, to feast on a banquet already provided, when various game quadrupeds have fallen by the bullets of the hunter's rifle. But, commonly, he provides his own meal, preying on reptiles, and on the larger varieties of antelopes; attacking the zebra, a favourite object of his pursuit; and frequently attending the vast herds of buffaloes, that he may prove at pleasure a match for one of these animals, which, in size and strength, greatly surpass the most powerful breed of English cattle.

The celebrated traveller, Mungo Park, passed a lion with impunity, but it was during the day; the animal was then reposing at his ease, and had probably satiated his appetite during his nocturnal rambles. Another traveller, Mr. Burchell, says, "While all of us were lying in the waggons, the dogs commenced a barking and howling; the whole of the oxen suddenly made efforts to get loose, and began to express that kind of uneasiness which, in a very intelligible manner, told us that a lion was not far off. He continued prowling round us till midnight; but his fears to encounter men were the only obstacle to prevent his carrying off his prey, and, finding it thus too strongly protected, he at last withdrew." Of the fatal success of the lion's attacks, there are, unhappily, many instances. In ancient times, he appears to have been employed as the public executioner. The case of Daniel in the lions' den is well known; as well as the fate of those who acted as spies on his conduct. Rapid must have been their execution, when "the lions had the mastery of them, and brake all their bones in pieces or ever they came at the bottom of the den."

FEMALE EDUCATION.—No. II.

By Elisa Meteyard.

IMPROVEMENT OF THE MIND.

Few young girls now begin their work in the factory, the warehouse, or the shop without some knowledge, at least, of reading, if not of writing. I will, therefore, presume that they can read, for without this elementary key to knowledge, mental improvement, at least from books, is impossible. If, however, such is unfortunately not the case, and the young girl is fifteen or sixteen years of age, let her at once set about acquiring this invaluable power by attending some respectable evening school, if she work in a factory or warehouse; or if in a shop, where the hours are late, by going to a Sunday-school regularly each Sabbath. Or some friend or young companion may be able to teach her; but at any rate let means be taken to give daily food to the mind as well as to the body.

Thus being able to read, and I will say to write, a world of power to good or evil rests in a young girl's hands. She may, if only ordinarily diligent, carry on her mental improvement to a great extent, or she may, if only a reader of the low, pernicious fictions of the cheap press, live to lament that any ignorance that was hers, was ever broken by such a simple thing as the knowledge of the alphabet. I speak of this matter in the first place, and this emphatically, because I am well aware to how great an extent this vile trash of fiction circulates in the manufacturing towns, and amongst the operative classes; because I have all an educated woman's abhorrence of what tends to corrupt the minds of the young; and because I well know from much which has been confided to me, and from much which I have read, the inevitable evils which take their rise in young minds from a continuous perusal of this debasing literature. There are no such scenes in nature as it paints; no such men and women as its heroes and heroines, except amongst the most debased and vile; no such queens and countesses, lords and ladies, as it draws; no human beings of ordinary intelligence speaking such language as its personages speak; and rarely in the round of human interest, startling and often strange as things are, do such murders, such seductions, such plots, and such crimes happen as fill its execrable pages. Mind, I do not object to fiction, for I know its worth when pure, and the charm it has for the young; but I do say to all young women who may read these pages, avoid this class of fiction as you would the gin-shop or a disreputable acquaintance, for its power to contaminate is as great, or even greater; and whilst there is so much that is interesting and pure in literature of this kind, pass by the common novel, as you would any other undoubted form of evil. And let not its ghastly woodcuts, its improbable narrations, its detestable advice in regard to marriage and courtship, have the least charm for your eye or ear. Of what is pure in literature I will presently speak.

Of time for mental improvement I must say a word. I am not amongst those who ask impossible things of the operative classes, or forget that rest and amusement are naturally sought for, after a hard day's labour. But indeed that, which is a happy law in nature, change of occupation is often equivalent to rest, and they who have worked all day with their hands usually find, if it be not too severe, or too protracted, an intense degree of pleasurable repose in mental occupation, just as the intellectual classes find a ride or walk restoring and refreshing after a long morning's study. But beyond some small amount of reading or preparation of a brief lesson, the leisure that the dinner-hour gives ought scarcely to be used for the purposes of mental improvement. The labour of the morning has exhausted the body, and the process of digesting the noon-day meal calls still further upon its powers; it is, therefore, in the well-husbanded hours of the evening, when both mind and body have been refreshed by washing the person, by change or arrangement of dress, and by a cup of tea, that the young women of the operative classes should seek the self-improvement they can with ordinary diligence make theirs.

In the first place, I would say, let a young woman try to write a fair, open hand. I do not mean the angular, wire-drawn, disjointed writing some fond mothers of the middle classes call "*fashionable*," when they show off or praise their daughters' correspondence, but the natural handwriting of the individual, which, if left free in its cultivation, will always be full of character. Indeed, with the present facilities for self-improvement which exist, and with the leisure their hours of labour leave, I think that, with

few exceptions, every young woman of the operative class ought to write a fair hand, and spell well. Fifty years ago, most ladies spelt ill, and wrote badly, without exciting either surprise or comment; but now such things would be inadmissible in any one pretending to the character of a gentlewoman; and I hope the day is not far distant when general education will make it equally so in the young women of the operative classes. For when once persons have acquired the rudiments of penmanship, by the careful imitation of those large text copies which can be bought at any stationer's shop for a few pence, they may carry on their self-improvement to what degree they please; and the young woman who will be at the pains to write a single copy of one of these, well and carefully, each evening, will soon find a wonderful improvement, for it is the practice of large-hand that lays the foundation of freedom and grace in writing. The next step, when large-hand is thus written well, and a smaller one undertaken, should be to make short extracts into a copy-book from a book or newspaper. Such are usually written with grammatical precision, and the spelling is invariably good; so that a young woman would not only thus learn to spell well, but to use the style of those who, from habit and education, have been able to express their thoughts on paper with facility, and without mannerism or vulgarity. Of all methods of self-help, I know none comparable to this, especially when habit and facility are so far advanced as to enable the copyist to condense the material into a few lines, and in her own language, so that it thus becomes, what is called by lawyers and students, 'note-taking.' In this way, grammar and correct spelling are not only acquired, but a precision given to remembered facts and habits of thought which become invaluable.

It is not in my province here to more than mention grammar and arithmetic as branches of knowledge it is desirable all should acquire,—there are departments of this work especially devoted to them as studies,—but this much I will say that the study of grammar, if properly undertaken by those who teach and those who learn, is far from being the repulsive and difficult thing many consider it; for if we begin by exercising thought and investing our study with a reality that may be easily made to belong to it, we become interested in our mental search and observation as we proceed, and what at first seemed abstract and difficult disappears. Thus I say, the *chair* on which I sit, the *table* at which I write, the *goodness* that I admire in my friend, are *nouns*, because they are objects which I can see, or which exist; the *strength* of my chair, the *height* of my table, the *greatness* of the goodness of my friend, put thus, as *strong* chair, *high* table, *great* goodness, are adjectives, because they express some, or add some, quality to the nouns; and when I further say my strong chair *stands*, my high table *shakes*, the goodness of my friend *is rewarded*, I show verbs, because I speak of something belonging to these nouns which is, or does, or exists. Next to grammar arithmetic is invaluable; for besides its great use in relation to domestic matters, especially to those of the operative classes who have much dealing with small shops and in small purchases, its acquirement and use train certain faculties in a woman's mind, which by a curious physical law are often reflected in the capacity of her children, and in their power to easily acquire notions of quantity and form, to say nothing of a woman's value when she can assist her husband, her father, her brother, or her employers in calculations connected with work or wages.

LESSONS IN LATIN.—No. V.

By John R. Beard, D.D.

NOUNS, SUBSTANTIVE AND ADJECTIVE.—*Continued.*

We pass on to the third declension. In the third declension we find, in the nominative case, so great a variety of terminations, that we must endeavour to arrange the nouns in certain classes. The genitive singular, however, is the characteristic case. And the genitive singular ends in *is*.

Before classifying these nouns, I must give you some explanations. *Parisyllabic* is a word I have to use. It consists of
1 2 3
three words, which I will mark thus *pari syl lab(ic)*, of these the two latter are of Greek origin. The former is Latin. As the word is thus made up of terms from two languages, it is a sort of hybrid. Number 2 signifies *with*; number 3 signifies *taken*; the *ic* is merely the termination. If you put 2 and 3 together you have *syllab*, which with the termination *bis* makes *syllable*. A syllable then is so much of sound as may be taken or uttered at once. Number 1 means *equal* (*pari* found in the English *par* and *pair*); *parisyllabic*, then, signifies that which is *equal in its syllables*; and nouns are called parisyllabic which have the same number of syllables in all the cases of the singular number. I say of the singular number because the plural of all nouns is not parisyllabic, inasmuch as the genitive plural, as in the cases of *arum* and *orum*, has a syllable more than the other cases. Now nouns which have in the genitive singular a syllable more than they have in the nominative singular are called *imparisyllabic*. In this word, as here given, you find an additional syllable, namely *im* from *in*, the *n* becoming *m*, before the *p*, which signifies *not*. *Imparisyllabic* then is *not-parisyllabic*; and the words denote those nouns which in the genitive sing. have not the same number of syllables as they have in the nominative. Piscis, *a fish*, is parisyllabic; for in the genitive it is *piscis*, having two syllables as in the nominative. But cantor, *a singer*, is imparisyllabic, for in the genitive it is *cantoris*, having three syllables, whereas the nominative has but two. Here then we have one distinction,—namely, nouns of the third declension are either parisyllabic or imparisyllabic.

Now, inquiry has shown that *parisyllabic* nouns have a *vowel* stem, and *imparisyllabic* nouns a *consonant* stem; that is, that the stem of the former ends in a vowel, and the stem of the latter ends in a consonant. Of the stem of a noun and a verb, I have already said something. It is better to repeat than not to be understood. Take nubes, *a cloud*, and form the genitive; the genitive is *nubis*. You get the stem by cutting off the sign of the genitive, which in this case is *s* (as in the English *cloud, cloud's*). You thus obtain *nubi*. *Nubi* has two syllables, the same as the nominative *nubes*. It is therefore parisyllabic, and ends in a vowel. Take also *dolor*, grief; genitive, *doloris*. Cut off *is*, the sign of the genitive, and you obtain *dolor*. *Dolor* ends, you see, in a consonant, and is a consonantal stem. The word is also imparisyllabic, because it increases in the genitive singular. Imparisyllabic nouns, then, have consonantal stems. In this case the stem and the nominative are the same, both being *dolor*. But in nomen, *a name*, genitive *nominis*, stem *nomin*, the nominative and the stem are unlike. Of consonantal stems, then, there are two classes; first, those of which the stem is identical with the nominative; second, those in which it is different. The consonants in which the stem terminates are—

c.	g.	t.	d.	p.	b.	mutes
l.		m.	n.	r.		liquids
s						the sibilant

From these stems the nominative is formed with or without the addition of *s*. An instance of the formation of the nominative with the addition of *s*, is found in nom. rex, *a king*, gen. regis, stem *reg*, add *s* and you have *regs*, which is pronounced *rex*. An instance of the formation of the nominative without the addition of *s* you find in nom. leo, *a lion*, gen. leonis, stem, *leon*, shortened into *leo*.

Third Declension.—Sign *is*.

Case-endings.

Cases.	*Singular.* M. F. or N.	*Cases.*	*Plural.* M. and F.	N.
Nom.	(various)	Nom.	ēs	Ă or Ĭă
Gen.	Ĭs	Gen.	ŭm or ĭum	ŭm or ĭum
Dat.	Ī	Dat.	ĭbŭs	ĭbŭs
Acc.	ĕm	Acc.	ēs	Ă or Ĭă
Voc.	(like the nom.)	Voc.	ēs	Ă or Ĭă
Abl.	ĕ or Ī	Abl.	ĭbŭs	ĭbŭs

The genders of the nouns of the third declension may be stated thus, though the rules are not without exceptions: First, nouns ending in *o*, *or*, *os*, *er* and imparisyllabics in *es*, are masculine; second, nouns ending in *as*, *is*, *aus*, *us* (gen. *ūtis* or *ūdis*) and *s*, and those which end in *s* blended with the preceding consonant, as well as parisyllabics in *es*, are feminine; third, nouns ending in *a*, *e*, *o*, *l*, *en*, *ar*, *ur*, *ut* and *us* (gen. *ŏris*, *ĕris*, *ăris*,) are neuter. By practice, you will in time become familiar with these somewhat complex facts.

I proceed to set down specimens in classes.

I. Class, nouns with consonantal stems; imparisyllabic.

1.—Without the termination *s*.

i. the stem and the nominative are the same; stems end in *r* and *l*. Thus, nom. dolor; gen. doloris; stem, *dolor*.

Masculines.

Examples.

Cases.		Singular.	
Nom.	dolor, *grief*	anser, *a goose*	pater, *a father*
Gen.	dolōris, *of grief*	anseris, *of a goose*	patris, *of a father*
Dat.	dolori, *to grief*	anseri, *to a goose*	patri *to a father*
Acc.	dolorem, *grief*	anserem, *a goose*	patrem, *a father*
Voc.	dolor, *O grief*	anser, *O goose*	pater, *O father*
Abl.	dolore, *by grief*	ansere, *by a goose*	patre, *by a father*
Cases.		Plural.	
Nom.	dolores, *griefs*	anseres, *geese*	patres, *fathers*
Gen.	dolorum, *of griefs*	anserum, *of geese*	patrum, *of fathers*
Dat.	doloribus, *to griefs*	anseribus, *to geese*	patribus, *to fathers*
Acc.	dolores, *griefs*	anseres, *geese*	patres, *fathers*
Voc.	dolores, *O griefs*	anseres, *O geese*	patres, *O fathers*
Abl.	doloribus, *by griefs*	anseribus, *by geese*	patribus, *by fathers*

Neuters.

Cases.		Singular.	
Nom.	guttur, *a throat*	calcar, *a spur*	animal, *an animal*
Gen.	gutturis, *of a throat*	calcaris *of a spur*	animālis *of an animal*
Dat.	gutturi, *to a throat*	calcari, *to a spur*	animali, *to an animal*
Acc.	guttur, *a throat*	calcar, *a spur*	animal, *an animal*
Voc.	guttur, *O throat*	calcar, *O spur*	animal, *O animal*
Abl.	gutture, *by a throat*	calcari, *by a spur*	animali, *by an animal*
Cases.		Plural.	
Nom.	guttura, *throats*	calcaria, *spurs*	animalia, *animals*
Gen.	gutturum, *of throats*	calcarium, *of spurs*	animalium, *of animals*
Dat.	gutturibus, *to throats*	calcaribus, *to spurs*	animalibus, *to animals*
Acc.	guttura, *throats*	calcaria, *spurs*	animalia, *animals*
Voc.	guttura, *O throats*	calcaria, *O spurs*	animalia, *O animals*
Abl.	gutturibus, *by throats*	calcaribus, *by spurs*	animalibus, *by animals*

Here observe, that as in the neuter nouns of the second declension, the neuter nouns of the third declension have in both the singular and the plural, three cases alike,—namely, the nominative, the accusative, and the vocative. In animal, the nominative plural is *ia*, instead of *a*. This is owing to its being originally from a vowel stem, as nominative animal, genitive animali*s*, stem, animali.

Vocabulary.

Color, colōris, m. *colour*; odor, odōris, m. *odour, smell*; rumor, rumōris, m. *report*; error, errōris, m. *error*; agger, aggĕris, m. *a mound* or *dam*; passer, passĕris, m. *a sparrow*; frater, fratris, m. *a brother*; mater, matris, f. *a mother*; fulgur, fulgŭris, n. *lightning*; pulvinar, pulvināris, n. *a cushion*; vectigal, vectigālis, n. *a tax*; est mihi, *I have*, used with the noun as nom. to *est*; thus, guttur est mihi, *I have a throat*; so in the plural, guttura sunt nobis, *throats are to us*) *we have throats*; in the same way, guttur est tibi (*a throat is to thee*) *thou hast a throat*; guttur est illi (*a throat is to him*) *he has a throat*; guttura sunt vobis (*throats are to you*) *you have throats*; guttura sunt illis (*throats are to them*) *they have throats*; observe that mihi, means *to me*; tibi, *to thee*; illi, *to him*; nobis, *to us*; vobis, *to you*; illis, *to them*.

Exercises—Latin-English.

Magnus dolor est mihi; non ne tibi est magnus dolor? sunt magni dolores matribus; color pulvinaris pulcher est; est ne pulcher pulvinaris color; funestus error est illi; cur funesti errores sunt patri? frater est mihi; fratribus sunt magni dolores; fulgura terrent animalia; non ne matres terrent fulgura? fulgura terrent passeres.

English-Latin.

I have a spur? hast thou a goose? they have geese; have you a mound? the odour of the lightning is on the cushion; I do not like (diligo) taxes; rumours are troublesome; have they a pillar? they have not a goose; you have a father, a brother, and a mother; they have griefs; thou hast a great cushion.

ii. the stem and the nominative are different; stem in *n* and *s*.

Masculines and Feminines.

Cases.		Singular.	
Nom.	leo, *a lion*	homo, *a man*	vomis, *a ploughshare*
Gen.	leonis, *of a lion*	hominis, *of a man*	vomĕris, *of a ploughshare*
Dat.	leoni, *to a lion*	homini, *to a man*	vomeri, *to a ploughshare*
Acc.	leonem, *a lion*	hominem, *a man*	vomerem, *a ploughshare*
Voc.	leo, *O lion*	homo, *O man*	vomer, *O ploughshare*
Abl.	leone, *by a lion*	homine, *by a man*	vomere, *by a ploughshare*
Cases.		Plural.	
Nom.	leones, *lions*	homines, *men*	vomeres, *ploughshares*
Gen.	leonum, *of lions*	hominum, *of men*	vomerum, *of ploughshares*
Dat.	leonibus, *to lions*	hominibus, *to men*	vomeribus, *to ploughshares*
Acc.	leones, *lions*	homines, *men*	vomeres, *ploughshares*
Voc.	leones, *O lions*	homines, *O men*	vomeres, *O ploughshares*
Abl.	leonibus, *by lions*	hominibus, *by men*	vomeribus, *by ploughshares*

Neuters.

Cases.		Singular.	
Nom.	corpus, *a body*	nomen, *a name*	genus, *a race*
Gen.	corpŏris, *of a body*	nominis, *of a name*	generis, *of a race*
Dat.	corpori, *to a body*	nomini, *to a name*	generi, *to a race*
Acc.	corpus, *a body*	nomen, *a name*	genus, *a race*
Voc.	corpus, *O body*	nomen, *O name*	genus, *O race*
Abl.	corpore, *by a body*	nomine, *by a name*	genere, *by a race*
Cases.		Plural.	
Nom.	corpora, *bodies*	nomina, *names*	genera, *races*
Gen.	corporum, *of bodies*	nominum, *of names*	generum, *of races*
Dat.	corporibus, *to bodies*	nominibus, *to names*	generibus, *to races*
Acc.	corpora, *bodies*	nomina, *names*	genera, *races*
Voc.	corpora, *O bodies*	nomina, *O names*	genera, *O races*
Abl.	corporibus, *by bodies*	nominibus, *by names*	generibus, *by races*

In vomis, vomeris, *vomer*; corpus, corporis, *corpor*, and genus, generis, *genor*; the stems,—namely, *vomer*, *corpor*, and *genor* seem to end in *r*. The *r*, however, is only the representative of *s*, for between two vowels, as in corporis, the *s* by the laws of pronunciation passes into *r*. Thus, instead of corpus, corpŏis, we have corpŏris, the *s* being changed into *r* and the *u* into *o*. Similar changes take place in tellus (tellŭsis) tellūris, *the earth*; pulvis, pulvĕris, *dust*; mas, maris, *a male*; aes, æris, *brass*; flos, flōris, *a flower*.

Vocabulary.

Carbo, carbōnis, m. *charcoal*; pavo, pavōnis, m. *a peacock*; regio, regiōnis, f. *a region* or *district*; occasio, occasiōnis, f. *an opportunity*; cardo, cardĭnis, m. *a hinge*; ordo, ordĭnis, m. *order, series*; cinis, cineris, m. *ashes*; pulvis, pulveris, m. *dust*; decus, decŏris, n. *becomingness*; littus, littŏris, *a shore*; pectus, pectŏris, n. *a breast*; pignus, pignŏris, n. *a pledge*; carmen, carmĭnis, n. *a poem*; lumen, luminis, n. *light*; vulnus, vulneris, n. *a wound*; opus, operis, n. *work*.

Exercises—Latin-English.

Carbonem timeo; pavones ferit puer; pulchrae sunt regiones; occasio est tibi; movemus cineres; cardo movetur; ordinis decus delectat matres; magnus est pulvis cineris; in littore sunt pavones; carmina non sunt nobis; vulnus est in pectore; regionis magnum est lumen; illi est nomen magnum; pignora non laudantur.

English-Latin.

Dost thou fear charcoal? why does the mother strike the boy? they have no becomingness; thou hast a wound; thy fathers have wounds; wounds frighten mothers; poems flourish in the region; thou hast a great name; I have not a pledge; they have an opportunity; the man's opportunity is great.

2.—With the termination *s*.

Consonantal stems with the sounds *k (c)*, *t*, *p*.

Masculines and Feminines.

Cases.		Singular.	
N.	judex, *a judge*	comes, *a companion*	princeps, *a chief or prince*
G.	judicis, *of a judge*	comĭtis, *of a companion*	principis, *of a prince*
D.	judici, *to a judge*	comiti, *to a companion*	principi, *to a prince*
A.	judicem, *a judge*	comitem, *a companion*	principem, *a prince*
V.	judex, *O judge*	comes, *O companion*	princeps, *O prince*
A.	judici, *by a judge*	comite, *by a companion*	principe, *by a prince*
Cases.		Plural.	
N.	judices, *judges*	comites, *companions*	principes, *chiefs or princes*
G.	judicum, *of judges*	comitum, *of companions*	principum, *of princes*
D.	judicibus, *to judges*	comitibus, *to companions*	principibus, *to princes*
A.	judices, *judges*	comites, *companions*	principes, *chiefs or princes*
V.	judices, *O judges*	comites, *O companions*	principes, *O princes*
A.	judicibus, *by judges*	comitibus, *by companions*	principibus, *by princes*

Cases.		Singular.	
Nom.	rex, *a king*	lapis, *a stone*	urbs (*f*) *a city*
Gen.	regis, *of a king*	lapidis, *of a stone*	urbis, *of a city*
Dat.	regi, *to a king*	lapidi, *to a stone*	urbi, *to a city*
Acc.	regem, *a king*	lapidem, *a stone*	urbem, *a city*
Voc.	rex, *O king*	lapis, *O stone*	urbs, *O city*
Abl.	rege, *by a king*	lapide, *by a stone*	urbe, *by a city*

Cases.		Plural.	
Nom.	reges, *kings*	lapides, *stones*	urbes, *cities*
Gen.	regum, *of kings*	lapidum, *of stones*	urbium, *of cities*
Dat.	regibus, *to kings*	lapidibus, *to stones*	urbibus, *to cities*
Acc.	reges, *kings*	lapides, *stones*	urbes, *cities*
Voc.	reges, *O kings*	lapides, *O stones*	urbes, *O cities*
Abl.	regibus, *by kings*	lapidibus, *by stones*	urbibus, *by cities*

A few words of explanation may here be desirable. The Latin c represents the Greek g (gamma), and for the most part was pronounced like our *k*. Thus, the Romans pronounced Cicero, the name of their great orator, *Kikero*. Now the *x* in judex, is made up of these letters thus *judecs;* the *c* and *s* blending together to form *x*; hence, judec, judicis, judecs; in the genitive, the laws of pronunciation convert the *c* of the nominative into *i* in the genitive; as it does in comes, comitis. You thus see that the variations which words undergo are not arbitrary. Those variations depend on the nature of the letters that come together, and in their ultimate causes, on the structure of the organs of speech, as these organs are in each nation modified by natural endowments, by climate, by culture, &c.

The *b* in urbs, may be considered as equivalent to *p*, for *b* and *p* being labials, that is letters in pronouncing which the lips are chiefly used, are as letters of the same organ, interchangeable, or may be used the one for the other, under certain conditions.

Vocabulary.

Artifex, artificis, m. *an artist* or *artificer*; pollex, pollicis, m. *the thumb*; cervix, cervicis, *f. the neck*; lex, legis, *f. a law*; grex, gregis, m. *a flock*; miles, militis, m. *a soldier*; eques, equitis; m. *a horseman* or *knight*; seges, segetis, *corn-land*; aetas, aetatis, *f. age*; merces, mercedis, *f. a reward*; caelebs, caelebis, m. *a bachelor*; plebs, plebis, *f. the people*; (plebs has no plural), stirps, stirpis, *f. a race, stem.*

Exercises.—Latin-English.

Artifices debent pueros docere: pollicem movet rex; reges custodiunt leges; leges custodiuntur a regibus; filius pollicem mordet; equites vexantur; artifices ornant urbes; merces artificum nutriunt filios et filias; caelebs dormit; plebs defenditur; stirps artificis laudatur; est ne tibi seges? cervix militis laeditur; caelebis aetas magna est.

English-Latin.

I defend artists; artists are defended by me; has he a reward? he has not a flock; I am pricked in the neck; artists paint flocks; the laws of the kings are deadly; the corn-land of the horseman is yielded; why is the bachelor blamed? the people blame bachelors; soldiers have rewards; age teaches many things (multa).

LESSONS IN ENGLISH GRAMMAR.—No. VI.

NOUNS (*continued*).—CASE.

The term Case, as used in reference to grammar, in a general sense, means a *change in the form* of a noun, pronoun, &c.

By the *cases of nouns* is meant, the change which nouns undergo when they agree properly with other words which happen to be connected with them in the same sentence.

According to most grammarians, there are *three* cases of nouns in the English language; namely, the *nominative*, the *possessive*, and the *objective*.

I. The Nominative Case simply expresses *the name* of a person or thing; that person or thing which is *the subject* of a sentence, or of part of a sentence. In the sentences, *Charles learns quickly*; or, *Mary rises early*; or, *Thompson bound my books*; *Charles*, *Mary*, and *Thompson* are the nominatives, they being *the names* of persons about whom we speak.

The nominative case of a noun is its ordinary form, whether singular or plural; as, *the prince was there*; or, *the princes were there*. The nominatives of pronouns (that is, of words used instead of nouns), are *I, thou, he, she, it, we, ye, you, they, who*. These words, and all nouns, can be used as subjects of sentences. The nominative case may be regarded as the *radical*, or original form of the noun or pronoun.

In examining the form of a sentence, the chief point is to find out the nominative case. And in order that a learner may be able to tell quickly what is the subject in any sentence, or part of a sentence, it will be well to examine a number of sentences, beginning, of course, with those that are short and easy. The nominative may be known by asking the question, *who*, *which*, or *what?* For example: in the sentence, *bees make honey*; ask, *who* make honey? answer, *bees*; therefore *bees* is the nominative. Try another sentence; *the book is mine*; ask, *what* is yours? answer, the *book*; the *book*, therefore is the nominative, that being the thing about which you speak.

Sometimes an infinitive mood (which will be explained in future lessons), answers as the nominative case to the verb; as, *to be industrious is praiseworthy*. Now apply the rule, just given, to this sentence, ask, *what* is praiseworthy? answer, to be industrious; then *to be industrious* is the nominative. Sometimes a sentence supplies the place of the nominative; as *the habit of rising early conduces to health*, ask, *what* conduces to health? answer, *the habit of rising early;* this, therefore, is the nominative.

In the following sentences the word forming the nominative is printed in *italic* letters;—*Charles* gets on nicely; *Mary* fell down; *he* was wet through; *she* wore her new gown; *we* will go together; *it* was placed on the shelf; *you* are wise; *they* came to dinner. In such sentences as these the nominative may be easily found; but in the course of your reading you will meet with words which so nearly resemble *verbs*, that you may be a little puzzled. Take the following sentence from Shakspeare as an example:—"*To gild refined gold—is wasteful and ridiculous excess:*" now, to *gild*, is evidently the subject in this sentence, and it will strike you that to *gild* is a verb. But if you call to mind what we said in a former lesson about nouns, namely, that some of them are derived from verbs, and that a noun may be the name of an *action*, or *state of being*,—your difficulty will be removed, and you will see that "*to gild refined gold*" is the subject of the sentence, and therefore the nominative.

Remember further, *first*, that there is always some *verb* which follows, or is joined with, the nominative: hence grammarians say, "The verb must agree with its nominative case." In the sentences,—*man* is an animal; the *wolf* broke into the fold; the *year* rolls round; *she* sits as a queen among the nations; *it* works well for the people; you may observe that the *verbs*, *is*, *broke*, *rolls*, *sits*, *works*, all agree with the subject of the sentences, or the nominative. *Secondly*, bear in mind, that the nominative is almost always placed before the verb, and, generally, immediately before it. In some compositions, however, and especially in poetry, or in prose, the style of which is poetic, the verb is placed first; as, "*Comes he* to mock at our solemnities?"—"*Pleads he* in earnest?" "Riding upon a white palfrey, *Sir Hugo was seen* approaching":—the verb and the nominative in these sentences are the words printed in italics.

II. The Possessive Case of nouns—as indeed you may judge from its name—implies property, ownership, or *possession;* it denotes the condition of any person or thing that has possession of something else; as, that saw is *Richard's;* this is *Mary's* shawl; where are the *child's* shoes? a *cat's* paw; a *ship's* rudder. It will be easily seen from these sentences, that the same meaning as that for which we use the possessive case, may be expressed by the words *of*, or *belonging to;* as, the rudder *of* a ship; the paw *of* a cat; the shoes *belonging* to the child; the shawl *owned* by Mary; the saw the *property* of Richard. When we speak of the head of Victoria stamped on a shilling, we may either say, this is the likeness *of* the queen, or, this is the *queen's* likeness.

To denote the possessive case it is usual to add an *apostrophe*, that is a comma placed thus ', after the last letter of the noun, and then the letter *s* at the end, as in the sentences above, and in the word *queen's*. There are, however, exceptions to this practice; to plural nouns ending with the sound of *s*, and some singular nouns ending with that sound, the apostrophe (') without the *s* is added to form the possessive case; as, *angels'* visits, meaning the visits of angels; or, the *horses'* bridles were mislaid, meaning the bridles of more than one horse. In singular nouns ending in *s*, *ss*, or *nce* it is usual to add the apostrophe ' only; as, England's gracious queen; for righteousness' sake; for conscience' sake; for goodness' sake; the swallows' flight, &c. In ordinary writing, however, the same idea may better expressed by using the preposition *of;* as, the flight *of* the swallow; the gracious queen *of* England, &c.

When the singular ends in *s*, most writers follow the general rule, except in poetry and in reference to some abstract nouns; thus we say, the *witness's* evidence; the *princess's* jewels; *Charles s* shoes; *mistress's* dresses, &c.

After proper names ending in *s* or *s*, the *s* is sometimes omitted; as, in *Felix'* room; *Achilles'* wrath; *Hercules'* strength. This is common in poetry, but in prose it is unnecessary; it is quite as easy to say, the strength *of* Hercules, as it is to say, Hercules' strength. In old forms of devotion, many prayers conclude with the sentence, "For Jesus Christ *his* sake," it is much better to say, for the sake *of* Jesus Christ.

In sentences where several names are coupled together in the possessive case, the apostrophe ' and the letter *s* may be joined to the last of them, and omitted, though understood, from the others; as, *Thomas, William, and Samuel's pony*; but if any words come between, the sign ' is necessary; as, *Samuel's and William's, as well as Thomas's pony*. Remember that *s* with an apostrophe, thus *'s* always signifies *of*, and denotes possession or relation, as in the example before given, the *princess's* jewels; that is, the jewels *of*, or *belonging* to the princess.

The possessive cases of the *pronouns*, mentioned in the lessons on nominatives, are, *mine, thine, his, hers, its, ours, yours, theirs, whose*. Thus: this orange is *mine;* that book is *his;* yonder is *its* place; the blame is *theirs*; &c.

Be careful in writing not to fall into the absurd, though not uncommon, error, of putting *'s* to the plural number of nouns; as, *law's, virtue's, vice's*, &c.; nor to the third person of verbs; as, she *carry's* plenty of sails; instead of laws, virtues, vices, carries, &c. And be sure you never say or write *hisen, hern*, or *ourn*, instead of *his, hers*, and *ours*.

Our explanations and illustrations of the *Objective Case* of nouns, together with a few general remarks upon nouns, and some useful examples for exercise must be reserved for our next meeting. In the mean time let us find out how far you understand us by answering the following

QUESTIONS ON THE FOREGOING LESSON.

What is meant by the cases of nouns?
How many cases are there in English grammar?
What does the *Nominative* express?
What name do you give to that case which expresses the subject of a sentence?
Name the nominatives of pronouns.
How may the nominative case be known?
Which is the nominative in the sentence, "Bees make honey?"
Which in the sentence, "They came to dinner?"
Which in the sentence, "To gild refined gold is wasteful and ridiculous excess?"
What is said in this lesson about the verb and the nominative?
What does the *Possessive* case imply or signify?
Give some examples.
How is the possessive case denoted?
What is an apostrophe? and what does it signify or denote?
Which are the pronouns of the possessive case?
What vulgar errors in writing or speaking should you avoid in using possessive nouns?

LESSONS IN ARITHMETIC.—No. VI.

RULE OF SIMPLE MULTIPLICATION.

No one should attempt to begin the study and the practice of this rule, until he has made himself complete master of the *multiplication table*, given in page 37, No. III. This being learned, he may proceed to multiply any large number by any one of the nine digits. In order to explain the mode of performing this process, it will be necessary to recall to mind the definition of multiplication,—viz., that it is the process by which we find the sum of one number repeated *as many times*, as there are units in another number. Suppose, for instance, that we wished to know how much 8 times 32768 would come to; we know that if we put down the number 32768 *eight times*, successively in vertical or upright columns as in addition, and found the sum of these columns by that rule, we should have the answer or product required. Thus:—

32768	
32768	
32768	
32768	
32768	
32768	
32761	
262144	sum

Adding, as you see in the margin, we have the sum 262144 for the product of 32768 by 8. These considerations plainly suggest to us the following rule for the multiplication of large numbers by any one of the nine digits,—viz., 1, 2, 3, 4, 5, 6, 7, 8, 9.

Rule 1.—Write down the multiplicand, or number to be multiplied, and under its units' place or figure, place the multiplier or number of times you are to repeat the multiplicand; then draw a line. Find the product of the multiplier and the units' figure of the multiplicand, and if it consist of *units only*, place it under the line in the place of units; and proceed to find the product of the multiplier and the tens' figure of the multiplicand. But, if the product of the multiplier and the units' figure of the multiplicand should consist of *units and tens*, then put down under the line, the *units only* as before, and add the tens of this product to the product of the *tens'* figure of the multiplicand by the multiplier, which will consist of so many *tens*; this is called in the language of the schools, *carrying the tens* to the next figure, or rather product. If this next product should consist of *tens and hundreds*, then put down under the line the *tens* only in its proper place, and carry the *hundreds* to the product of the *hundreds'* figure of the multiplicand by the multiplier; but if it consist of *tens only*, then put it down as before. Again, if the product of the hundreds' figure of the multiplicand by the multiplier (increased or not, as the case may have required, by the *hundreds carried from the last product*), should consist of *hundreds and thousands*, then place under the line the *hundreds only* in its proper place, and carry the thousands to the next product. Proceed in the same manner, to find the products of the successive figures of the multiplicand by the multiplier, increasing them as they occur in order by the number of *tens carried* from the products immediately preceding them; inasmuch as *ten* of the rank in any one place in the product makes *one* of the rank in the next place of the product, according to the decimal scale of notation; this part of the process being exactly the same as that of *carrying the tens* in addition.

EXAMPLE 1.—Multiply 32768 by 8.

Factors.	Multiplicand	32768
	Multiplier	8
Product		262144

MODE OF OPERATION.

Here, beginning with the units' figure of the multiplicand, you say 8 times 8 are 64, that is 64 units, or 6 tens and 4 units. You therefore put down under the line, the 4 units in the proper place, and *carry* the 6 tens to the product of the tens' figure of the multiplicand; you then say 8 times 6 are 48, and to this product, which is 48 tens, adding (or *carrying*) the 6 tens, you have 54 tens; now 54 tens make 5 hundred and 4 tens; you therefore put down under the line the 4 tens in the proper place, and *carry* the 5 hundreds to the next product; you again say, 8 times 7 are 56, and to this product, which is 56 hundreds, you add the 5 hundreds *carried*, and you have 61 hundreds; now 61 hundreds make 6 thousands 1 hundred; you therefore put down under the line the 1 hundred in the proper place, and carry the 6 thousands to the next product. Proceed in this manner through all the figures of the multiplicand, obtaining their successive products by the multiplier, and *carrying* the highest figure of each product as it comes in order to the next product, until you come to the last figure, when you put down the last product in full without *carrying* its highest figure, this figure being then the highest figure in the whole product. By *highest figure* here, we mean the figure of highest value, or highest rank. The product is now obtained,—namely, two hundred and sixty-two thousand one hundred and forty-four.

In performing the preceding operation, the labour may be shortened by attending to a piece of practical advice, similar to what we gave under the rule of addition,—namely, to *look at* the multiplier and the successive figures in the multiplicand, without naming them, to name their product and the sum of this product and the figure *carried* (if there be any) from the preceding product; then to put down the units' figure of the sum and mentally carry the tens' figure. Thus, in the preceding example, the operation would be shortened as follows:—Looking at the multiplier 8 and the figures 8, 6, 7, 2, and 3, in succession, you say 64, and put down 4; 48, 54, and put down 4; 56, 61, and put down 1; 16, 22, and put down 2; 24, 26, and put down 26.

EXAMPLE 2.—Find the product of 7060080 by 6.

Factors.	Multiplicand	7060080
	Multiplier	6
Product		42360480

MODE OF OPERATION.

Here, beginning at the units' place of the multiplicand, the product of 0 and 6 is 0, you therefore put 0 in the units' place under the line. You then say 6 times 8 are 48, put down 8, and

carry 4; then, 6 times 0 being 0, put down the *carried* 4; again, the product of 6 and 0 being 0, put down 0, as nothing was *carried*, and proceed. Next say 6 times 6 are 36, put down 6 and *carry* 3; and the next product being 6 times 0, or 0, put down 3 in the next place of figures; lastly, say 6 times 6 are 36, and put down the complete product being the last in the operation. On the abridged process, above recommended, this operation would be very short; thus you say 0, and put down 0; 48, and put down 8; 0, 4, and put down 4; 0, and put down 0; 36, and put down 6; 0, and put down 3; 42, and put down 42.

EXERCISES.—1. Find the products of the number 142857 by the nine digits.

2. Find the products of the number 98998, the smallest number contained in the table in Exercise 4, page 64, No. 4, by the nine digits, and you will find these products in the same table.

3. 857142×9; 76876898×2; 101040060×7; 79806090×8; and 999999999999×5.

DEFINITION.—As the cipher or 0, denotes nothing by itself, and is only employed to keep the combinations of the other nine figures in any number, in their proper places according to their rank or value, it is called an *insignificant (not-meaning)* figure; but the nine digits are called *significant (meaning)* figures; yet when the cipher, or 0, occurs between any of the other figures, as in the numbers 206 and 3007, it is called, and reckoned by arithmeticians, as *significant;* but when it occurs at the end of any of the other figures, that is, on their right, it is called *insignificant*, as in the numbers, 90, 100, and 25000. Ciphers are never put at the beginning of other figures, except in decimal fractions, as shall be explained in future numbers of this work.

If the multiplier to any proposed multiplicand, happens to consist of any one of the nine digits, followed by one cipher or any number of ciphers, then multiply according to the following rule:—

Rule 2.—Place the multiplier under the multiplicand, so that the significant figure of the multiplier shall stand under the units' figure of the multiplicand; and multiply the successive figures of the multiplicand by the significant figure of the multiplier according to Rule 1, explained above. Then place the same number of ciphers in a line at the end of the product thus obtained, (that is, *on the right,*) as are contained in the multiplier. The reason of placing these ciphers at the end of the product, is in order that the significant figures of the product may be preserved in their proper places, according to the decimal scale of notation.

EXAMPLES: Multiply 123456789 by 90, and by 90000.

		(1)
Factors.	Multiplicand	123456789
	Multiplier	90
	Product	11111111010

		(2)
Factors.	Multiplicand	123456789
	Multiplier	90000
	Product	11111111010000

In the first of these examples, you multiply first by 9, according to Rule 1; you then annex (i.e., *join to*) to the product *one* cipher, because the multiplier contains *one* cipher, in order to preserve the product in its proper place, as the product of 9 *tens*. In the second example, you follow the same rule, but you annex to the product *four* ciphers, because the multiplier contains *four* ciphers, in order to preserve the product in its proper place, as the product of 9 *tens of thousands*.

EXERCISES: 1. Multiply 76854 by 80; 90763 by 700; and 142857 by 70000.

2. Find the following products: 98998×7000; 692986×80000; and 395992×7000000.

When the multiplicand consists of figures, both significant and insignificant, and the multiplier of one digit followed by ciphers, then multiply according to the following rule:—

Rule 3.—Place the multiplier under the multiplicand so that the significant figure of the multiplier shall stand under the first significant of the multiplicand, that is, the one nearest to the right hand, and multiply the successive figures of the multiplicand by the significant figure of the multiplier, according to Rule 1. Then place the same number of ciphers in a line at the end of the product thus obtained (that is, *on the right*), as are contained both in the multiplier and the multiplicand. The reason of this is, in order that the significant figures of the product may be preserved in their proper places, according to the decimal scale of notation.

EXAMPLES.—Multiply 78912345600 by 900; and 45608008000 by 70000.

		(1)
Factors	Multiplicand	78912345600
	Multiplier	900
	Product	71021111040000

		(2)
Factors	Multiplicand	45608008000
	Multiplier	70000
	Product	3192560560000000

In the first of these examples, you multiply by 9, according to Rule 1; you then annex to the product *four* ciphers, because the multiplier contains *two* ciphers, and the multiplicand *two* ciphers, in order to preserve the product in its proper place, as *tens of thousands*; for the multiplicand having *two* ciphers, expresses so many *hundreds* as the significant figures denote, and the multiplier expresses 9 *hundreds*; now, *hundreds* multiplied by *hundreds* produce *tens of thousands*; and this is manifest from the consideration, that ten times a hundred are ten hundreds or *a thousand*; and ten times a thousand, are *ten thousands*.

This operation might be further illustrated, by saying that 78912345600=789123456×100; and 900=9×100; therefore 78912345600×900=789123456×100×9×100=789123456×9×100×100=7102111104×10000=71021111040000. This illustration proceeds on two important principles: 1. That, *the product of any two or more numbers is equal to the continued (that is the successive) product of their factors*; and 2. *That the continued product of the factors of any number will be the same in whatever order they may be taken.* For the sake of younger readers, we shall give some simpler examples of the application of these principles. Thus, we know that the simplest factors of 12 are 2, 2, and 3; now 12 is produced from these factors by multiplication in any of the following ways: 2×2×3=12; or 2×3×2=12; or 3×2×2=12; here, 12 is the continued product of the three factors, taken either way. In like manner, if we had to multiply 18 by 10, we might separate 18 into its factors 3, 3, and 2; and 10 into its factors 2 and 5; and then multiply these factors in any order, thus 3×3×2×2×5=180; or, 3×2×3×2×5=180; or, 2×2×3×3×5=180; or, 5×2×2×3×3=180; and so on, as often as the numbers can be varied as to their position: in all these cases, the product of the factors will be equal to the product of the two numbers,—viz., 18×10=180.

ELUCIDATION OF THE PRECEDING REMARKS.

FACTORS OF 12.

	(1)	(2)	(3)
Multiplicands	2	2	3
Multipliers	2	3	2
Products	4	6	6
Multipliers	3	2	2
Continued Products...	12	12	12

FACTORS OF 18 AND 10.

	(1)	(2)	(3)	(4)
Multiplicands	3	3	2	5
Multipliers	3	2	2	2
Products	9	6	4	10
Multipliers	2	3	3	2
Products	18	18	12	20
Multipliers	2	2	3	3
Products	36	36	36	60
Multipliers	5	5	5	3
Continued Products...	180	180	180	180

PRODUCT OF 18 AND 10.

Factors	Multiplicand	18
	Multiplier	10
	Product	180

EXERCISES.

1. Multiply 768432900 by 7000; and 142857000 by 80000.

2. Find the following products: 96985000×500000; 807060×7000; and 9999000×90000.

3. Show that the product of the factors of 20 and 15 may be varied in a variety of ways, and still produce the same result,—viz., the product of 20 and 15.

CORRESPONDENCE.

To the Editor.

In No. 4 of the POPULAR EDUCATOR, page 64, Mr. Webster has given a few examples in simple subtraction, proved by the method of casting out the 9's, which are quite correct. This method of proof is far from being a new thing. The rules both simple and compound are handled in Mair's Arithmetic, Edinburgh Edition, 1799. Thus:—

	(1)			(2)			
6							7
×	5847	major		£73	15	10	×
6	2569	minor		48	12	6	7
	3278	remainder		£25	3	4	

The major being equal to the sum of the minor and remainder, therefore the excess of the nines in the one must be equal to that in the other. 1. Place the excess of the nines in the major at the top of a cross, and the excess of the minor and remainder (as if they were items in addition) at the bottom; consequently, the figure at the top and bottom will be the same, if the work is right. 2. Begin with the highest denomination, reducing always the excess to the next inferior denomination.

Thus, 7 + 3 = 10; the excess 1 reduced to shillings is 20; the excess is 2; then say 2 + 1 + 5 = 8, which reduced to pence is 96; and the excess 6 + 1 = 7, which is the excess of the major.

Again, 4 + 8 = 12, excess 3; then 3 + 2 + 5 = 10, excess 1 = 20s.; then 2 + 1 + 2 + 3 = 8, and 8 × 12 = 96, the excess is 6; and 6 + 6 = 12, excess 3; and 3 + 4 = 7, which is the excess of the minor and remainder.

CHARLES CURRIE.

Glasgow, April, 1852.

LITERARY NOTICES.

The ILLUSTRATED EXHIBITOR and MAGAZINE OF ART, is in course of issue in Weekly Numbers, price 2d.; Monthly parts, price 9d.; or if containing five weekly numbers, price 11d. The characteristics of this splendid publication are, that it presents specimens of the various departments of Fine Art, and the highest attainments in Wood Engraving, with a perfection of printing hitherto unattempted in works of so moderate a price. The new Printing Establishment of JOHN CASSELL is now in full operation, so that he can present to the public a work unique in character, and certainly never surpassed in grandeur of design, in execution of details, or in magnificence of illustration, though issued at double or treble the cost. The *fourth* Monthly Part is just published, price 9d., and contains a Portrait of the late J. M. W. Turner, R.A., drawn by J. Gilbert, and engraved by W. J. Linton; together with upwards of forty other choice illustrations. The first half-yearly volume of this truly National Illustrated Work will be published July 1st, in a style of binding in strict accordance with the character of the work, price 6s. 6d. It may with safety be asserted that this volume will contain a larger number of first-class engravings, executed in the most finished manner, than has ever previously appeared in works of three times the cost.

SCRIPTURE LIBRARY FOR THE YOUNG, in Shilling Volumes.—The first two volumes of this instructive series of works, "The LIFE of JOSEPH," illustrated with sixteen choice engravings and maps, and "The TABERNACLE, its PRIESTS, and SERVICES," with twelve engravings, are now ready.

ANSWERS TO CORRESPONDENTS.

H. A. W. C.—ELIZABETH—ASTRONOMER—MENES—T. J. S.—G. S. T.—All we can say is, that everything mentioned by our correspondents will come in its turn.

W. M.—His suggestion will meet with attention.

W. JAMES.—In some of the latest works on Chronology, it is shown, by a careful and searching examination of Holy Scripture itself, that the deluge took place 3215 years before the birth of Christ; according to this mode of reckoning, the revolution of Menes took place 432 years after the deluge. For the demonstration of the truth of this chronology, see Professor Wallace's work, entitled "The True Age of the World, &c.," published by Smith, Elder, and Co., Cornhill.

M. L.—She should read the first lesson very carefully over a good many times, and try to remember as much of it as she can; she should then get an intelligent friend to ask her the questions at the end of the lesson, in order to see if she can answer them; if so, she may then safely proceed to the second lesson, and do the same thing in reference to it; then to a third, a fourth, &c.

R. H.—Bailey's Dictionary was a very good one in its day, and even yet it possesses some claims to the notice of the student. Dr. Samuel Johnson's Dictionary, however, is that which is universally referred to as an authority for the meaning of words, especially "hard words" derived from the Latin, of which the author was remarkably fond. For instance, instead of saying "a chain of events," the Dr. would say "a concatenation of events," and yet mean the same thing.

A. Z. B. Y.—The students of the POPULAR EDUCATOR are expected to answer the Problems and Queries in it if they can. If new and ingenious problems, either in Geometry or Algebra, or new and ingenious solutions of old problems be sent, they will be admitted.

J. S. E.—We thank him for his offer, but really we have so much in hand, that we must decline it at present.

PERKINS.—We are much pleased with his communication on the descent of nations, and we would insert it at once, but we should like to see his authorities before giving it our *imprimatur*.

W. R.—We think very highly of his proposal to engage a teacher of French for the purpose of assisting himself and his friends in the study of the lessons given in the POPULAR EDUCATOR and in the WORKING MAN'S FRIEND. If any properly qualified teacher should apply to us for this purpose, we shall be happy to be the medium of intercommunication.

J. E. SMYTH.—The meaning of the exercise in section 2 of the French lessons, which he calls a vocabulary, is to give the student some good practice in learning to *pronounce* French words aright, or as they ought to be pronounced according to the rules laid down in the first section. There is no necessity for committing such a mass of words to memory; but they should be read over and over several times in order, if possible, to acquire a correct method of pronouncing vowels, diphthongs and consonants, as well as the peculiar nasal sounds. While this is practised, the student will insensibly acquire a knowledge of a great many words, and that almost *without effort*; but if it be read as a task, it is to be feared that very little knowledge either of words or sounds will be gained. Our reason for placing the sons of Noah in the ethnographic table in the order in which they stand, is simply this, that in Scripture the same order is preserved; and we consider the reason of the order to be such as an attentive reader of the Bible might fairly discover. Shem was the head of the sacred line of descent in which the Saviour was born, and therefore ought to stand first; Ham was guilty of a grievous offence towards his father the aged patriarch, and second head of the human race, and therefore ought to stand last; of course Japheth, under such circumstances, must naturally stand second.

N. A. G.—Jos. HOLLINGWORTH.—A plan is in contemplation in order to meet their wishes, and those of their friends.

F. T. RAYNER.—He is right; it was a misprint, and has been corrected.

W. J—N BELPER.—We are obliged by your courteous note, and hope the defect alluded to will not again occur.

J. G. A. S. *Professor of Music.*—The syllable TE is used instead of SI (pronounced SEE) that we may have a different initial letter from SOL (or SOH) for the simple "Interpreting Notation" which we afterwards use. The great variety of syllables used by different teachers (see prefaces to Hickson's "Part Music" and to Turle and Taylor's "Singing Book") will surely be sufficient excuse for this very slight innovation which Miss Glover has introduced. You have only to stop the sibilant s with the tongue at the root of your teeth, and you make it a T. The clefs and flats, and sharps and time signatures, are removed from the staff in the earlier exercises, to prevent the pupil attempting to learn too many things at once. At present he has to do only with the key-note, the chord, and the scale. The key-note is marked for him by a peculiar form. The pitch of the key-note is given him either in the title, thus, "Key D" "Key G," or by the general directions of the note below. The places of the semi-tones are already known to him in all keys. They are between ME FAH and TE DOH. If our correspondent will be patient, for a few weeks, he shall be gratified by seeing clefs and time signatures, and flats and sharps gathering in all their ominous dignity at the beginning of the staff. The key of D is preferred to that of C, for the earlier scale exercises, because its compass is more *in the middle* of the various voices. See Crivelli.

*** Several subscribers to the POPULAR EDUCATOR have expressed a wish to have an edition printed on finer paper, and declared their willingness to pay a higher price for it. To this there can be no possible objection should the demand so greatly increase as to warrant the trial of the experiment. Those who wish to have covers can most easily obtain them by purchasing the monthly parts, for which an extra penny is charged, in order to pay the expense of the cover and stitching. Portfolios for enclosing and preserving the numbers contained in a volume are now ready, and may be procured at our office, price 1s. 6d. each.

Printed and Published by JOHN CASSELL, 335, Strand, and Ludgate-hill, London.—May 8, 1852.

THE EDUCATION OF THE PEOPLE.

THE success which has already attended the publication of the POPULAR EDUCATOR, demonstrates the readiness with which the people do appreciate any well-directed effort for their improvement and their elevation. It cannot but be very pleasing to us to reflect that each successive week nearly a hundred thousand families are undergoing a course of useful instruction by means of this periodical. The adult as well as the youthful members of each of these families have something in its pages from which they can learn; and it is not only among the humbler classes that our work is read and appreciated, but many among the affluent welcome its appearance. Sitting in the House of Commons the other evening, a member for one of our large boroughs came up to thank us for the publication of the POPULAR EDUCATOR, and exclaimed, "I find it invaluable; indeed, I have commenced my education over again."

Encouraged, therefore, by what has already been done, and believing that much more may be accomplished in the great work of education, by building on the simple but solid foundation of having learned to read, we are anxious to develop our views on this important subject. We feel our own deficiencies in many respects, and particularly in not being able to convey all the instruction that is required by means of type only; but we ask, why should not the living voice of the teacher be made to bear upon the subject, and convey at once to the ear of the student of the POPULAR EDUCATOR, any necessary information which we fall short of imparting to him through its pages? Take, for instance, the knowledge of the French language; we cannot, even in the best lesson that could be written, convey all that is required concerning its sounds and pronunciation; but a teacher could do this at once, and with the greatest ease.

We sincerely believe that we shall do more towards cementing the friendship of England and France, and preventing the horrors and atrocities of war, by making the mass of the people able to read and to speak the French language, than could be done by forming battalions of militia-men from our industrial population. We say to the young men of the United Kingdom, follow our advice; only devote as much time to the facilities for the acquisition of this or any other kind of knowledge which we are placing before you, as you do to the pleasures and frivolities of youth, and you will not only realise the truth of what we have said, but you will elevate and improve your condition in life, and secure for yourselves a green and happy old age—loved, honoured, and respected by all.

What we wish to see organised for the instruction of the people, in connexion with the POPULAR EDUCATOR, is the establishment of Public Instructors or lecturers on the various lessons it contains; and, first of all, on the lessons in French, as being at present the most required to render our teaching perfect. Instructions on the other lessons would of course follow if success attended the first experiment. Such instructions might next be given in Music, in Mathematics, including Geometry and Arithmetic, in Latin and English Grammar, and in other subjects as they appear from time to time in our pages. The utility of a sound and practical acquaintance with the harmony of sweet sounds, and with the principles of vocal and instrumental music, will not be questioned in our day. It is well known also what great advantages would be gained by our handicraftsmen and mechanics, if they were instructed in the principles of Geometry—a science so necessary to the perfection of the practical arts of carpentry, masonry, building, and engineering of all kinds; to navigation, nautical astronomy, and architecture, and, in short, to all the elegant and refined arts of common life. Living instructions in these branches, added to those given by us, would create an interest and a desire to learn among our working population which would have the happiest effects on their social and industrial habits, and on the welfare of all with whom they are connected by the nearest and the dearest ties. To speak of the utility of a knowledge of Arithmetic and English Grammar, and even of the Latin under certain points of view, must appear superfluous, as every one acknowledges the fact; yet how few possess that acquaintance with these branches which would fit them for that position both in business and in society to which, by a little patient industry, they might naturally aspire. The barriers to their upward progress are now being rapidly removed; and the efforts of the POPULAR EDUCATOR will not be wanting in the hour of need.

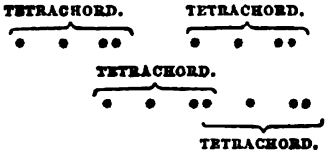
We propose that a room properly adapted for the purpose be selected in any town or district where these instructions are most wanted—that it be engaged for one evening or so in the week—and that the students of the POPULAR EDUCATOR be admitted to the lectures on the payment of *one penny* each evening, if it is possible to arrange it at so low a figure; that the funds thus raised be appropriated to the payment of the lecturer and other necessary expenses—that in general the lecturer should occupy the first half-hour in explaining the peculiarities of the French language, such as its sounds, its pronunciation, its idioms, &c.; and the next half-hour in answering queries on the subject, put to him by any of the students, for the benefit of all—that none but fully qualified gentlemen be appointed in each department—and that the names of the public teachers, with the appointments for each evening, be announced in the POPULAR EDUCATOR.

In large towns there can be no doubt that this plan would be found self-supporting; but in places where this would not be the case, and where a great desire for the lectures existed, assistance would be given from a fund to be raised by subscription. We have the means of knowing that our publication is read by many wealthy and liberal-minded individuals, who are warm-hearted friends to the cause of POPULAR EDUCATION; and we trust that the mere announcement of our plan will secure their co-operation and assistance. We shall cheerfully subscribe £50 to this fund. A list will be opened, and subscriptions will be received, by JOHN CASSELL, Belle Sauvage Yard, Ludgate-hill, London. All subscriptions will be acknowledged, and the names of the subscribers inserted in the POPULAR EDUCATOR; and the amount placed to an account opened with a Bank in London. The fund thus raised will be expended under the direction of a Committee to be specially appointed.

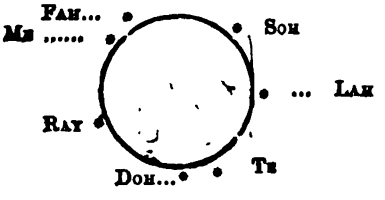
LESSONS IN MUSIC.—No. III.

By JOHN CURWEN.

IN order to fix in the memory yet more distinctly, the real structure of the scale, it may be well to notice that it is divisible into two similar sets of four notes, each set including two tones, crowned by a tonule. These sets of four notes have been called TETRACHORDS. If the replicate of the key-note is included, you will have DOH RAY ME FAH for the first tetrachord, and SOH LAH TE DOH' for the second. These are called *disjunct* tetrachords, because the tone, between FAH and SOH separates them. If the key-note is made the highest note of the one and the lowest of the other tetrachord, SOH, LAH, TE, DOH, will form the first, and DOH (repeated), RAY, ME, FAH, the second. These are called the *conjunct* tetrachords, because they are joined in the key-note. Take coins or counters to represent the notes, and arrange them on the table, first with the disjunct, and then with the conjunct tetrachords—thus:



Learn to do this *from memory*, and, having done it, to *name* the notes you have arranged. Some scale-makers, beginning upon RAY and ascending to the upper RAY', suppose they have got hold of a different scale, because the tonules (semi-tones) are between the second and third, and sixth and seventh notes *from* RAY, while they were between the third and fourth, and seventh and eighth *from* DOH! In the same way, they begin upon ME, and ascending to the upper ME', suppose they have discovered another new scale with its tonules differently placed! And so on, making every note of the scale the beginning of what they strangely fancy to be a new scale! You will be saved from this delusion by simply observing that, whatever note you begin on, the tonules are divided by two tones on the one hand, and by three on the other. This will best appear by your placing the notes in the form of a circle, thus:



Our pupil will not blame us for having so long drawn his attention to this foundation scale of all music, when he comes to see the importance in his after progress of thus thoroughly comprehending its structure. He will now be prepared to understand the "modulator, or pointing board for teaching tunes." (See the margin.) The middle column represents the seven notes of the scale in their proper order and at their proper distances. The replicates (octave notes) are added, both above and below, with the figures attached to them as already described. It will be seen that, with the exception of the middle octave (eight notes), the initial letters of the solfa syllables alone are used. The side columns (which are but repetitions of the same thing at different heights in pitch) and the additional notes ("accidentals" as they are called) TU, FI, NE, NI, and NU, need not be attended to at present. They are only printed here for the sake of completeness. The scale is sometimes called the "common *mode*" (the common mode in which notes are arranged for a tune), and the word *modulate* means properly to sing "in mode," or, in other words, to sing correctly "in tune." The uses of the modulator are the following:—1. It supplies the learner with a perfect pictorial representation of the notes he is singing, and thus enables him, as he sings and "points," to *measure to the eye* the exact intervals which the voice is taking. This cannot be done on the staff of five lines, for there is nothing there to indicate *pictorially* the place of the tonules (semi-tones) and it is not easy for the *learner* to know at all times, from that staff, what part of the scale he is in; a knowledge which every *true* singer should carry with him, and which the learner cannot escape possessing if he faithfully and constantly uses the modulator. Let him steadily do this for the next twenty or thirty lessons, and he will find that the modulator has become a ready *interpreter* of the "staff," and a clear, sure *light*, guiding him through all the maze of flats and sharps, and clefs and keys, and whatever other difficulties may be crowded upon it. 2. It gives to the learner a simple and uniform "language of *interval*," for DOH being always the key-note, the *intervals* remain always the same, to whatever pitch the scale may be raised or lowered. Thus the tonules are *always* between ME FAH, and TE DOH, and the pupil is so accustomed to sing those syllables to that interval, that he would find it difficult to sing them wrongly. This constant use of the syllables in connexion always with the same intervals, helps the mind to recall those intervals with great ease. We all acknowledge the power of this mental association of syllable and interval. When we wish to remember some favourite tune, for instance, how frequently do we ask ourselves in aid of memory, "What are the *words* we usually sing it to?" and immediately that we think of the words we remember the tune. How is this? It is plain that the first *syllables* of the hymn or song had so often coexisted in our minds along with the first *intervals* of the tune, that the one had gained a power to *suggest* the other. This power of "association," proved to be occasionally so useful, we *systematise* and make of constant use. Several persons, recently made acquainted with this method of teaching to sing, have written to us in this manner: "I was reckoned a very fair sight-singer before I became acquainted with this method, but I frequently, in preparing for our choral meetings, met with passages which I could not conquer without the help of an instrument. I now, however, simply trace out such passages on the modulator, translate them into this accurate and unchanging language of interval, and then it becomes really difficult to sing them wrongly." 3. It facilitates the practice of *teaching by pattern*. This is of great importance. The teacher sings, softly and distinctly, a short phrase of the tune to be taught. To the vocal pattern the pupils *so listen* that they may be able to *imitate* immediately afterwards. There are two mental processes in learning to sing a note. The first is an effort (if we may so speak) of *perception* in seeking to appreciate clearly the note to be imitated. The second is an effort of *will*, commanding the organs of voice to reproduce the note thus clearly perceived. The "pattern" cultivates each of these distinctly. It stimulates the pupil to a *strong mental effort* in endeavouring to bring the ear and the voice to do the mind's bidding. In this mental effort alone consists the real *work* of learning to sing. That method is the best, therefore, which requires the most of it. One hour's training of this kind is far more effective than five spent in singing *with* a leader. The teacher also, not singing with his pupils, is better able to

THE MODULATOR,

OR, POINTING BOARD FOR TEACHING TUNES.

d^1	f^1	
t	m^1	
l	r^1	s
s	DOH^1	f
	TE	m
f fi—		
m	LAH	r
	ne	
r	SOH	d
	—tu_1	t_1
d	FAH	
t_1	ME	l_1
		—nu_1
l_1	RAY	s_1
ni_1 —		
s_1	DOH	f_1
	t_1	m_1
f_1-		
m_1	l_1	r_1
r_1	s_1	d_1
		—t_1
d_1	f_1	
t_2	m_1	l_1
l_2	r_1	s_1
s_2	d_1	f_2

criticise and patiently correct their mistakes. The pupil who has to teach himself, with only an occasional pattern from some voice or instrument, must make himself *thoroughly perfect* in pointing on the modulator, and singing those pieces in which he *has* had the advantage of a pattern, and they will help him to the rest. The first sign of intelligence in a learner is that he *knows* when he sings wrong. Let him always, in that case, go back to the key-note and chord, and "try again." Many persons have taught themselves to sing in this way, often making mistakes of which they were ignorant for a while, but discovering their error and the means of correcting it, in their efforts to sing some following exercise. A teacher always by our side will, doubtless, save us from many misunderstandings and blunders; but he who cannot enjoy this advantage, may work on sturdily and hopefully without one. Let him remember that his *first business* is to use the modulator so constantly that it shall become "printed" in the eye of memory.

This introduces as our next topic that simple way of writing vocal music which we intend to use as the companion and interpreter of the more difficult and complex "old notation," of which we hope finally to make you master. It is the invention of an excellent and intelligent lady—Miss Glover, of Norwich—and has been modified and adapted to popular purposes by Mr. Curwen, in his "Grammar of Vocal Music," "Tonic-Solfa Edition of the People's Service of Song," and other works. It consists of the *first letters* of the solfa syllables, which you have used in learning a tune from the modulator, *written down*. And, if you have used the modulator till you are able to carry one "in your mind's eye," this simple notation answers the purpose of *pointing out the notes on that mental scale*. But, let it be remembered that *this notation should never be used apart from a perfect modulator either on paper before the learner, or clearly seen in his mind's eye*. When we remember that to secure this mental modulator it is only necessary to learn the proper position of seven notes, the effort does not appear a difficult one; yet, so inrooted is laziness in some people, that we have found many who go on using the solfa syllables to no advantage for years, without taking the trouble to learn this little ten minutes' lesson, which would make those syllables, in connexion with the power of association just described, clear interpreters of music to them. You will perceive, then, that these notes of the new notation do not appear to our own pupils as they would to others, only on one horizontal line, but seem, as they sing them, to rise or fall to their proper places in the scale. Some persons have objected to this marking of the notes by the solfa syllables, saying, "If the old notation must be learnt at last, however difficult it is, because it contains all the stores of classical music, then why not begin with that at once? why teach two notations?" First, because there is really no trouble in teaching the solfa notation; we have seen children in an infants' school use it before they had learnt to read. It was to them, as we have described it, simply the letters from the modulator "written down." Secondly, because the old notation presents such difficulties to the learner as to make it impossible to teach music in any short time by its means alone. Many of the best systems make use of some simpler notation to interpret the old. Mr. Gall, of Edinburgh, Mr. Waite, and some others, make use of a notation by figures. Dr. Bryce, of Belfast, uses both the figures and the solfa syllables. And we have lately learnt that a sort of solfa notation was printed under the notes with some of the very earliest English psalm-tunes. It consisted of the initial letters of the solfa syllables placed under the notes much as we shall use them. Thirdly, because the use of some such new notation is the quickest and most perfect means of gaining a real command of the old. Already, by the method which we are now developing, many children in day-schools, in addition to a large number of adults, have learnt to sing "at sight" *from the old notation*.

It is of small consequence *what syllables* are used for this purpose. A great variety have been used at different times. We have chosen those given above because they are best known, only changing Se into Te for the sake of having a different initial letter from Soh. We have given the English spelling of the syllables instead of the Italian, as we have nothing to do with the Italian language in these lessons.

It may be easily noticed that, at certain distances throughout a tune, the voice is delivered with increased *distinctness* and *force*. This combination of distinctness and force is called "accent." Close observation will enable you to distinguish three degrees of accent thus produced—the *louder* (or stronger), the *softer* (or weaker), and the *medium*. Listen to a well sung tune more closely still, and you will find that the accents recur *in regular order*, and *at equal distances of time*. Take care to verify all these assertions by singing some well-known tune yourself, or by listening to another. Then remember that—the distance of time from one of the louder accents to the next, is called a MEASURE. (It is somtimes inaccurately called a BAR.) The distance of time between *any* accent and the next is called an ALIQUOT, or equal part, of the measure. It may also be called a "pulse" of the voice. There are four sorts of MEASURE in common use.

The BINARY or TWO-PULSE MEASURE contains two aliquots, one having the louder and the other the softer accent. We use an upright bar to represent the louder accent, and two dots to represent the softer. The binary measure may, therefore, be represented thus:—

| : | : &c., or : | : | &c.

The TRINARY or THREE-PULSE MEASURE contains three aliquots, one of which has the louder and the other two the softer accent. It may be represented thus:—

| : : | : : &c., or : | : : | : &c.

The QUATERNARY or FOUR-PULSE MEASURE is formed from the Binary by changing every alternate louder accent into one of *medium* force. We represent the medium accent by a shorter bar than that used for the louder accent. This measure may then, be thus represented:—

| : ˈ : | : ˈ : or ˈ : | : or : | : ˈ : | : ˈ

THE SENARY OR SIX-PULSE MEASURE is formed from the trinary measure by changing every alternate louder accent into a medium accent, and may be represented thus:—

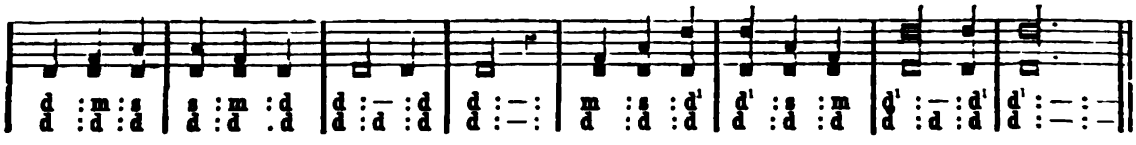
| : : ˈ : : | : : ˈ : : or : | : : ˈ : &c.

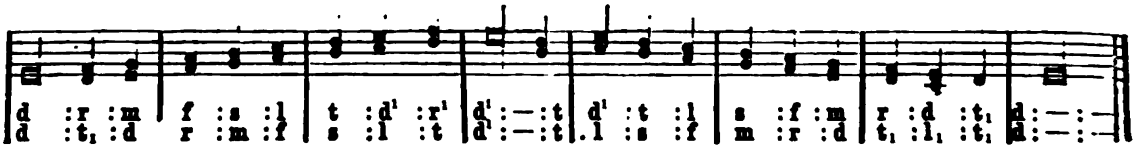
You perceive that these measures often begin on the softer or medium accents, but the imperfect measure is always completed at the end of a tune. Much of the delicacy and expressiveness of music depends on this proper recurrence of accent, sometimes called Rhythm. By neglect of this a properly beautiful tune is often made dull, heavy, and unmeaning, while careful attention to it will give beauty to some of the plainest melodies. Many of our most popular tunes owe their effect almost entirely to Rhythm, and it forms nearly the sole power of such instruments as the drum and the tambourine. It makes even the regulated step of the soldier and the dancer akin to music. The philosophy of the origin of our sense of Rhythm is treated very admirably in the appendix to Dr. Bryce's "Rational Introduction to Music." He shows its connexion with the pulsations of the heart, which are multiples of the respirations of the lungs. "About the commencement of each expiration of the breath, there is one moment at which the effort, whether muscular or elastic, is *stronger* than at any other time in the whole breathing. This is most apparent in a person sleeping soundly when the mechanism of the body, not being controlled by the mind follows unceremoniously its own laws. * * Between the expiration and inspiration there seems to intervene a pause during which the lungs are at rest, but during or immediately after great bodily exertion—running for example—this pause disappears, and exspiration succeeds inspiration immediately or with a very brief period of rest. The same happens when the breathing is impeded by disease. * * Hence a respiration may be divided into two (Binary) or into three (Trinary) parts. If into three parts they will be 1st expiration, 2nd pause, 3rd inspiration. If into two, 1st expiration, 2nd inspiration."

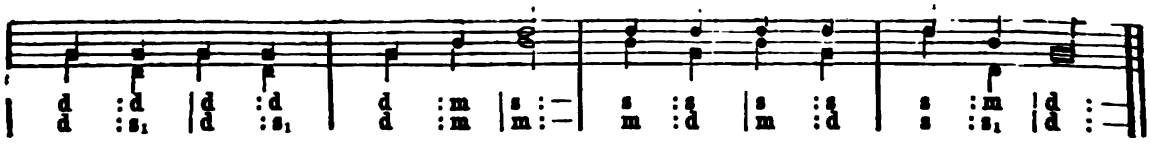
Rhythm in its fullest sense has a wider range and more delicate expression than can be given within the boundaries of a single measure. Colonel Thompson ("Westminster Review," Oct. 1832) very beautifully describes it thus:—"Whoever has been rocked in a boat upon what, in plain prose may be called "the ocean waves" will have been conscious that besides the petty furrow which lifted its head and stern

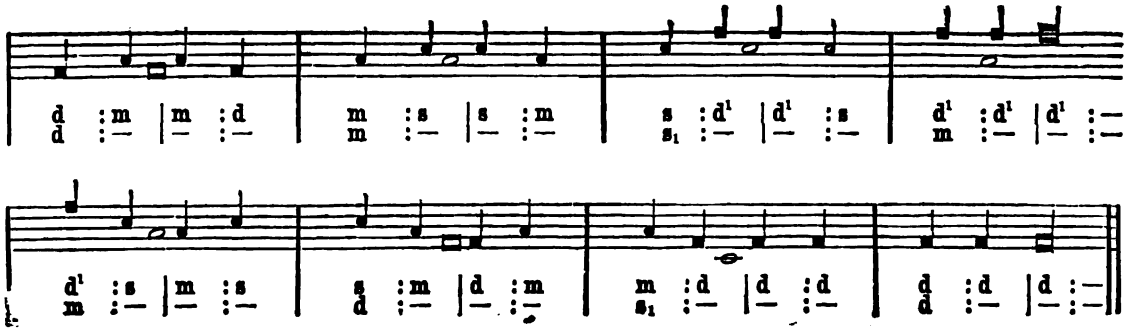
alternately in a time approaching to the vibrations of a church pendulum, there was a larger swell of which the others were but inconsiderable parts, and even a mightier still, of which this second was but a limb and portion. Something like this appears to be the nature of the undulations of musical notes. There is a great swell and a little one, and both of them contribute to the general effect. The examination may therefore on this principle be conducted in two directions :—first, to enquire what quantity of minor undulations may be within the compass of a bar or "measure"—and secondly, to ask whether bars themselves may not be fractions of greater undulations, and whether out of these again may not be constituted undulations of higher orders in succession, to an extent that can only be measured by the skill of the performer, and probably also by the cultivated sensitiveness of the hearer. Any person who will attend critically to the execution of superior instrumental performers, will be surprised to find to what an extent this species of 'linked sweetness' may be traced, and how large a number of bars may be formed into a connected whole, by means of the relations of what is here termed accent."

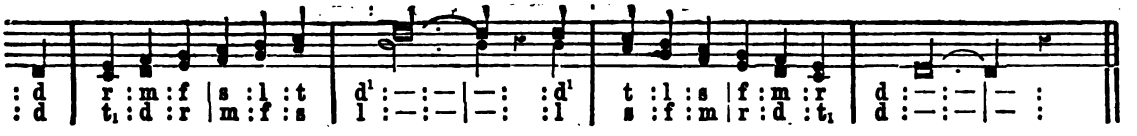
The Binary measure is the boldest of the measures and the one most easily felt or performed. It is by far the best for large masses of voice, and is well adapted to aid in giving majesty to a tune. Try "St. Stephen's" or "Bedford" first in the *three-pulse* measure (lengthening the accented notes) and then in the *two-pulse* measure, and you will understand the character of the Binary measure. The Trinary measure is well adapted to aid in producing a soft and soothing musical effect. When the tune is simple it is not unfit for congregational use—especially if the people have been trained to keep the accent. The adaptation of this measure to soft and soothing music is illustrated by its analogy (according to Dr. Bryce) to the breathing of *health* and *rest*. The Quaternary measure, when delicately performed, gives much elegance to a tune. It is adapted to congregational tunes when the movement is not too slow. Try the well-known tune "Vesper Hymn," taking care to give the medium accent. The Senary measure is commonly used in connexion with quick movements, and is naturally soft, light, and elegant. It is better adapted to secular than to sacred music.

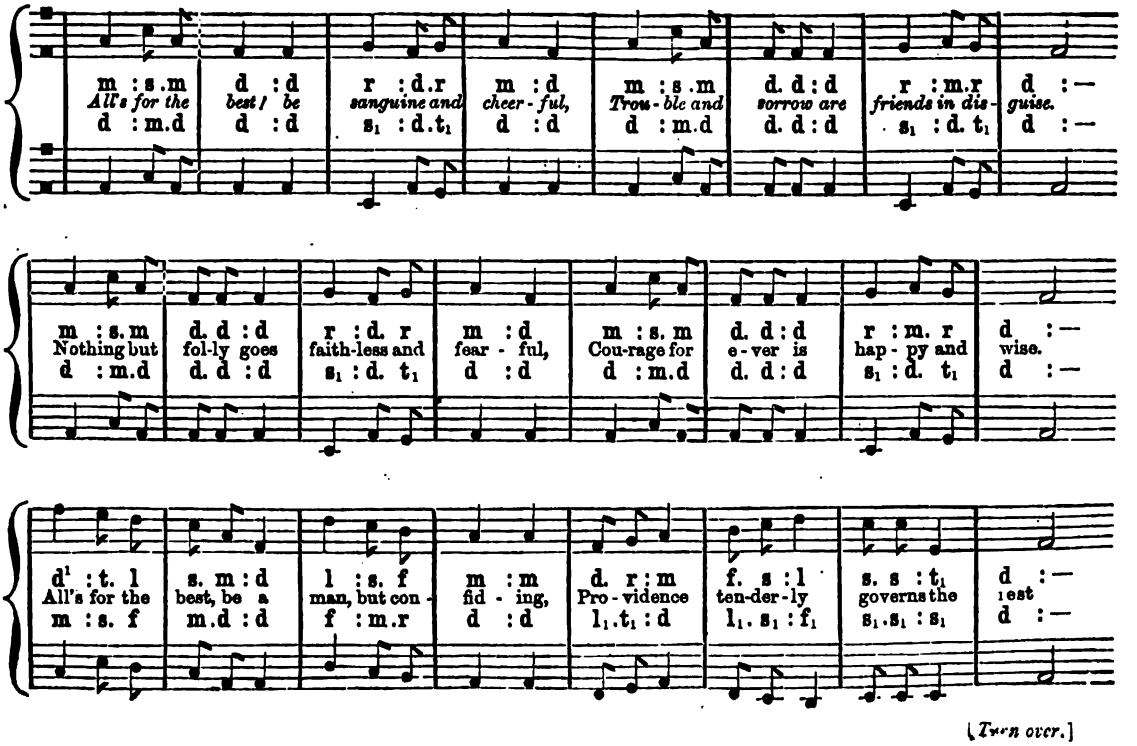
Exercise 9. DOH, ME, SOH. *Three-pulse Measure.* Key D (or C).

Note.—Take a low sound of your voice for the key-note in this exercise. If any one gives you the pattern from an instrument, tell him to play in the key of D with two sharps. You understand that the letters are the initials of the notes on the modulator, and direct you in tracing out the tune there. The notes are placed within the accent marks to which they belong. Doh occupies the whole of the loud "pulse" of the measure. Me fills the first soft pulse, and Soh the second. This is the Trinary measure. The second measure is easily understood. In the third measure you have the first Doh occupying two pulses (loud and soft), and the second Doh only one pulse. The horizontal stroke, as in the second pulse, always indicates that the preceding note is to be continued. Thus the last note of the exercise is continued through the whole measure. In the fourth measure, the third accent-mark is followed by no note. In the time of that pulse, therefore, the voice rests. If the previous exercises have been perfectly learnt from the modulator, you will probably be able to make this out without pattern. Be careful to give the proper accent. You are strongly recommended not to study the "staff," at present, in any of these exercises. It is printed here that you may be able to return to it when you have gained some command of voice and some knowledge of music itself, and are not likely to be perplexed by its numerous signs; but, if we may suppose that you have done this, then the following remarks will be of use. [The open note is twice as long as the closed notes. The empty "pulse," during which the voice rests, is represented by a distinct character, called a "rest." It tells you to *rest* as long as one of the closed notes, in the same time, would be *sung*. A dot after a note, in the old notation, bids you sing that note *half* as long again. Thus you perceive that the relative length of notes is expressed by *symbols*, and not, as in the solfa notation, measured out *pictorially* by the regularly recurring accents placed along the page.]

Exercise 10. THE SCALE. *Three-pulse Measure.* Key E (or D).

Note.—Take a low note for the key-note of this exercise also. Point it from memory on the modulator, like the last, and all you learn. Mark the accent well, and learn to sing both the upper and the lower line of notes. [The key-note is placed on the lowest line to prevent your accustoming your eye to look for it always in the same place on the staff. It would be well for you if it could be so. But as it is to be found, in different tunes, on every position on the staff, it is important that we should not mislead you. We prefer, however, that this exercise should be sung in the key of D or C, not of E.]

Exercise 11. DOH, ME, SOH. *Four-pulse Measure.* Key G. *Quickly.*

Note.—Take a *middle* sound of your voice for the key-note. If your friend patterns, let it be "in the key of G with one sharp." Trace the exercise on the modulator. Sing it with spirit, marking the accents carefully. What measure is it in? [You will notice that the old notation has no mark for the secondary accents.]

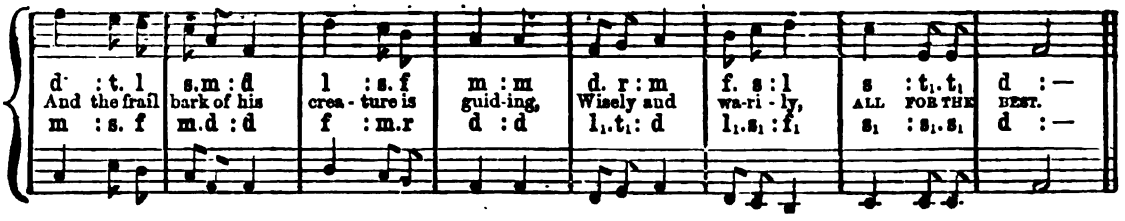
EXERCISE 12. DOH, ME, SOH. *Four-pulse Measure.* KEY F (OR E).

NOTE.—Take a low, but not very low note for your DOH. Tell your friend to pattern it (if you are still dependent on him) "in F with one flat." Learn both "parts." Be careful to hold the long notes of the lower line with evenness of sound, swelling them a little in the middle, so as to express the medium accent. [The open note *without a stem* is to be sung twice as long as that with a stem. There was not room to write the last long open note of the "second" part on the staff.]

EXERCISE 13. THE SCALE. *Six-pulse Measure.* KEY D. *Quickly.*

NOTE.—Take a low sound for the key-note. Sing, when you have traced the tune on the modulator, rapidly and lightly, marking delicately the accents. In singing from the book, your eye will scarcely rest on the soft accents. You will only have time to think of the "loud" and "medium" marks. [A curve over the dotted open note and the close note, shows that they should be sung as one. The note is written in this way, instead of being written as an open note without a stem (which would give the same length) that the accent may be marked.]

TROUBADOUR. (The words from "Ballads for the Times," by M. F. Tupper, Esq.) KEY F. M. 96.

m :s.m | d :d | r :d.r | m :d | m :s.m | d. d :d | r :m.r | d :—
All's for the | best! be | sanguine and | cheer-ful, | Trou-ble and | sorrow are | friends in dis- | guise.
d :m.d | d :d | s₁ :d.t₁ | d :d | d :m.d | d. d :d | s₁ :d. t₁ | d :—
m :s.m | d. d :d | r :d. r | m :d | m :s. m | d. d :d | r :m. r | d :—
Nothing but | fol-ly goes | faith-less and | fear-ful, | Cou-rage for | e-ver is | hap-py and | wise.
d :m.d | d. d :d | s₁ :d. t₁ | d :d | d :m.d | d. d :d | s₁ :d. t₁ | d :—
d¹ :t. l | s. m :d | l :s. f | m :m | d. r :m | f. s :l | s. s :t₁ | d :—
All's for the | best, be a | man, but con- | fid-ing, | Pro-vidence | ten-der-ly | governs the | rest
m :s. f | m.d :d | f :m.r | d :d | l₁.t₁ :d | l₁. s₁ :f₁ | s₁.s₁ :s₁ | d :—

[Turn over.]

TROUBADOUR (*Continued*).


d' : t. l | s.m : f | l : s. f | m : m | d. r : m | f. s : l | s : t_1. t_1 | d : —
And the frail | bark of his | crea - ture is | guid-ing, | Wisely and | wa-ri - ly, | ALL FOR THE | BEST.
m : s. f | m.d : d | f : m.r | d : d | l_1.t_1: d | l_1.s_1 : f_1 | s_1 : s_1.s_1 | d : —

2 All for the best; then FLING AWAY TERRORS,
Meet all your fears and your foes in the van,
And, in the midst of your dangers or errors,
TRUST LIKE A CHILD, WHILE YOU STRIVE LIKE A MAN.

All's for the best; for unbiassed, unbounded,
Providence reigns from the east to the west,
And by his wisdom and mercy surrounded,
HOPE AND BE HAPPY THAT ALL'S FOR THE BEST.

NOTE.—You should take a *rather* low note for your DOH here. Tell your patterning friend—"the key of F with one flat." The first thing you will notice, in looking at this tune, is, that some of the "aliquots" or pulses have two notes in them. The dot which follows SOH, the second note, always means that the note before it takes *half* a pulse. It, of course, leaves the other half to the other note,—in this case ME. When you have carefully traced the first phrase of the tune (five notes) on the modulator, then sing it with special attention to this point,—letting the notes SOH ME (which are placed in one pulse of the voice) run from your tongue just twice as fast as the others. And so on with the rest. You will notice that both the first and second parts of the tune are repeated, so that it is not as long as it looks. If you find the "second" part of the tune low for your voice, pitch the key-note a little higher. Be careful to point on the modulator *from memory*. Remember that very tune, thus thoroughly learnt, becomes a power by which others will be more easily mastered. This tune, in its present arrangement, is taken from Mr. Curwen's "People's Singing Lessons." It is harmonised for three voices—"two Trebles and a Bass"—in his "School music," so as not to be discordant with the present harmony for two voices. You need not attempt the words yet. When you do, let those printed in CAPITALS be sung with increased force and loudness of voice; and those in *italics* with increased softness. [The square note is used to indicate the place of DOH at the beginning of the staff, but it is not to be sung. The place of DOH, being thus once marked, is not afterwards indicated by a square note as in previous exercises. The pupil must learn to keep the place of DOH in his mind. The notes, with a tail to the stem, are to be sung *half* as long as those without the tail.]

LESSONS IN LATIN.—No. VI.

By JOHN R. BEARD, D.D.

II.—Nouns with vowel-stems; parisyllabic.

With and without the termination *s*.

For the most part feminines.

Cases.	*Singular.*	
Nom.	avis, *a bird*	febris, *a fever*
Gen.	avis, *of a bird*	febris, *of a fever*
Dat.	avi, *to a bird*	febri, *to a fever*
Acc.	avem, *a bird*	febrem (im), *a fever*
Voc.	avis, *O bird*	febris, *O fever*
Abl.	ave or avi, *by a bird*	febri (e), *by a fever*
Cases.	*Plural.*	
Nom.	aves, *birds*	febres, *fevers*
Gen.	avium, *of birds*	febrium, *of fevers*
Dat.	avibus, *to birds*	febribus, *to fevers*
Acc.	aves, *birds*	febres, *fevers*
Voc.	aves, *O birds*	febres, *O fevers*
Abl.	avibus, *by birds*	febribus, *by fevers*
Cases.	*Singular.*	
Nom.	nubes, *a cloud*	mare (neuter), *the sea*
Gen.	nubis, *of a cloud*	maris, *of the sea*
Dat.	nubi, *to a cloud*	mare, *to the sea*
Acc.	nubem, *a cloud*	mare, *the sea*
Voc.	nubes, *O cloud*	mare, *O sea*
Abl.	nubi, *by a cloud*	mari, *by the sea*
Cases.	*Plural.*	
Nom.	nubes, *clouds*	maria, *seas*
Gen.	nubium, *of clouds*	marium, *of seas*
Dat.	nubibus, *to clouds*	maribus, *to seas*
Acc.	nubes, *clouds*	maria, *seas*
Voc.	nubes, *O clouds*	maria, *O seas*
Abl.	nubibus, *by clouds*	maribus, *by seas*

VOCABULARY.

Ignis, ignis, m. *fire*; civis, civis, m. *a citizen*; orbis, orbis, m. *a globe; the world*; navis, navis, f. *a ship*; securis, securis, f. *an axe*; rupes, rupis, f. *a rock*; sedes, sedis, f. *a seat*; clades, cladis, f. *slaughter*; altāre, altāris, n. *an altar*; ovīle, ovīlis, n. *a sheepfold*.

EXERCISES.—LATIN-ENGLISH.

Aves fallunt caelebes; matres occiduntur febribus; valde diligo mare; mare diligitur a nautis; agricŏlae colunt ségetes; nautae sunt in navibus; in orbe est ignis; in ignibus sunt fratres; altaria sunt deabus; non ne diis sunt altaria? secúri defendunt agricolae ovilia.

ENGLISH-LATIN.

Sailors defend ships with (their) bodies; birds are on the rocks; are rocks loved by sailors? slaughter injures the people; birds strike the clouds; axes defend the ships; the birds of the citizens are injured; the seat of the prince is praised; we conquer the companions of the princes.

General view of nouns of the third declension, according to their stems:—

CLASS I.

Nouns with consonantal stems or imparisyllabic.

1st division; nouns without the termination *s*.

1st subdivision; nouns in which the nominative and the stem are the same; the stems end in *r* and *l*.

2nd subdivision; nouns in which the nominative and the stem are different; the stems end in *n* and *s*.

2nd division; nouns with the termination *s*, with the sounds *k*, *t*, *p*.

CLASS II.

Nouns with vowel-stems, or parisyllabic.

With and without the termination *s*.

Some peculiarities belonging to this declension must be briefly indicated. The termination of the accusative singular is properly *m*, which is connected with the consonantal stem by the interposition of *e*. In the vowel-stems no interposing vowel is required, because there is a vowel in the stem. That vowel is *i*. Vowel-stems therefore end in *im* in the accusative, and in *i* in the ablative singular; for the most part, however, they in usage have *e* in both. However, in sitis, *thirst*, tussis, *a cough*, and vis, *strength*, *i* only is used. Vis is a defective noun; *vis* is thus declined; singular, *vis*, *vim*, *vi*; plural, *vires*, *virium*, *viribus*, *vires*, *vires*, *viribus*, the plural being complete and regular. In these nouns,—namely, febris, *a fever*; securis, *an axe*; pelvis, *a basin*; turris, *a tower*; and restis, *a cord*, *im* is more usual than *em*; but less usual than *em* is it in classis, *a fleet*; messis, *a crop of corn*; clavis, *a key*; navis, *a ship*. The ablative singular has for the most part *i* (perhaps from *ie*) instead of *e* in parisyllabics with the vowel-stem in *i*. In imparisyllabics with consonantal stems, *e* is the usual ablative termination, but *i* is sometimes found, derived from the usage in the vowel-stems.

Nouns which make the ablative singular in *i* make the genitive plural in *ium* instead of *um*; and nouns neuter, which in the ablative singular end in *i*, in the nominative, accusative, and vocative plural end in *ia*.

Adjectives of the third declension, in general, follow the declension laws of the nouns, only that in the ablative singular they prefer *i*. Adjectives of the third declension are of two sorts; first, those that have three terminations, as, alăcer, m., alăcris, f., alăcre, n., *lively, active;* second, those that have two terminations, as the comparitive, vĭlior, m. and f., vĭlius, n. *meaner*; under this second class may stand such as ferox, *fierce*, which in the nominative singular is m. f. and n. (accusative, ferocem), but in the plural has for the neuter a separate form in ia, as ferocia.

Declension of an Adjective of Three Terminations.

Example: Acer, ācris, ācre, *sharp; acute, pungent; energetic.*

	Singular.				*Plural.*		
Cases.	M.	F.	N.	*Cases.* M.	F.	N.
N.	acer	ācris	ācre	N. ācres	acres	ācria
G.	acris	ācris	acris	G. acrium	acrium	acrium
D.	acri	acri	acri	D. acribus	acribus	acribus
A.	acrem	acrem	acre	A. acres	acres	acria
V.	acer	acris	acre	V. acres	acres	acres
A.	acri	acri	acri	A. acribus	acribus	acribus

Declension of an Adjective of Two Terminations.

Example: Suavis, m. and f.; suave, n. *sweet.*

	Singular.			*Plural.*	
Cases.	M. and F.	N.	*Cases.*	M. and F.	N.
Nom.	suavis	suave	Nom.	suaves	suavia
Gen.	suavis	suavis	Gen.	suavium	suavium
Dat.	suavi	suavi	Dat.	suavibus	suavibus
Acc.	suavem	suave	Acc.	suaves	suavia
Voc.	suavis	suave	Voc.	suaves	suavia
Abl.	suavi	suavi	Abl.	suavibus	suavibus

Other Forms of Adjectives of Two Terminations.

Examples: Major, m. and f.; majus, n. *greater;* audax, m. f. and n. (audacem in acc.); audācia, n. plural, *bold.*

	Singular.			*Plural.*		
Cases.	M.	F.	N.	M.	F.	N.
N.	major	major	majus	majores	majores	majora
G.	majoris	majoris	majoris	majorum	majorum	majorum
D.	majori	majori	majori	majoribus	majoribus	majoribus
A.	majorem	majorem	majus	majores	majores	majora
V.	major	major	majus	majores	majores	majora
A.	majore	majore	majore	majoribus	majoribus	majoribus

Audax, m. and f.; audacia, n. *bold.*

	Singular.			*Plural.*	
Cases.	M. and F.	N.	*Cases.*	M. and F.	N.
Nom.	audax	audax	Nom.	audaces	audacia
Gen.	audacis	audacis	Gen.	audacium	audacium
Dat.	audaci	audaci	Dat.	audacibus	audacibus
Acc.	audacem	audax	Acc.	audaces	audacia
Voc.	audax	audax	Voc.	audaces	audacia
Abl.	audaci	audaci	Abl.	audacibus	audacibus

Adjectives and Nouns of the Third Declension—Declined together.

Cases	*Singular.*		
N.	acer	odor, m. *a pungent smell*	dulcis mater, f. *a sweet mother*
G.	acris	odŏris, *of a pungent smell*	dulcis matris, *of a sweet mother*
D.	acri	odŏri, *to a pungent smell*	dulci matre, *to a sweet mother*
A.	acrem	odŏrem, *a pungent smell*	dulcem matrem, *a sweet mother*
V.	acris	odor, *O pungent smell*	dulcis mater, *O sweet mother*
A.	acri	odŏre, *by a pungent smell*	dulci matre, *by a sweet mother*

Cases.	*Plural.*		
N.	acres	odŏres, *pungent smells*	dulces matres, *sweet mothers*
G.	acrium	odŏrum, *of pungent smells*	dulcium matrum, *of sweet mothers*
D.	acribus	odŏribus, *to pungent smells*	dulcibus mātribus, *to sweet mothers*
A.	acres	odŏres, *pungent smells*	dulces matres, *sweet mothers*
V.	acres	odŏres, *O pungent smells*	dulces matres, *O sweet mothers*
A.	acribus	odŏribus, *by pungent smells*	dulcibus mātribus, *by sweet mothers*

Cases.	*Singular.*			
N.	majus	opus, n. *a greater work*	rudis	miles, m. *an untrained soldier*
G.	majoris	opĕris, *of a greater work*	rudis	militis, *of an untrained soldier*
D.	majori	operi, *to a greater work*	rudi	militi, *to an untrained soldier*
A.	majus	opus, *a greater work*	rudem	militem, *an untrained soldier*
V.	majus	opus, *O greater work*	rudis	miles, *O untrained soldier*
A.	majore	opĕre, *by a greater work*	rudi	milite, *by an untrained soldier*

Cases.	*Plural.*			
N.	majora	opĕra, *greater works*	rudes	milites, *untrained soldiers*
G.	majorum	opĕrum, *of greater works*	rudium	militum, *of untrained soldiers*
D.	majoribus	opĕribus, *to greater works*	rudibus	militibus, *to untrained sold.*
A.	majora	opĕra, *greater works*	rudes	milites, *untrained soldiers*
V.	majora	opĕra, *O greater works*	rudes	milites, *O untrained soldiers*
A.	majoribus	opĕribus, *by greater works*	rudibus	militibus, *by untrained sold.*

Forms of Nouns and Adjectives of the 1st, 2nd, and 3rd Declensions.

Examples; Bonus puer, m. *a good boy*; bona soror, f. *a good sister*; bonum nomen, n. *a good name.*

Cases.	*Singular.*		
N.	bonus puer	bona soror	bonum nomen
G.	boni pŭeri	bonae sorŏris	boni nŏminis
D.	bono pŭero	bonae sorŏri	bono nŏmini
A.	bonum pŭerum	bonam sorŏrem	bonum nomen
V.	bone puer	bona soror	bonum nomen
A.	bono pŭero	bona soŏre	bono nŏmine

Cases.	*Plural.*		
N.	boni pŭeri	bonae sorŏres	bona nŏmina
G.	bonorum puerŏrum	bonārum sorŏrum	bonorum nŏminum
D.	bonis pŭeris	bonis sorŏribus	bonis nomĭnibus
A.	bŏnos pŭeros	bonas sorŏres	bona nŏmina
V.	boni pŭeri	bonae sorŏres	bona nŏmina
A.	bonis pŭeris	bonis sorŏribus	bonis nomĭnibus

Examples: Campus vĭrĭdis, m. *a green field*; herba vĭrĭdis, f. *a green herb*; gramen viride, n. *green grass.*

Cases.	*Singular.*		
N.	campus viridis	herbă vĭrĭdis	gramen viride
G.	campi vĭridis	herbae vĭridis	grămĭnis vĭridis
D.	campo vĭridi	herbae vĭridi	grămĭni vĭridi
A.	campum vĭridem	herbam vĭridem	gramen viride
V.	campe vĭridis	herba vĭridis	grămen viride
A.	campo vĭridi	herbă vĭridi	grămine vĭridi

Cases.	*Plural.*		
N.	campi vĭrides	herbae vĭrides	grămĭnă vĭrĭdia
G.	campŏrum vĭrĭdium	herbarum vĭridium	grăminum vĭrĭdium
D.	campis vĭridibus	herbis vĭridibus	gramĭnibus vĭrĭdibus
A.	campos vĭrides	herbas vĭrides	grămĭna vĭrĭdia
V.	campi vĭrides	herbae vĭrides	grămĭna vĭrĭdia
A.	campis vĭrĭdibus	herbis vĭrĭdibus	gramĭnibus vĭrĭdibus

Examples: Audax vir, m. *a bold man*; audax femina, f. *a bold woman*; audax animal, n. *a bold animal.*

Cases.	*Singular.*		
N.	audax vir	audax fĕmina	audax animal
G.	audācis viri	audācis fĕmĭnae	audācis anĭmālis
D.	audāci viro	audāci fĕminae	audāci anĭmāli
A.	audācem virum	audācem fĕmĭnam	audax ănimal
V.	audax vir	audax fĕmina	audax animal
A.	audāci viro	audāci fĕmĭnā	audāci anĭmāli

Cases.	*Plural.*		
N.	audāces viri	audāces fĕminae	audācia animālia
G.	audācium virorum	audāciam fĕmĭnārum	audācium animālium
D.	audācibus viris	audācibus fĕminis	audācibus animālibus
A.	audāces viros	audāces fĕmĭnas	audācia ănimălia
V.	audāces viri	audāces fĕminae	audācia animālia
A.	audācibus viris	audācibus fĕminis	audācibus animālibus

Exercises:—According to these paradigms or examples form the following:—

N.	vir major, m. *a greater man*	silva magna, f. *a great wood*
G.	viri majŏris, *of a greater man*, &c.	silvae magnae, *of a great wood*, &c.
N.	mulier major, f. *a greater woman*	leaena ferox, f. *a fierce lioness*
G.	mulieris majŏris, *of a greater woman*, &c.	leaenae ferōcis, *of a fierce lioness*, &c.
N.	acetum acre, n. *sharp vinegar*	pratum sterile, n. *an unfruitful meadow*
G.	aceti ācris, *of sharp vinegar*, &c.	prati sterilis, &c.
N.	audax agmen, n. *a daring band*	Julius Caesar, m. *Julius Cæsar*
G.	audācis agmĭnis, &c.	Julii Caesăris, &c.

Cicero disĕrtus, *eloquent Cicero*
Ciceronis disĕrti, &c.

Vocabulary.

Fortis, e, *brave*; mortālis, e, *mortal*; immortālis, e, *immortal*; omnis, e, *every one*, in the plural, *all*; gravis, e, *heavy, severe*; industria, ae, f. *diligence*; littĕrae, arum, f. *letters, literature, knowledge*; littera, in the singular, signifies a *letter of the alphabet*; litterae in the plural means also a *letter*, that is, *an epistle* (epistŏla); fundamentum, i, n. *a foundation*; avis, is, f. *a bird*; hostis, is, m.

an enemy; mos, moris, m. *a custom*; mores, in the plural, denotes *morals, character*; pietas, ātis, f. *piety*; virtus, ūtis, f. *virtue* (originally *valour*); vox, ōcis, f. *a voice*; consto 1, *I consist of*; habeo 2, *I have*; incumbo 3 (with *in* and the ac.), *I apply to*; meus, mea, meum, *my*; tuus, tua, tuum, *thine*; facile, adv. *easily*.

EXERCISES.—LATIN-ENGLISH.

Miles forti animo pugnare debet; homines cŏrpora mortălia, animos immortăles habent; non ne sunt hominibus mortalia corpora? suavi voce avium delector; suavi ne avium voce delectāris? pueri in litteras incumbere debent alăcri animo; cur non in litteras incŭmbitis, pueri, alăcri animo? discipulorum laus constat bonis moribus et acri (severe) industriâ; acri industriâ pater meus incumbit in litteras; pietas omnium virtutum est fundamentum; tuae virtutes, O mater, me delectant; viri fortes non vincuntur doloribus gravibus; non cedĭmus hostibus audacibus; vox omnis bene auditur a matre tuâ; tuae voces, soror, mihi sunt dulces.

ENGLISH-LATIN.

Brave men yield not to enemies; a bold band is not easily conquered; my son studies with an active (alacri) mind; do thy sisters love knowledge? they are delighted by the voices of the birds; the birds of the enemy have sweet voices; my scholars apply well to knowledge; the bold band is conquered by Julius Cæsar; the bodies of men are mortal, the souls immortal; the piety of the mother delights the son; the daughter is delighted by the virtue of the father; the virtue of boys consists in industry and good character; my mother's letter (the letter of my mother) is heard by all.

LESSONS IN BOTANY.—No. III.

THE GRASSES AND THE CORN PLANTS.

THE verdant carpet, which strikes foreigners on arriving in England with so much surprise and pleasure, and which, spread over the country, gives it as individual a character as the pines of Norway or the palm-groves of the Equator,—is composed chiefly of *grasses*. And, perhaps, the only instance in which a country has derived a name from the character of its vegetation is that of Ireland, which is often called the "Emerald Isle." So familiar have we been from infancy with our rich pasture-lands and the smooth lawns of our parks, that it is difficult for us to imagine what an agreeable contrast is caused between the country that gave us birth and the naked appearance of other lands, however rich they may be in various plants, from a deficiency of this verdant covering. In some vegetable products they may equal, or exceed ourselves, but by all accounts, the perpetual freshness of verdure caused by our grass-lands is almost peculiar to the United Kingdom.

And then what important purposes do grasses serve! Cattle feed on their leaves, and birds on their smaller seeds. Well has it been said, "Grasses are Nature's care." Their extraordinary means and power of preservation and increase, their hardiness, their disposition to spread, their properties of reproduction, coincide with the designs of God respecting them. They thrive under a treatment by which other plants are destroyed. The more their leaves are consumed the more their roots increase; the more they are trampled upon the thicker they grow. Many of the seemingly dry and dead leaves of grasses revive, and renew their verdure on the return of spring. In lofty mountains, where the summer heats are not sufficient to ripen the seeds, grasses which increase without seed abound. It has also often been stated that herb-eating animals attach themselves to the leaves of grasses, and if at liberty in their pastures to range and choose, leave untouched the straws which support the parts essential to their increase.

The stems of other plants are variously branched, but in grasses the *culm*, or stem, is single, till, in some instances, it parts to produce a cluster of flowers. The length of the leaves is great when compared with their breadth. The flowers are composed of concave parts, called *valves*, applied one over the other. When four of these valves belong to a single seed, the lower pair are called the *calyx*, or flower-cup, and the upper the *corolla* or blossom.

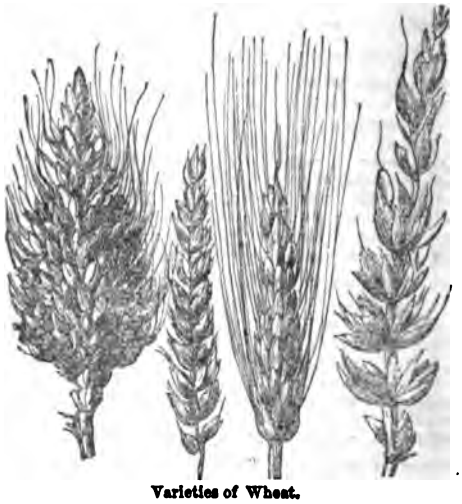
In some grasses every particular seed has a calyx and corolla; as the Canary grass, distinguished by its pretty and compact head of flowers; and the Timothy grass, remarkable for its long spike of flowers, resembling the tail of a cat. It is exactly the same with many others. In other cases a single pair of calyx leaves contains two or several florets. There is an example of the latter in the annual meadow-grass, on which the stems or bents are in flower for nearly six months of the year.

All *grains* belong to the humble tribe of grasses. They are annual plants, which complete their vegetation generally in a few months, and never in longer time than a year. All send up a hollow straw, or *culm*, which is divided into lengths by joints; at these joints the leaves are inserted, one at each joint on the alternate sides of the stem, and each leaf embraces the stem for some length like a sheath. These stems, moreover, always contain a portion of silex or earth of flint, hence their firmness and stability, while their ashes are useful for polishing articles formed of wood, horn, ivory, and some of the softer metals. The last leaf of the season becomes a sheath to the newly-formed flower, embracing it for a time so firmly that the sheath cannot be opened without difficulty. With the growth of the flower it bursts open its sheath, rises above it, and the leaf then turns backward.

The small yellow points which beautify an ear of wheat, when in flower, are the *anthers*, and there are generally three *stamens*. Two threads always appear at the top of every seed; these, called the *styles*, are pretty objects when viewed through a glass. Sometimes they are peculiarly elegant, as in the case of the floating sweet-grass. The head or ear consists of an uncertain number of flowers, followed by seeds. The plant on which many people chiefly depend for food is called *corn* by them; as *wheat* is in England, *oats* in the northern lowlands of Scotland, *rye* in the sandy districts on the southern shores of the Baltic Sea, and *maize* throughout the United States of America.

Let us look for a few moments at *wheat*, some varieties of which are exhibited in the following engravings:—

Fig. 1. Fig. 2. Fig. 3. Fig. 4.



Varieties of Wheat.

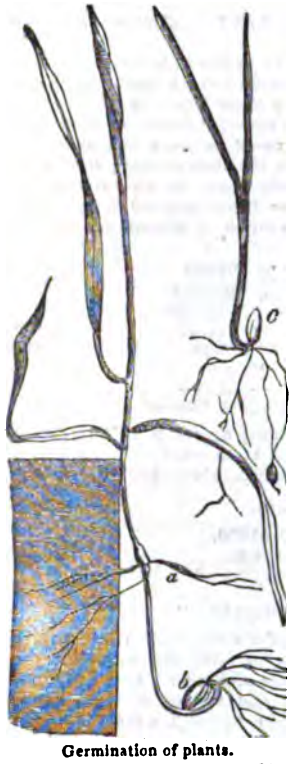
Fig. 1, the giant species; fig. 2, the common winter wheat; fig. 3, the bearded wheat; and fig. 4, the Talavera wheat.

The engraving, fig. *b*, represents a remarkable fact in the germination of wheat. The grain sends forth a young stalk, the bottom of which is surrounded with roots; and just where the stalk emerges from the earth, there is formed its first knot, from which springs a leaf. As soon as the atmosphere will allow, the same knot sends forth some lateral roots, which act as the real feeders of the plant; while the stalk and the roots that are beneath, speedily perish. In the figure, *a* represents the roots that issue from the first knot on the stalk when the seed *b* is properly covered with loose earth, capable of being duly acted on by the atmosphere; and *c* shows the state of the grain when it has been too superficially sown, and can produce neither lateral shoots nor after-stalk.

A full-grown, and perfect grain of wheat, is, in form, a compressed oval; first enclosed in certain chaffy sides, which are easily separated, and then in a membraneous covering,

which is wrapped about the seed much more closely. On one side of the grain a groove may be observed; and at the base on the opposite side, a small oval lump, which shows the germ of the future plant. The vessels by which the grain was attached to the plant, and through which it drew support until its maturity, were at the lowest end of this protuberance. When the seed is perfectly ripe, these vessels separate, the point of separation speedily heals, the grain may then be easily threshed out from the chaff in which it had been buried, and sometimes it sheds itself spontaneously.

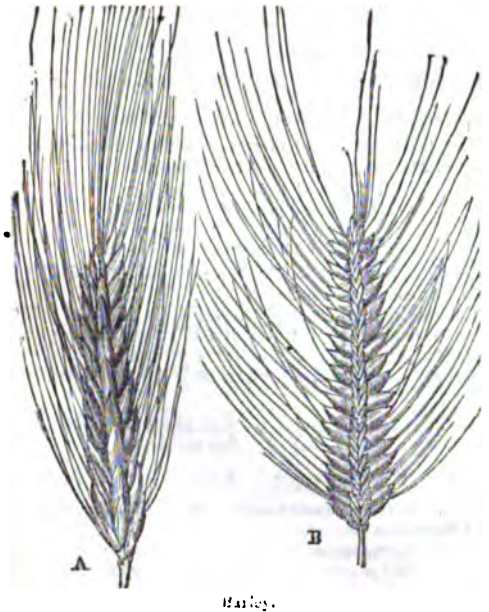
Fig. 5.



Germination of plants.

Wheat is very widely diffused. It flourishes not only in our temperate clime, but also in the extremes of heat and cold. In Lapland it is cultivated as far as sixty-eight or seventy degrees north latitude; and Humboldt found, in the neighbourhood of La Victoria, at the height of more than 2,000 feet above the ocean, some fields of wheat, mingled with plantations of coffee, plantains, and sugar-canes. Thus, as it is the plant most necessary to mankind, so it is the most general; while its presence in any region of the earth, attests the civilisation of man. In the sepulchres of the Egyptian kings, for example, the common wheat was found in vessels so perfectly closed, that the grains retained their form and colour; and as the corn-plants do not grow wild in any part of the earth, and appear

Fig. 6.



Barley.

as they do under culture, they show as clearly the civilisation of that country, as its temples which are now in ruins.

Barley is grown to almost as great an extent as wheat; more particularly in the East, as in Egypt and Syria, where it forms the staple grain for making bread. It wants, indeed, the substance called *gluten*, which appears peculiar to wheat, and makes flower form so good a paste, and which is essential in rendering fermented bread light. But in the East, barley is chiefly used for unleavened bread, in the form of thin cakes, so common among the peasantry of Scotland, and not unpalatable to those accustomed to its use. *Pearl barley* is the same vegetable, only freed from the husk by a mill. Barley-water, a decoction of pearl barley, is a valuable beverage. In the engraving, fig. 6, A represents the common kind, and B the fan barley.

The seeds of a corn plant are sometimes placed on a single rib or *rachis*, as in wheat and barley, and they then form a *spike*. In what is called Egyptian wheat this spike is compound, there being more than one rib, and if this consists of branches that are naked at their points of junction, and have *spikelets* at their extremities, they form a *panicle*; such, for example, is the case with *oats*. Oats will grow in soils which will not bear wheat or barley, and in situations not adapted to other grain. In the mountainous parts of Scotland, and the hilly districts of Derbyshire, it is almost the only grain cultivated. The ear of the oats blade has two forms, which are represented in the engraving, fig. 7. While young and light

Fig. 7.

Oats.

the branches arrange themselves round the centre of the stem; but as they advance towards maturity, and acquire weight, they generally bend over on one side. Thus, a beautiful provision is made for the health of the plant. For now the air and light can visit it freely, and the rain may wash every individual grain, and preserve it from the seeds of any destructive plants. And then, as the grains are pendent and have the open extremities of the chaff towards the earth, they are effectually defended from the lodgment of rain within—an advantage which neither wheat nor barley possesses, and hence are liable to diseases from which oats are exempted.

Such, then, is a brief description of some of the cultivated *grasses*, which have become so familiar, and so valuable as *corn*; and we may conclude the present lesson with an interesting and instructive anecdote related by Pliny. Cresinus, a Roman, was cited before an assembly of his people, on a charge of sorcery, from his reaping much larger crops than others from a small piece of ground. In answer to the charge, Cresinus produced his implements of husbandry, his well-fed oxen, and a hale young woman, his daughter, and pointing to them, he exclaimed, "These, Romans, are my instruments of witchcraft; but I cannot here show you my labours, sweats,

and anxious cares." And so it is in many other instances. We see the result, it may be with pleasure or astonishment, but the skill—the toil that secured it, is hidden from our view. Let us remember, however, that nothing valuable is gained without effort, and that labour, wisely directed and perseveringly employed, will achieve what many would regard as absolutely impossible.

LESSONS IN ARITHMETIC.—No. VII.

RULE OF SIMPLE MULTIPLICATION—*Continued.*

When the multiplier and multiplicand consist of several significant figures, then proceed according to the following rule.

Rule 4.—Place the figures of the multiplier under those of the multiplicand, as in addition or subtraction, so that units shall be under units, tens under tens, &c., and draw a line under it as before. Then, multiply all the figures of the multiplicand by the units' figure of the multiplier, and place the product under the line, as directed in Rule 1; next, multiply all the figures of the multiplicand by the tens' figure of the multiplier according to Rule 1, and place their product under the former, taking care to observe that as it is the product of tens, a cipher either expressed or understood should stand under the units of the preceding product, then the tens under the tens, the hundreds under the hundreds, &c. Again, multiply all the figures of the multiplicand by the hundreds' figure of the multiplier according to Rule 1, and place this product under the preceding one, observing that ciphers, either expressed or understood, should stand under the units and tens of that product, then the hundreds under the hundreds, the thousands under the thousands, &c., as before. Proceed in the same manner, multiplying all the figures of the multiplicand by the successive figures of the multiplier, and placing the successive products under each other, preserving them in their proper places, by ciphers, either expressed or understood, until the last product is obtained. Then, draw a line under the last product, and add together all the products thus obtained, when the sum will be the complete product of the multiplicand by the multiplier. The general principle of this rule is that *the product of two numbers is equal to the sum of the products of the one number by the several parts of the other number.*

Example 1.—Multiply 234567 by 376.

Factors	Multiplicand	234567
	Multiplier	376
units' product		1407402
tens' product		1641969
hundreds' product		703701
Complete product		88197192

In this example the partial products are put down with the ciphers *understood*; if they were put down with the ciphers *expressed*, the work would stand as follows:—

Factors	Multiplicand	234567
	Multiplier	376
Partial products	1407402	units' product
	16419690	tens' product
	70370100	hundreds' product
Complete product	88197192	

Note.—If ciphers occur as significant figures in the multiplier, it is not necessary to put down a line of ciphers as the product of the figures of the multiplicand by the cipher of the multiplier; but merely to place the partial products in their own proper places, without regard to the cipher or ciphers which may occur in the multiplier.

Example 2.—Multiply 3070809 by 20306.

Multiplicand		3070809
Multiplier		20306
Partial products	18424854	units' product
	9212427	hundreds' product
	6141618	tens of thousands' product
Complete product	62355847554	

Exercises.

1. Multiply 857142 by 19; by 23; by 48; by 97; by 103; by 987; and by 4562.

2. Find the products of the number 98998, by all the numbers from 11 to 49 inclusive, and the answers will be found in the table given in Exercise 6, page 58, No. IV.

3. 70508 × 70508; 1010101 × 20202; 99999×999; and 14285714285×7777.

When the factors have insignificant figures in both; or, in other words when the multiplicand and multiplier both terminate in any number of ciphers, proceed according to the following rule:—

Rule 5.—Multiply the significant figures of the factors as directed in Rule 4. Then, to the product annex as many ciphers as are annexed, both to the multiplier and the multiplicand; that is, to both factors. Should one of the factors have no ciphers annexed to it, then annex only as many as are found annexed to the other factor. The principle of this annexation of ciphers has alread been explained under Rule 3.

Example 1.—Multiply 4076800 by 307000.

Factors	Multiplicand	4076800
	Multiplier	307000
	285376	
	122304	
Product		1251577600000

Here the product of the significant figures is 40768×307=12515776; to this *five* ciphers must be annexed, because 100×1000=100000; and 12515776×10000=1251577600000.

Exercises.

1. Multiply 10101001000 by 100101000.
2. Multiply 707080800 by 909090000.
3. 300010003000×400100020000.

Proof of Multiplication.

Generally speaking, the best proof of multiplication is to reverse the position of the factors; that is, to make the multiplier the multiplicand, and the multiplicand the multiplier. As this process, however, would be both awkward and tedious in some cases, especially in its application to Rules 1, 2, and 3, a proof founded on the principle of Rule 4,—viz., that the product of two numbers is equal to the sum of the products of the one number by the several parts of the other number, is to be preferred. We proceed to show the application of this principle to rules 1, 2, and 3.

Taking the first example in Rule 1, we find that the multiplier 8 is composed of two parts, say 5 and 3; then, multiplying the multiplicand separately by each of these parts, and adding the partial products, we shall have the same result as if we multiplied by 8. Thus:—

Multiplicand	32768	Multiplicand	32768
1st partial multiplier	5	2nd partial multiplier	3
1st partial product	163840	2nd partial product	98304

Now taking these partial products and adding them together as follows, we have the complete product; thus:—

1st partial product	163840
2nd partial product	98304
Complete product	262144

As this product agrees with the former (page 94, No. VI.), the proof must be considered complete.

Again, taking the first example in rule 3, we find that the multiplier 900 is composed of 400 and 500; then, multiplying the multiplicand separately by each of these parts and adding them as before, we shall have the same result as if we multiplied by 900. Thus:—

Multiplicand	78912345600	Multiplicand	78912345600
1st multiplier	400	2nd multiplier	500
1st product	31564938240000	2nd product	39456172800000

Adding these partial products together, we have the complete product, as follows:—

1st product	31564938240000
2nd product	39456172800000
Complete product	71021111040000

This product being the same as before (page 95, No. VI.), the proof is complete.

Lastly, taking the first example in rule 4, and inverting the multiplier and multiplicand, we find the product as follows:—

Multiplier	376
Multiplicand	234567
	2632
	2256
	1880
	1504
	1128
	752
Product	88197192

The product or result here also, being the same as that formerly obtained under Rule 4, the proof is complete. The same principle as that adopted in the two preceding examples of proof may be followed in this example also; thus, separating 376 into any two parts, as 244 and 132, the partial products of the multiplicand by these numbers, will stand as follows:—

Multiplicand	234567	Multiplicand	234567
1st multiplier	244	2nd multiplier	132
	938268		469134
	938268		703701
	469134		234567
1st product	57234348	2nd product	30962844

Now adding these products as before, we have

1st product	57234348
2nd product	30962844
Complete product	88197192

The complete product here being the same as the preceding, the proof is again complete. To obtain the parts of a multiplier for this process, take any number less than the multiplier, for the 1st part; and subtract the 1st part from the multiplier, and you will obtain the 2nd part; then proceed as above.

As it may be of considerable use to many of our arithmetical readers, and may save a great many small calculations, we add here an *extended multiplication table*.

EXTENDED MULTIPLICATION TABLE.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
3	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
4	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
5	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
6	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120
7	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140
8	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160
9	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	144	153	162	171	180
10	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
11	11	22	33	44	55	66	77	88	99	110	121	132	143	154	165	176	187	198	209	220
12	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240
13	13	26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260
14	14	28	42	56	70	84	98	112	126	140	154	168	182	196	210	224	238	252	266	280
15	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300
16	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	256	272	288	304	320
17	17	34	51	68	85	102	119	136	153	170	187	204	221	238	255	272	289	306	323	340
18	18	36	54	72	90	108	126	144	162	180	198	216	234	252	270	288	306	324	342	360
19	19	38	57	76	95	114	133	152	171	190	209	228	247	266	285	304	323	342	361	380
20	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400

Besides various other uses to which this table may be applied, we shall point out *four* of considerable importance to the trading community. The vertical (upright) or horizontal (from side to side) column containing the products of 12 by all the numbers from 1 to 20, will be an excellent substitute for a *pence table*. If we take the vertical column of the products of 12, then the *number of shillings*, answering to any *number of pence* in this column, will be found in the *first* vertical column, on the left hand. Thus, if you wish to know how many shillings are in 204 pence, look down the column having 12 at the top, for the number 204, and in the same horizontal line with it, on the left, in the first vertical column, stands 17, the number of shillings.

The column containing the products of 20, by all the numbers from 1 to 30, will be a substitute for a *shillings' table*. If we take the vertical column of the products of 20, then the *number of pounds*, answering to any *number of shillings* in this column, will be found in the *first* vertical column, on the left hand. Thus, if you wish to know how many pounds are in 340 shillings, look down the column having 20 at the top, for the number 340, and in the same horizontal with it, on the left, in the first vertical column, stands 17, the number of pounds.

The column containing the products of 16 by all the numbers from 1 to 20, will be an *ounces' table*. If we take the vertical column of the products of 16, then the *number of pounds* (weight), answering to any *number of ounces* (avoirdupois) in this column, will be found in the first vertical column on the left hand. Thus if you wish to know how many pounds are in 224 ounces, look down the column having 16 at the top, for the number 224, and in the same horizontal line with it, on the left, in the first vertical column, stands 14, the number of pounds (weight).

Lastly, the column containing the products of 14 by all the numbers from 1 to 20, will be a *pounds' table* for stones. If we

take the vertical column of the products of 14, then the *number of stones* (weight) answering to any *number of pounds* in this column, will be found in the first vertical column on the left hand. Thus, if you wish to know how many stones are in 238 pounds, look down the column having 14 at the top for the number 238, and in the same horizontal line with it, on the left, in the first vertical column stands 17, the number of stones.

DEFINITION.—When a number is multiplied by itself, the product is called the *square* of the number. Thus, when we say 9 times 9 are 81, the number 81 is called the square of 9. The name *square* is borrowed from *applied geometry*, because in finding the area of a square, the length of whose side is given, we multiply this length, given in numbers, by itself, and the product is the area. Thus, if the side of a square was 6 feet long, the area of the square would be 36 square feet; because $6 \times 6 = 36$.

The table given above contains, diagonally (that is from corner to corner) from the blank corner to 400, in the last square on the right, the squares of all the numbers from 1 to 20. The square of any number is found at the place where the vertical and horizontal columns, that contain the number, meet. Thus, the square of 12 is found by running the eye down the column having 12 at the top, till it come to the horizontal column having 12 at the beginning. The square of 12 is thus found in the table to be 144.

LESSONS IN PHYSIOLOGY.—No. IV.

MAN.

WE take, for granted, that you now understand the theory of THE CIRCULATION OF THE BLOOD. Plants have no blood, but they have a circulation. In the leaf, the ascending sap undergoes such an elaboration or preparation as adapts it to the nourishment and growth of the plant; and from the leaf, there is a network of small vessels, which runs along the branches of the stem and roots, and by which the sap is thus conveyed to every part, till it is all but entirely exhausted by the different tissues through which it has circulated, taking up into themselves all its nutritive matter. The only condition necessary for the life and increase of the lowest plants, is, that they be in immediate contact with the two elements of air and water. Their whole substance is nourished by means of the fluid which surrounds them. Take, for example, the SEA-WEED—every part of its soft external surface being equally in contact with the water, every part of the weed takes from the surrounding fluid, and assimilates whatever is suited to itself. It is only, as we ascend the scale of animal life, that we find provision made for circulation; and this provision may consist of a single vessel, with the power of contracting and sending forward the fluid which it contains through all the vessels that issue from it, as in the STAR-FISH, up to the complex and wonderful structure and apparatus of the human heart.

The human body is made up of an assemblage of countless cells; but the arrangement and disposition of these cells is such, that they cannot all come into immediate contact with the influences of the external world, as in the case of a simple plant. Between the external world, however, and these cells, there comes the nutritive and vital fluid of the blood, which goes to every individual part of the body, and which, in its circulation, represents two distinct currents. One current conveys to the cells the material of nutrition and secretion; and the other current carries away from these cells the materials of absorption. The vessels or tubes, in which these currents are performed, are called the arteries and the veins. The arteries convey the blood in its pure and vital condition to every part of the system, and the veins take it up in a degenerated state, and carry it back to the heart and lungs, to come in contact with the air in the organs of respiration; while the absorbents are small, delicate, transparent vessels, which take up from the surface of the body, or from any cavity, those portions of nutritive matter which are not in a state of perfect solution, and which, by passing through the thoracic duct, or the passage which lies in the front of the spine, between the chest and the belly, is prepared for entering into the current of the blood. These little vessels are called LACTEALS, from the Latin word LAC, which signifies milk, because of the milk-like appearance of the fluid; or LYMPHATICS, because they absorb the lymph or superfluous moisture which is found in the body.

In a chemical point of view, the blood represents the whole body in a liquid state, since the blood contains all the elements which enter into the human frame, and which are combined in the form of albumen, febrine, colouring matter, fat, and salts. It is owing to this composition that the blood is fitted to furnish the materials of growth and increase to every individual part. But while it furnishes the materials of nutrition to every part of the body, it sustains itself a positive loss; and this loss must be continually made up, otherwise the blood will no longer be fitted to minister to the nutrition of a single part. If every tissue in the body is taking from the blood that which is adapted to support and preserve itself, then we must restore to the blood that which it has lost. This we do by the food which we eat, and the air which we breathe.

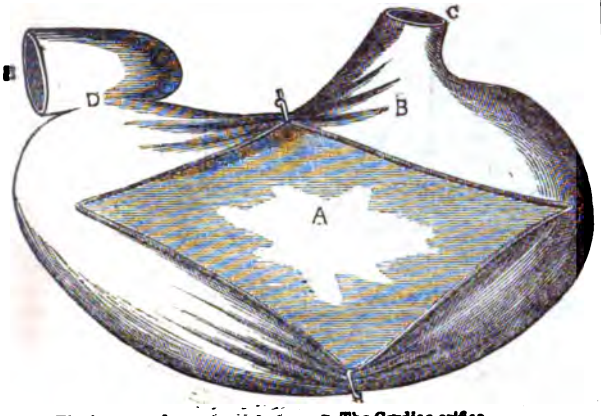
If the loss which the blood sustains is to be made up by our taking food, then the food itself must undergo certain changes. The first change takes place in the mouth. Why has the great Creator furnished the mouth with two rows of teeth? Though essential to beauty, they were given not for ornament only, but for use. Most articles of food require to be masticated or chewed. And for this a beautiful provision has been made in the teeth, of which we have sixteen in each jaw. Four of these are placed in the front, and are called INCISORS, from their power of cutting or dividing the food; two are named CANINE or dog-like teeth; and the other ten are known as molars or grinders.

In the act of chewing, the food becomes mixed with the SALIVA of the mouth, which partakes of an alkaline, and so reduces it into a kind of pulp. Till it is so reduced, it is not in a fit state to pass into the stomach. In the stomach the gastric juice should have access to every particle of matter that passes into it; but this is impossible unless there be a thorough admixture of the food and the saliva in the mouth. Persons who eat fast never sufficiently chew their food; being imperfectly chewed it never becomes thoroughly mixed with the saliva; and passing into the stomach in this state, it never digests as it ought, and hence such persons are doomed to suffer all the horrors which arise from indigestion. The mouth into which the food is received is lined with a beautiful thin membrane or covering, which extends backwards, and terminates in a common tube or funnel, which is called the PHARYNX. The pharynx is divided into prolonged tubes, one of which descending from the pharynx is called the ŒSOPHAGUS, or commencement of the digestive canal; while the other, which is situated in the pharynx and named the LARYNX AND TRACHEA, is the passage to the lungs or respiratory organs The digestive canal traverses the chest, developes itself in the bowels, terminates in the anus, and in its whole course represents a tube whose superior opening is the mouth.

Although the quantity of saliva formed in the mouth during four-and-twenty hours is from fifteen to twenty ounces, yet its flow takes place only as it is wanted, or as food is taken into the mouth, and the work of mastication goes on. But if you are hungry, and pass the kitchen during the process of cooking, or go into a room in which a nice dinner is being served, or even let your mind be directed to some favourite dish, there will be an instant flow of saliva, or to use the common phrase —a watering of the mouth.

The food being prepared by the mouth, this is followed by the act of swallowing. The pulp passes from the mouth into the œsophagus, which descends from the pharynx into the stomach. The stomach, of which the annexed engraving is but a simple and imperfect representation, is the grand receptacle for the food, and in which it comes into immediate contact with the GASTRIC JUICE. While the saliva is alkaline, this juice is acid, and is poured forth from the walls of the stomach on every successive introduction of food. The presence of food is necessary to excite this fluid, and hence it is never detected in the empty stomach. Its flow may be increased by taking a small quantity of salt, pepper, mustard, or any other stimu-

lating substance that can affect the mucous membrane. But stimulants taken in excess are injurious, as they retard the process of digestion. So is the introduction of any superfluous

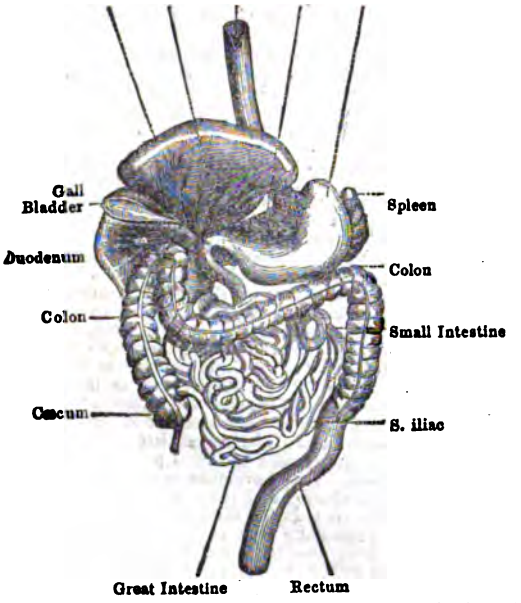


A The inner surface. B The Cardiac orifice.
C The Œsophagus, or passage into the stomach. D The Pyloric orifice.
E The intestine, or passage out of the stomach.

article into the stomach. So is the habit of taking more food than the system requires. So is the error of not allowing a sufficiently long interval between our meals. So is the practice of taking too much cold liquid. Digestion requires a temperature of about one hundred degrees, but if we fill the stomach with cold water or with ice, we reduce the power of digestion, and delay the process. All these errors should be carefully avoided. Never forget that it takes from three to five hours to perfect the work of digestion, and that in every instance, it is our duty to sacrifice taste to health.

The food being subjected to the action of the gastric juice, is gradually transformed into a greyish pap, something like gruel, and to which is given the name of CHYME. This is a purely chemical change, corresponding in some degree to fermentation, and during which, the alimentary substances in the stomach so completely lose their form and colour, and become so modified in their chemical nature, that it is no longer

Liver. Pylorus. Œsophagus. Pancreas. Stomach.



possible to recognise in the chyme the aliment out of which it has been formed. In quitting the stomach, the chyme passes into the DUODENUM, where it comes into contact with two new liquids—the bile and the pancreatic juice. The PANCREAS is a flat roundish gland, in form like the tongue of a dog, situated behind the stomach, and secretes a liquid resembling saliva in its appearance and chemical properties, and whose use seems to be to dilute the chyme, and to incorporate it with the bile, so as to produce the chemical changes necessary for the formation of CHYLE. The secretion of bile, is, therefore, a process of the highest importance in the human economy. Of this we feel sure from the size of the liver, and the large supply of blood which it receives. Though we are comparatively ignorant of the chemical action of the bile upon the chyme, it cannot be denied that the bile itself serves the most useful and beneficial purposes in the process of digestion. Among these uses, we may name the following:—

It renders more soluble the fatty matter that enters into most of our food.

It takes from the chyme a certain portion of its acidity, if its acid be in the extreme.

It gives to the chyme its colouring matter, and a resinous substance designed to prevent its decomposition.

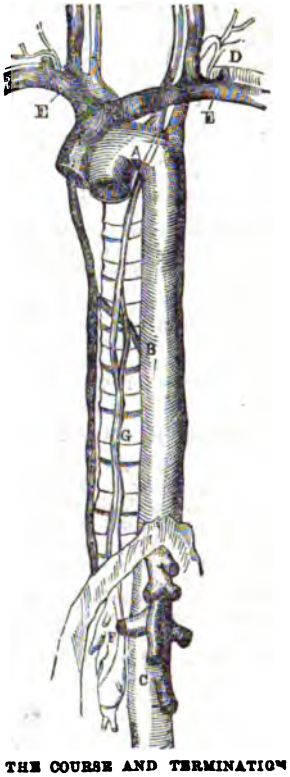
It partly excites in the intestine those movements which determine the progress of the chyme along the whole length of the intestinal canal.

Its flow into the intestine is favoured by the presence of chyme; but, if that flow is obstructed, all the digestive processes become disordered. It therefore aids digestion.

The action of the liver is constant; but when the bile is not wanted in the intestine, it accumulates in the gall-bladder, which opens and gives out its contents when needed, and meets the chyme as it passes from the stomach to the duodenum.

It withdraws from the blood certain products in a state of decomposition, and which would prove highly injurious to the whole system.

Independently of the pancreatic juice and the bile, which are poured into the intestine, there is formed, in the surface of this canal, a liquid, which is called the INTESTINAL JUICE, similar in its nature, source, and uses, to the gastric fluid, whose action it supplements and completes.



THE COURSE AND TERMINATION OF THE THORACIC DUCT.

[A The arch of the Aorta. B The Thoracic Aorta. C The Abdominal Aorta and Branches. D The left Subclavian Vein. E E The junction of the internal Jugular and Subclavian Vein at each side. F The Receptaculum Chyli. G The Thoracic Duct.]

The process of digestion being thus advanced, there are, on the walls of the intestines, what are called ABSORBENT VESSELS, which gradually withdraw the nutritious portion from the contents of the intestine, and this is carried by the circulating current into the most remote tissues of the body. These absorbent vessels are called LACTEALS, on account of the milky appearance of the fluid which is formed in them. This fluid is the chyle, and these vessels, in their course form larger trunks, which converge and pour their contents into a cavity, known by the name of the RECEPTACULUM CHYLI, or chyle-receptacle, which arises in the front and lower part of the spine. Into the same cavity are poured the contents of another system of vessels, which, from the transparency of their fluid or lymph, is called the LYMPHATIC SYSTEM, which, in its general design and end, is very closely allied to the lacteals. In the THORACIC DUCT or CANAL, which passes upwards in front of the spine, from the belly into the

chest, the chyle becomes mixed with the chyme, and is conducted by this canal into the vein which passes under the left clavicle, and there becomes mingled with the venous blood. The composition of the chyle is the same with that of the blood, and the blood contains all the elements which are required for the nutrition and growth of every part of the body, as well as to repair that incessant loss which is going on in the system. Reparation is the end of nutrition; and if the chyle hold in a state of solution all the material elements of this reparation, then the reparation itself may be realised by the addition of the chyle to the blood. We have seen that the chyle gets into the venous system; and all that is now needful, is, that the venous blood should come into contact with the oxygen of the air in the lungs, to be transformed into arterial blood, and thus regain its own vital and vivifying property.

Questions for Examination.

Can you describe the circulation in a plant, and in the lower kind of animals?

What does the blood in the human body represent when looked at in a chemical point of view?

Of what use are the teeth; and how are they divided?

What is the effect of eating our food too fast, and of drinking too much cold liquid?

What is the temperature necessary for digestion?

What change does the food undergo in the stomach?

What is the difference between the saliva and the gastric juice?

What juices does the chyme meet with in passing into the duodenum?

What important purposes are served by the bile?

In what vessel is the chyme found, and the lymph?

In what cavity do these lacteals and lymphatics empty themselves?

Where does the thoracic duct arise; and what is its course?

How does the chyle get into the current of the blood?

How is venous blood converted into arterial?

Does the chyle contain all the elements of the blood; and how does the blood supply the various parts of the body?

SOLUTION OF PROBLEMS AND QUERIES.

The following is the complete solution of query 8, No. II.

Euclid, Book I. Proposition XLVII. Theorem. *In any right-angled triangle, the square which is described upon the side subtending the right angle, is equal to the squares described upon the sides which contain the right angle.*

Let A B C (figs. 1 and 2), be a right-angled triangle, having the right angle B A C.

The square described upon the side B C, shall be equal to the squares described upon B A, A C.

On B C, describe the square B D E C (I. 46);
and, on B A, A C, the squares G B, H C;

Fig. 1.

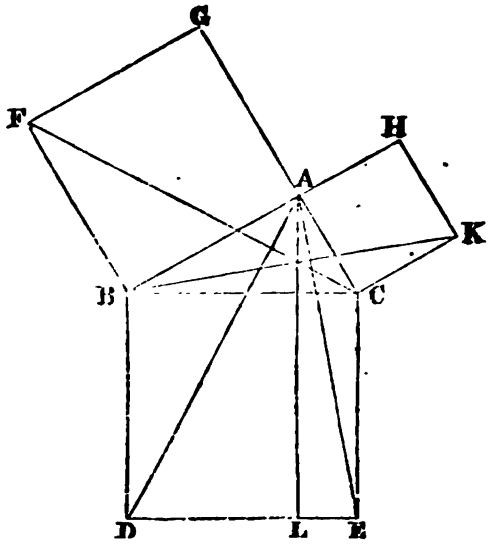
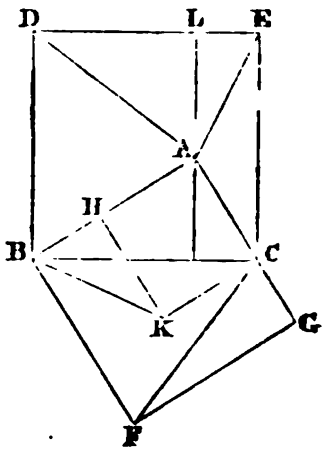


Fig. 2.



through A, draw A L parallel to B D, or C E (I. 31);
and join A D, F C.

Then, because the angle B A C is a right angle (hyp.),
and that the angle B A G is a right angle (def. 30),
the two straight lines A C, A G, UPON THE OPPOSITE SIDES of *on the same side*, of A B, make with it at the point A, THE ADJACENT ANGLES, *or the angles on the same side*, two right angles;
therefore, C A IS IN THE SAME STRAIGHT LINE with A G, or *coincides with it.* (I. 14.)

For the same reason, B A and A K are in the same straight line.

And, because the angle D B C is equal to the angle F B A,
each of them being a right angle,
ADD TO, *or subtract from*, each of these equals, the angle A B C;
therefore, THE WHOLE, *or the remaining*, angle D B A is equal to THE WHOLE, *or the remaining*, angle F B C (ax. 2).

And, because the two sides A B, B D, are equal to the two sides F B, B C, each to each, and the included angle A B D is equal to the included angle F B C,
therefore, the base A D is equal to the base F C (I. 4),
and the triangle A B D to the triangle F B C.

Now the parallelogram B L is double of the triangle A B D (I. 41),
because they are upon the same B D, and between the same parallels B D, A L;
also the square G B is double of the triangle F B C,
because these also are upon the same F B, and between the same parallels F B, G C.

But the doubles of equals are equal to one another (ax. 6);
therefore, the parallelogram B L is equal to the square G B.

Similarly, by joining A E, B K, it can be proved
that the parallelogram C L is equal to the square H C.

Therefore, the whole square B D E C is equal to the two squares G B, H C (ax. 2).

and the square B D E C is described upon the straight line B C, and the squares G B, H C, upon the straight lines A B, A C:
therefore, the square upon the side B C is equal to the squares upon the sides A B, A C.

Therefore, in any right-angled triangle, &c., Q. E. D.

In the preceding demonstration, which is taken from one of the latest and best editions of Euclid's Elements, we have only introduced, in italics, the words which refer *exclusively* to the second figure; the words in small capitals referring EXCLUSIVELY to the first figure, and the rest of the demonstration to both figures. It is evident to any one who attentively studies the first book of Euclid, that the chief, if not the sole intention of the author, was to establish the truth of the 47th Proposition, or, in other words, the Pythagorean Theorem, on the sure foundation of logical and irrefragable demonstration. Many students of Geometry have read this demonstration carefully—have admitted the truth established by it as convincing, provided the other propositions on which it is founded were true. They have then read the demonstrations of these other propositions, and those also of the propositions on which the latter were founded, and thus in a regular series retraced the steps of his reasoning back to the very first proposition. In this way, they have discovered that the Greek Geometry, as delivered to us by Euclid, is one of the most perfect specimens of pure and logical reasoning of which the human mind in this sublunary state is found to be capable.

From the incidental remark of the editor of his works, which led to the query solved in the preceding demonstration, we have

discovered not only his mistake, but the deficiency even of Euclid's work, although it be a masterpiece. It is evident that he never contemplated the construction of the squares on the *interior* sides of the triangle, as shown in fig. 2, otherwise he would have found it necessary to alter the enunciation of the 14th proposition of the first book into the following:—

If at a point in a straight line two other straight lines make the two angles on opposite sides of it, or the two angles on the same side of it, either two right angles, or together equal to two right angles, these two straight lines shall be either in the same straight line, or shall coincide with each other.

It will be a useful exercise for some of our more advanced readers to demonstrate the truth of this proposition under its new phase. In the printed arrangement of the preceding demonstration, we have adopted the very useful method followed by Mr. Potts in his edition of Euclid; where the text is "so arranged as to exhibit to the eye of the student the successive steps of the demonstration, and thus to facilitate his apprehension of the reasoning."

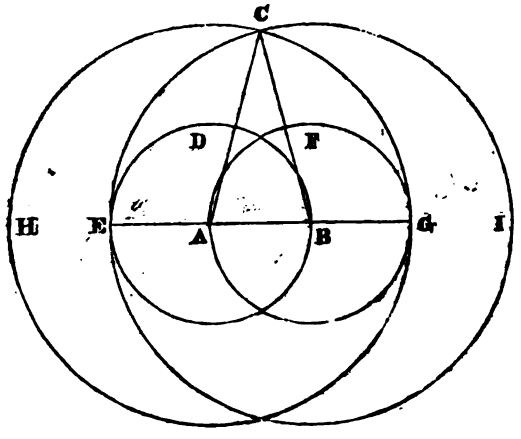
In conclusion, we remark, that although the above demonstration is complete as regards the construction of the squares on the *interior* sides of the triangle, we shall not now consider the demonstration of the Pythagorean theorem absolutely complete, until our geometrical correspondents have actually solved all the possible cases of construction, which are the following six:—

1. The squares on the three *exterior* sides of the triangle.
2. The squares on the three *interior* sides of the triangle.
3. The two smaller squares on the *exterior* sides, and the greater on the *interior* side.
4. The two smaller squares on the *interior* sides, and the greater on the *exterior* side.
5. The greater and one of the smaller squares on the *exterior* sides, and the other on the *interior* side.
6. The greater and one of the smaller squares on the *interior* side, and the other on the *exterior* side.

The first case is that given by Euclid. The second is that given above, and solved by many correspondents. The third we have repeatedly seen. But we should like to see a demonstration adapted to all the cases at once, with such necessary differences as are given in the preceding one.

PROBLEM.—*To describe an isosceles triangle, such that each of its legs shall be double the base or third side.*

Let A B be the given base. It is required to describe an isosceles triangle on A B, such that each of its legs shall be double A B.



From the points A and B as centres, with radius A B, describe the circles B D E, A F G; produce A B both ways to E and G; then, from the point A, as a centre with radius A G, deacribe the circle G C H; from the point B, as a centre with radius B E describe the circle E C I; and from the point C, where the circles intersect, draw C A, C B; then C A B is the triangle required.

Because A B is equal to A B (I. Euc. def. 15), therefore B E is double of A B; for the same reason, A G is double of A B. Because A is the centre of the circle G C H, therefore A C is equal to A G (I. Euc. def. 15); but A G is double of A B, therefore A C is double of A B; in like manner it may be shown that B C is double of A B; wherefore A C and B C are each double of A B; they are, therefore, equal to each other (I. Euc. ax. 6), and the triangle A C B is the isosceles triangle required.

Of this problem we have received many correct solutions exactly similar to the above. Owing to the problem being put without reference to a given base, we have received a number of solutions of a different kind, but equally correct. Others, however, have not confined themselves within the prescribed limits; and therefore their solutions, though correct in themselves are not so in reference to these limits.

PROBLEMS AND QUERIES.

1. Draw a straight line at right angles to a given straight line from one of its extremities without producing it, and give a demonstration with as few propositions from Euclid as possible, but still geometrically correct.

2. If sound travels at the rate of 1,142 feet per second, and a stone falls through the height of 16 feet 1 inch per second, from what height would a stone fall, which should occupy the same time in falling through it, that sound would occupy in ascending it?—E. J. R. B.

3. In the figure of the 47th Proposition of the First Book of Euclid's Elements (see figs. 1, 2, preceding page), if the points F D, G H, and K E, of the squares B G, C H, and C D, be joined, they will form three triangles—F B D, G A H, and K C E, which are all equal to one another; required the proof.

4. In the same figure, prove that the straight lines F C, B K, intersect each other and the straight line A L in the same point.

5. Show how the squares B G and C H, if made of paper or pasteboard, must be cut, so that the pieces may be laid upon the square B E, and made exactly to fit or cover it, without leaving any space under or over.

CORRESPONDENCE.

To the Editor.

The following is an answer to question 4 in the Arithmetic Lesson No. IV., page 58:—The nine digits may be arranged several ways to produce this result. Thus:

(1)	(2)	(3)	(4)	(5)	(6)
276	834	438	294	816	672
951	159	951	753	357	159
438	672	276	618	492	834

James-street, Oxford-street, April 21, 1852.

Yours respectfully,
JAMES VEECOCK.

A correspondent, E. C., earnestly suggests to us the utility of giving Lessons on Politeness, and our social duties to friends and foes, male and female, somewhat in the Chesterfield style. He draws a contrast between foreign manners and our own, to the disadvantage of the latter; and instances a case where, on two afternoons in the week, the children in schools are lectured on the art of politeness, and their social bearing towards all classes of society,—namely, in the Grand Duchy of Baden. He relates an anecdote of what he witnessed and was ashamed of in the conduct of some of his countrymen on the quay at B——. American politeness invited English on-lookers to inspect a ship. Females as well as males availed themselves of the offer. The female descent of the ladder in returning after inspection, excited the risibility of an English crowd to the degree called the *horse-laugh;* while American politeness, in the shape of a common sailor, at once removed the cause, and prevented the repetition of the insult.

As another instance, which we have often witnessed ourselves, he mentions that of a gentlemen and lady walking on the pavement, the lady being *next the kerb*, and forced off into the dirty street by persons standing in a knot on the pavement, or walking and talking together, without any regard to the comfort and convenience of others. He also wishes the masses to be taught, how to settle disputes among themselves by arbitration, as is done among the upper classes, rather than by "fighting it out," as the phrase is. We think our correspondent is right, to a considerable extent, and we hope his abstract of his remarks will be taken in good part by those for whom it is intended.

LITERARY NOTICES.

The EMIGRANT'S HANDBOOK, a Guide to the Various Fields of Emigration in all Parts of the Globe, is now ready, price 6d.

The ILLUSTRATED EXHIBITOR and MAGAZINE OF ART, is in course of issue in Weekly Numbers, price 2d.; Monthly Parts, price 9d.; or if containing five weekly numbers, price 11d. The *fourth* Monthly Part, price 9d., contains a Portrait of the late J. M. W Turner, R.A., drawn by J. Gilbert, and engraved by W. J. Linton together with upwards of forty other choice illustrations. The first half-yearly volume of this truly National Illustrated Work will be published July 1st, in a style of binding in strict accordance with the character of the work, price 6s. 6d. It may with safety be asserted that this volume will contain a larger number of first class engravings, executed in the most finished manner, than has ever previously appeared in works of three times the cost.

SCRIPTURE LIBRARY FOR THE YOUNG, in Shilling Volumes.—The first two volumes of this instructive series of works, "The LIFE of JOSEPH," illustrated with sixteen choice engravings and maps, and "The TABERNACLE, its PRIESTS, and SERVICES," with twelve engravings, are now ready.

ANSWERS TO CORRESPONDENTS.

A. W. (Aberdeen).—He is right; there is a mistake in the place to which he refers, which has been corrected.

W. M. H. (Hull).—SACKVILLE.—F. L. C.—Lessons on the subject they mention will be given as soon as proper arrangements can be made.

J. S. K. (Kirby, Notts.)—The words to which he refers are all pronounced so that the *a* in them sounds like the *a* in *ae*, with the exception of what may be included in his &c.; for this we cannot answer.

An admirer and student at Newcastle is rather sharp on our English grammarian; but *Lennie* is no authority, neither is Cobbett; and Murray is on the wane. *Use* has the power to alter a language, and use will do it too. As to mathematical instruments, we can only give him our own experience,—viz., that with a pair of small bow compasses, and a common ruler, or straight-edge, we carefully constructed *all the figures* of the Elements of Euclid. And, with the addition of the diagonal scale, we solved many practical questions and problems deducible from the same, in mensuration, surveying, trigonometry, &c. The price of the small compasses, about three inches in length, which served us for a geometrical pen, a pair of dividers, and various other purposes, was 1s. 6d. The common ruler, was the bevelled edge of a diagonal scale, which cost about 1s.; so that, for about half-a-crown, we had a couple of instruments that served our purpose for many a long day.

AMY (Northwich).—A friend, under this name, suggests that it would be well to render the French exercises more useful, by substituting the qualities of different objects, their origin, use, &c., for unconnected sentences, for instance, using the verb "avoir" and "un œuf." What has an egg? It has an outside, an inside, a surface, a shell, a porous membrane, the white, the yolk, the embryo or germ. What shape has the egg? It has an oval shape. How many eggs has the hen? She has thirteen, and perhaps will have twelve chickens, &c. Then with "être." Where is the hen's nest? It is in the poultry yard, where the cock is also. What colour is the egg-shell? It is white. What are its qualities? It is hard, yet porous. And so on, till the whole egg was examined, thus giving connexion and precision of ideas, at the same time that accurate words were acquired. Afterwards the same object might be recapitulated with other verbs: and thus well fixed in the memory, with facts and observations worth treasuring up. It is quite possible to pack a multitude of materials in a small box, if skilfully disposed; why not written ideas and words in the mind?

R. A. (Dublin).—His suggestion is a very good one indeed; but we fear our subscribers would soon get tired of it, and that would defeat our purpose. There are many cheap publications on the subjects he mentions, but they are subjects upon which we intend to have papers ourselves.

J. P. COX.—A list of the best books on the subjects of which the various papers or articles treat will be a desideratum which we shall endeavour to supply; but this must be deferred to the close of each series, as we wish our own work to be first and specially consulted in reference to any subject of which it treats.

J. W——N (Newtown).—When our treatise on the French language is completed, we shall consider it sufficient in itself to educate a pupil in that language.

F. BLANELEY.—His idea of an intercommunication page is very good, and so is the sample; but we prefer the idea of correspondence, notes and queries, under our own control and management, in order to prevent the circulation of error.

LIVER.—The subject he mentions will be begun as soon as possible. He is quite right in his Latin lessons. *Amare, to love, to be fond of*, expresses generally the love of affection, whether with or without reflection or consideration; hence it is distinguished from diligere, *to value, to have an affection grounded on esteem*, as the etymology of the word implies; for diligere is derived from *dis* and *legere;* now *dis* is a preposition only used *in composition*, that is, in union with other words; and it means *separately* or *apart;* legere means to *gather* or *collect*, (from the Greek *lego*, to lay), that is, *to lay together;* but as whatever is *laid together* or *collected apart* is peculiarly *esteemed* or *loved*, it naturally follows that the verb diligere signifies *to love* in a more rational manner than amare does, which merely implies an affection of the mind without particular regard to the grounds or the consequences of the passion. This correspondent deserves high commendation for his laudable desire to improve himself, and for the means which he proposed to employ for that purpose. We are glad to think that our journal is likely to prove so serviceable to him.

J. PARSELLE (Kennington).—His solution of the 8th query in No. II. is complete, and similar to that inserted in this number.

JOSEPH WEBSTER.—His ingenious communication is under consideration.

EUROPA.—Lessons on the first-mentioned subject are in actual preparation, and will soon make their appearance. The other subject will also occupy our most anxious attention as soon as we can afford room; but really we must finish some of the lessons in hand before we begin others.

H. H. M. D. CAMBRAY (Cheltenham).—His communication had fallen aside. We now state that without some further explanation we cannot give a decided answer on the subject to which he refers. Of course, the subject he is anxious about will appear.

WM. WALTON.—He is right in his objection; the want he complains of must be supplied.

INDOCTUS.—We shall make some inquiry about the biographers' subject he speaks of.

A HARD WORKER AND THINKER.—The omission will be supplied. The subjects he mentions will be treated of in our pages.

A Subscriber, at Bishop-Auckland, puts in a word or two for the ladies' department of our pages. With every wish to serve the fair sex, we fear that the great objects we have in view, namely the improvement of the mind, and the elevation of the character, by the diffusion of literature and science among the people, will preclude our attempting to meet her wishes for some time to come. Still, if she can really assist us by her own efforts, to disseminate the kind of information she proposes, in a way that we can heartily approve of, we shall be glad to give her some encouragement in the attempt.

C. BATES.—The simplest method of ascertaining the circumference of the earth at any latitude (by which we understand the length of any parallel of latitude), is to multiply the circumference of the earth at the equator, or rather its mean circumference, by the cosine of the given latitude. Otherwise: in "Keith on the Globes," there is a table of the the length of a degree of longitude, in geographical miles, corresponding to every degree of latitude, from the equator to the pole, appended to the ninth problem on the terrestrial globe. Take the number from the table, corresponding to the given latitude, and multiply it by 360, the product will be the circumference required in geographical miles. To convert them into British miles, *very nearly;* take *a tenth part* of the geographical miles, and the *half* of this *tenth part;* then add these parts and the whole together, and the sum will be the required answer, within a small fraction of the truth.

C. L.—There is a mistake in the VOCABULARY, in page 35, column 1 No. III., for vincio, *I conquer*, read vinco, *I bind*. In the same page, *stay* is a misprint for *stay*. As to *amare* and *diligere*, they both mean *to love*. The errors have been corrected in later impressions.

W. P. (Dublin).—The syllables are written according to the *pronunciation*. Why should our Dublin friends want them spelt in the Italian language? Not many others, we are persuaded, have any desire to be puzzled with Italian spelling in their music lessons. The change of *Si* (See) for *Te*, is already explained.

CANTABO (Hounslow).—The monochord could not be used to set the "pattern," unless you could "stop" the strings at the appointed places very rapidly. Pianos are very commonly tuned more "sweet," that is more correctly, in the keys most used, being, in proportion, all the more out of tune in the others. The best "pattern" is the voice of a correct singer. An equally accurate one is the notes of a well-played violin. If you can strike the right notes on the piano (taking care of the flats or sharps peculiar to the different keys), you can set yourself the "pattern" from that instrument. But let it be only a pattern. Do not sing with the piano. Though few persons can say where precisely the piano notes are wrong, or to what extent, by the ear alone, yet almost any one can feel, as the general effect, that they are not so true and satisfactory as a "concert of sweet voices." It is *easier* and more *natural* to sing a perfect tune than in "temperament." Therefore you will soon become more perfect than your piano-pattern, especially if you study the "mental effect of notes," of which more anon. A piano tuned by "equal temperament," would be most nearly right on the *fifth*, the *fourth*, and the *second* of the scale. The third *(Me)*, the sixth *(La)*, and the seventh *(Te)*, would be considerably too sharp. An "accordion" or "German concertina," which gives only one key, and that tuned "sweet," would be useful for giving the pattern in the earlier lessons. If you *observe* and *think* you will soon grow independent of the pattern, and a pattern in one key would serve you for any other.

MICH. RAFFERTY.—The memory, like other powers of the mind, is strengthened by exercise. He should endeavour to learn some useful rules by heart, and the effort itself would assist greatly in producing the power of concentration in the mind. He should, however, proceed by degrees, and not attempt too much at first. Let him begin by carrying the calf, and he will ere long be able to carry the bull.

*** The inquiries of subscribers, well-wishers, admirers, scholars, &c. &c., are really more than we can meet individually. Hebrew, Drawing, Perspective, Shadow, Phonography, Electro-Biology, and the whole range of the arts and sciences are all expected to be commenced in every successive number! Our readers ought to reflect that all this is actually impossible. Putting the question of expense entirely aside, the powers of men are limited, and time is positively required to bring every subject under notice in its appointed order. Again we request that our correspondents will have patience, and give us time to prepare for the proper arrangement and discussion of the subjects to be introduced.

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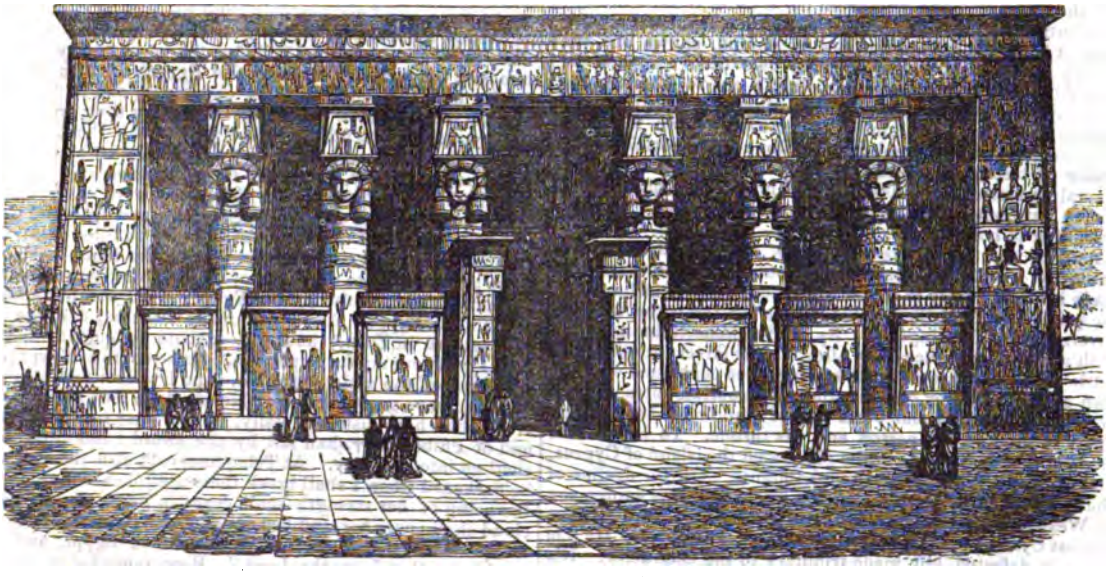
LESSONS IN ANCIENT HISTORY.—No. IV.

By Robert Ferguson, LL.D.

It is a fact in history, of which the young student should never lose sight, that before states and kingdoms submit to foreign power, they will be found, if not outwardly and visibly, yet secretly and internally undermined. The conduct of Psammetichus towards the caste of warriors, which included the whole class of the nobility, created the most serious division between them and the princes of the throne. The disaffection of these nobles, led Psammetichus to take Greek soldiers into his pay, and intrust the defence of Egypt to an army of foreign mercenaries. This circumstance, together with the growing commercial intercourse with the Greeks, and the number of Greek settlements in Lower Egypt, all prepared the way for the subsequent conquest of this division of the kingdom. In fact, so close was the connexion between Greece and Egypt, and so fully did they correspond in their institutions and pursuits, that in the reign of Psammis, the son of Necho, an embassy was sent from the city of Elis, to obtain



TEMPLE OF DENDERA.

instruction from the Egyptian priests for the management of the Olympic games.

In the year, B.C. 594, Apries, the Pharaoh-Hophra of Scripture, ascended the throne, as a prince distinguished for his martial prowess. On his accession, he hazarded a war with the Phœnician States, took the rich city of Sidon, and returned to Egypt laden with spoil. It was this success, which, in all likelihood, led Hezekiah, king of Judah, to form an alliance with him against Nebuchadnezzar. The monarch of Babylon, having, with his army, taken up a position before Jerusalem, it appears, that, to relieve the city, which was now in such imminent danger, Apries marched his forces from Egypt; but no sooner did he come in sight of the Babylonian troops, than his courage failed him; he retreated with all haste, and left the Jews in the hand of the enemy. For this act of perfidy, God, by the mouth of his servant Ezekiel, denounced the severest judgments on the Egyptians and their sovereign. He charges Pharaoh-Hophra with the most extravagant pride and profanity, in affecting to himself divine honours, and in so boasting of the strength and internal resources of his kingdom, as if not any god could dispossess him. He then addresses him under the image of one of those crocodiles or monsters which inhabited the river of that country, of whose riches and revenue he so loudly vaunted, and tells him, that, with as much ease as a fisher drags the fish he has hooked, God would drag him and his people to captivity, where their carcasses would fall a prey to birds and wild beasts;—that he should be subjected to the Babylonian yoke till the fall of that great empire, and that even after that catastrophe, Egypt should continue to be the basest of kingdoms.

For thirteen years Nebuchadnezzar had been employed in the siege of Tyre, till the head of every soldier had become bald by the constant wear and friction of his helmet, and his shoulder had become peeled by the heavy burdens which he was doomed to carry in raising the necessary fortifications. And all this toil and endurance ended in getting possession of an empty city, for the inhabitants gradually withdrew till not a soul was left behind. Nebuchadnezzar then turned his arms against Egypt, at a time when the kingdom was being rent asunder by internal feuds and divisions. A Grecian colony of Cyrene having reinforced themselves by a large addition of their own countrymen, under their third king, Battus the Happy, commenced an attack on the neighbouring Libyans, and took possession of their lands. Andican, king of Libya, applied for aid to Pharaoh-Hophra, who sent a large and powerful army to his relief. The Egyptians were overthrown with tremendous loss; while those who escaped, with a view to cover their retreat, affected to say that they had been betrayed by their monarch. The people were foolish enough to believe these fugitives, and then followed a universal revolt. In vain did Apries try to bring back his subjects to a sense of their duty. His friend Amasis took advantage of this popular

disaffection to usurp the supreme authority. He enlisted the whole kingdom in his favour, challenged Apries to an open conflict, came to battle with him near Memphis, took him prisoner, treated him for a time with great kindness and respect, but the people becoming clamorous for his life, he at length delivered him into their hands; and no sooner had they got possession of the royal captive than they strangled him, and committed his body ingloriously to the grave. Thus was fulfilled the prophecy of Jeremiah:—"Behold! I will give Pharaoh-Hophra, king of Egypt, into the hand of his enemies, and into the hand of them that seek his life; as I gave Zedekiah, king of Judah, into the hand of Nebuchadnezzar, his enemy, and that sought his life."* According to Ezekiel,† the king of Babylon was to leave Egypt so ruined and desolate that its waters should run as pure as oil, without the feet of man or the hoof of beast to disturb them; while the Egyptian monarch, should, like a beast of prey, be caught and slain, and his carcass thrown out to the fowls of heaven. More than this:—a place in the lower regions is ordered to be prepared for him and his host; while those who buried the slain are commanded to drag him and his followers to the subterraneous mansions. At the tumult and commotion excited by this command, the infernal Shades are represented as roused from their couches to learn the cause. They see and hail the king of Egypt, and again lie down to their slumbers. Once introduced into this immense subterraneous cavern, the prophet leads the unhappy prince all around, shows him the gloomy mansions of former tyrants, tells their names as he goes along, and concludes with pointing out to Pharaoh the place appropriated to him, and in which, in the midst of despots and tyrants like himself, he must lie down for ever! The imagery of the prophet is sublime and terrible. No reader of taste and feeling can go along with him in this funeral procession, and descend with him to the mansions of Hades, without being impressed with a degree of awe approaching to horror itself.

Amasis who in the year B.C. 569, assumed the supreme authority, was a man of mean birth, but of great abilities. He made it his first duty to secure the affection and attachment of the priesthood, and then enacted laws for the better internal government of the kingdom. By allying himself in marriage with a Cyrenean princess, by allowing the Greeks to come and settle in Egypt, or to carry on an unfettered commerce with his own subjects, and by granting them appropriate sites for the erection of temples and other sacred buildings, he attached many of them to his person and his throne. To ensure the trade of the Mediterranean, he conquered the island of Cyprus, and exacted a tribute from the inhabitants. On the decline of the Babylonian power, he aimed at establishing his supremacy in Western Asia, and entered into an alliance with Crœsus against Cyrus, the Persian monarch. It was a fatal step. He was not only defeated, but made tributary to the conqueror. His proud spirit could not brook this humiliation, and on the death of Cyrus, he attempted to assert his independence. Cambyses, who now occupied the Persian throne, vowed the destruction of Amasis. Unfortunately for Amasis, and at the moment when he stood most in need of succour, the commander of his Grecian auxiliaries, Phanes of Halicarnassus, had some private quarrel with his royal master, and leaving Egypt, embarked for Persia, and presented himself to Cambyses, just as Cambyses was meditating the destruction of the Egyptian monarchy. As if to hasten his own ruin, Amasis now broke off his alliance with Polycrates, king of Samos—a man whose history was made up of uninterrupted prosperity and success—and Polycrates, finding that he could better dispense with the services of Amasis, than Amasis could dispense with his succour and help, threw himself into the arms of Cambyses, and offered to assist him, both by sea and land, in his expedition against Egypt. The crisis came. But ere Cambyses had time to reach the scene of action, Amasis died, B.C. 525, after a reign of forty-four years, and left to his son, Psammenitus, a kingdom rent and torn, and on the point of ruin, by its own internal divisions.

Scarcely had Psammenitus ascended the throne, when Cambyses laid siege to Pelusium, and took it with but little resistance. His conquest was the effect of device. Having placed in front of his army a number of animals which the Egyptians held sacred, he thus deterred them from throwing one dart, or shooting an arrow, lest they should kill any of these sacred animals. Psammenitus waited his opportunity; and, having raised a numerous army, advanced against Cambyses. But, before the engagement, the Greeks who served under him, in order that they might avenge the desertion and treachery of Phanes, brought his children into the camp; put them to death in the presence of their father, and then drank their blood. This awakened the indignation of the Persians, who fell upon the Egyptians with the utmost fury, and cut the greater part of them in pieces. Those who escaped fled to Memphis, where, having been guilty of the murder of one of the Persian ambassadors, Cambyses renewed his assault, and spared neither rank, nor age, nor sex. He put to death the chief of the Egyptian nobles, and reduced their wives and daughters to slavery. Psammenitus was not in a position to save his capital, and he himself fell into the hands of the conqueror. At first, Cambyses seemed to spare the life of the captive prince; but, Psammenitus having committed himself to some treacherous design, he was afterwards doomed to drink bull's blood, which acted as a fatal poison. The allies of the Egyptian monarch at once submitted to Cambyses. The Egyptians were reduced to the most degrading vassalage their country became a province of the Persian empire; the body of Amasis, their late king, was dug up, and mangled and burnt; their god Apis was slain, and his priests treated with the deepest ignominy.

The foundation was thus laid for the most deadly national animosity between the Persians and Egyptians. On the one side we find the most crushing oppression, and on the other side, the most hopeless rebellion. Led on by their priesthood, the Egyptians frequently rebelled against the Persians; and the Persians, who regarded every ecclesiastical hierarchy as their natural enemy, punished these insurrections with the most heartless severity. The Egyptians were never able to regain and establish their independence; and thus the deep-toned prediction of Ezekiel was literally fulfilled:*—"thus saith the Lord God:—I will also destroy the idols, and I will cause their images to cease out of Noph;† and there shall be no more a prince of the land of Egypt; and I will put a fear in the land of Egypt. And I will make Pathros‡ desolate, and will set fire in Zoan,§ and will execute judgments in No. And I will pour my fury upon Sin,¶ the strength of Egypt; and I will cut off the multitude of No. And I will set fire in Egypt; Sin shall have great pain, and No shall be rent asunder, and Noph shall have distresses daily. The young men of Aven** and of Phibeseth†† shall fall by the sword; and these cities shall go into captivity. At Tehaphnehes‡‡ also the day shall be darkened when I shall break there the yokes of Egypt; and the pomp of her strength shall cease in her. As for her, a cloud shall cover her, and her daughters shall go into into captivity. Thus will I execute judgments in Egypt, and they shall know that I am the Lord." How remarkably has this prophecy been accomplished! For more than two thousand years, Egypt has produced nothing great or remarkable in learning, wisdom, or exploit. From the conquest of Cambyses, it has continued to be the basest of kingdoms. Without a prince of its own, it has ever been subject either to foreigners or to slaves. It was first subject to the Babylonians, then to the Persians:—afterwards to the Macedonians, and then to the Romans:—from them it passed to the Saracens, from the Saracens to the Mamelucs or slave usurpers, and from the Mamelucs to the Ottoman empire, of which it now forms a province governed by a Turkish Bashaw and twenty chiefs, advanced from among the slaves to the administration of public affairs. It was a superstitious notion or belief among the Egyptians, that it is decreed by the Fates, that slaves must always rule, and the natives be in subjection. What profound homage to the omniscient Spirit who sees the end from the beginning!

Questions for Examination

What grand truth should the student of history ever keep in mind?

To what did the policy of Psammetichus lead?

* Jeremiah xliv. 30. † Ezekiel xxix.—xxxii.

* Ezekiel xxx. 13—19.

† Memphis. ‡ Thebais. § Tanis, the metropolis in the time of Moses. ¶ Pelusium. ** Heliopolis. †† Bubastes. ‡‡ Daphnæ Pelusiæ, where the prophet Jeremiah is said to have been put to death.

When did Apries ascend the throne, and for what was he remarkable?

What ally did he betray, and how was he punished?

Which of the prophets describe the fate of Apries, and by what name do they describe him?

Who succeeded Necho, and in what year?

What were the chief features and events of his reign?

By what prince was the throne and kingdom of Amasis endangered?

In whose reign did Cambyses lay siege to Pelusium, and by what stratagem did he take it?

Did the Egyptians ever regain their independence?

How were they treated by Cambyses and the Persians?

What has been the state of Egypt and the Egyptians since the Persian conquest?

Has any remarkable prophecy been fulfilled in their history from that time?

What does the accomplishment of such predictions prove?

LESSONS IN LATIN.—No. VII.

By JOHN R. BEARD, D.D.

SUBSTANTIVES of the fourth declension have in the nominative two case-endings, one in *us*, the other in *u*. The nouns which end in *us* are for the most part masculine; those which end in *u* are neuter, and are indeclinable. The *u* belongs to the stem. With this *u* are blended the case-endings of the genitive and ablative singular, and the nominative and accusative plural; hus *u* and *is* become *ū* in the genitive singular; *u* and *e* become *ū* in the ablative singular; *u* and *es* become *ūs* in the nominative and accusative plural. The fourth conjugation then, is only a contracted form of the third; contracted, I say, that is shortened, as when *u* and *e* are melted together to form *ū* the case-ending of the genitive singular.

FOURTH DECLENSION.

Sign *ūs* in the Genitive Singular

CASE-ENDINGS.

	Singular.			*Plural.*	
Cases.	M. and F.	N.	*Cases.*	M. and F.	N.
Nom.	ŭs	ū	Nom.	ūs	ŭ
Gen.	ūs	ū	Gen.	ŭum	ŭum
Dat.	ŭi or ū	ū	Dat.	ĭbus	ĭbus
Acc.	ŭm	ū	Acc.	ūs	ŭ
Voc.	ŭs	ū	Voc.	ūs	ŭ
Abl.	ū	ū	Abl.	ĭbus	ĭbus

The following words have in the dative and ablative singular *ŭbus* instead of *ĭbus*; namely, ĭcus, *f. a needle*; arcus, m. *a bow*; artus, m. *a limb*; partus, m. *a birth* or *offspring*; lacus, m. *a lake* or *inland sea*; quercus, *f. an oak*; specus, m. *a cave* or *grotto*; tribus, *f. a tribe*; pecu, n. *cattle*; veru, n. *a spit*.

As *u* belongs to the stem, *ŭbus* is the regular form in the dative and ablative plural; but the *u* has been set aside by the connecting vowel *i*, as in fruct-*i*-bus.

EXAMPLES.—Fructus, m. *fruit*; cornu, n. *a horn*.

Cases.	*Singular.*	*Plural.*	*Singular.*	*Plural.*
N.	fructŭs, *fruit*	fructūs, *fruits*	cornū, *a horn*	cornŭa, *horns*
G.	fructūs, *of fruit*	fructŭum, *of fruits*	cornū, *of a horn*	cornŭum, *of horns*
D.	fructŭi, *to fruit*	fructĭbus, *to fruits*	cornū, *to a horn*	cornĭbus, *to horns*
A.	fructŭm, *fruit*	fructūs, *fruits*	cornū, *a horn*	cornŭa, *horns*
V.	fructŭs, *O fruit*	fructūs, *O fruits*	cornū, *O horn*	cornŭa, *O horns*
A.	fructū, *by fruit*	fructĭbus, *by fruits*	cornū, *by a horn*	cornĭbus, *by horns*

Domus, *f. a house* partakes of the second as well as the fourth declension: thus, from the second, it has the ablative singular in *o*, as domo, and one form of the genitive plural in *orum*, as dom*orum*; from the fourth declension, it has most of its other cases. It is declined thus:

Domus, ūs, *f. a house.*

Singular.—N. Domus. G. domūs. D. domui. Ac. domum. V. domus. Abl. domo. *Plural.*—N. domus. G. domuum or domorum. D. domĭbus. Ac. domos (rarely domus). V. domus. Abl. domĭbus.

Domus has also domi, genitive singular; but domĭis not used except in the sense of *at home*; with domi, you may connect other words, as, domi tuae, *at thy house*; domi alienae, *at another's house.*

VOCABULARY.

Luctus, m. *grief*; lusus, m. *play*; sensus, m. *feeling* or *a sense*; bestia, *f. a beast*; vis, *f. strength, power*; voluptas, ātis, *f. pleasure*; genus, ĕris, n. *a race*: amārus, a, um, *bitter*; gratus, a, um, *pleasant, thankful*; praeditus, a, um, *endowed with*; quantus, a, um, *how great*; puerĭlis, e, *boyish, childlike*; sapiens, sapientis, as an adjective, *wise*, as a noun, *a sage*; evĭto 1, *I avoid*; paro 1, *I make ready, I procure*; indulgeo 2, *I indulge in* (with the dative); frango 3, *I break, I overcome*; succumbo 3, *I lie under, I yield to* (with the dative); libenter, adv. *willingly*; suaviter, *sweetly*; vehementer, *greatly*; quam, *how*; sagitta, *f. an arrow.*

EXERCISES—LATIN-ENGLISH.

Lusus gratus est puĕris; varia sunt genera lusūs; pueri libenter indulgent lusui; nonne puĕris gratus est lusus? lusus est mihi gratus; tibi est lusus vehementer gratus; viri graves evĭtant lusus puĕriles; O lusus, quam suaviter animos puerorum delectas! reges non delectantur lusu puerili; sensus sunt acres; acres mihi sunt sensus; vis sensuum est magna; est ne sensuum vis magna; vir fortis non succumbit sensibus doloris; acres sensus habent bestiae; O sensus, quantas voluptates hominibus paratis! animalia praedita sunt sensibus.

ENGLISH-LATIN.

The feeling of pain is bitter; is not the feeling of pain bitter to thee? the feeling of pain is bitter to all men and to all animals; the power of grief is great; the sage is not overcome by the power of the senses; a brave (fortis) man yields not to grief; do brave men yield to the power of the senses? O grief, how dost thou overcome the minds of men! boys willingly yield to play; (there) are many kinds of play; plays (games) of all kinds are pleasant to boys and girls; boyish plays delight not men; men are not delighted by boyish plays; boys and men yield to pleasure; how greatly is grief avoided by children; boys delight in bows and arrows; girls delight in needles.

There are no adjectives which follow the fourth declension, as there are none which follow the fifth declension. Adjectives follow exclusively the first, the second, and the third declensions. Yet nouns of the fourth and of the fifth declensions are sometimes united with adjectives. In declining nouns and adjectives so united, you must take care to preserve the proper forms of both, and not allow the one to influence the other. To aid you in making the necessary distinctions, I supply instances for practice.

NOUNS AND ADJECTIVES OF VARIOUS DECLENSIONS.

EXAMPLES.—Maturus fructus, m. *ripe fruit*; frequens coetus, m. *a full assembly*; matura ficus, *f. a ripe fig*; debile genu, n. *a weak knee.*

Cases.	*Singular.*	
Nom.	maturus fructus	frequens coetus
Gen.	maturi fructūs	frequentis coetūs
Dat.	maturo fructui	frequenti coetui
Acc.	maturum fructum	frequentem coetum
Voc.	mature fructus	frequens coetus
Abl.	maturo fructu	frequente coetus
Cases.	*Plural.*	
Nom.	maturi fructus	frequentes coetus
Gen.	maturorum fructuum	frequentum coetuum
Dat.	maturis fructibus	frequentibus coetibus
Acc.	maturos fructus	frequentes coetus
Voc.	maturi fructus	frequentes coetus
Abl.	maturis fructibus	frequentibus coetibus
Cases.	*Singular.*	
Nom.	matura ficus	debile genu
Gen.	maturae ficūs	debilis genū
Dat.	maturae ficui	debili genu
Acc.	maturam ficum	debile genu
Voc.	matura ficus	debile genu
Abl.	maturā ficu	debili genu
Cases.	*Plural.*	
Nom.	maturae ficus	debilia genua
Gen.	maturarum ficuum	debilium genuum
Dat.	maturis ficis	debilibus genibus
Acc.	maturas ficus	debilia genua
Voc.	maturae ficus	debilia genua
Abl.	maturis ficis	debilibus genibus

Here, observe, that the regular form of the dative and ablative plural would be fici*bus* or ficu*bus*, but only fic*is* is found in good Latin authors.

Vocabulary.

Frémutus, ûs, m. *a roaring*; genu, u, *or* us, n. *a knee*; tonitru, n. *or* us, m. *thunder*; vigor, óris, m. *vigour*; fulmen, ĭnis, n. *lightning*; robur, ŏris, n. *strength*; multus, a, um, *much* or *many*; validus, a, um, *strong*; horrĭbilis, e, *frightful, horrible*; terrĭbilis, e, *terrible*; supplex, supplĭcis, as an adjective, *entreating*, as a noun, *a suppliant*; indĭco 1, *I point out*; resŏno 1, *I resound, I echo*; vacillo 1, *I move to and fro, I vacillate*; permŏveo 2, *I move greatly*; antecĕdo 3, *I go before*; extimesco 3, *I fear*; flecto 3, *I bend*; procumbo 3, *I fall down*.

Exercises—Latin-English.

Tonitru terrĭbile animos hominum permŏvet; nonne tonitrûs sonus est terrĭbilis? tonitrûs fremitus horrĭbilis est; horrĭbile est tonitru; fulmen antecedit tonitru; multi homines extimescunt tonitru; tonitru extimescitur a multis hominibus; O tonitru, quam horrĭbilis est fremitus tuus! domus résonat tonitru; genus virorum sunt valida; vigor genuum indĭcat robur corpŏris; magna vis est genibus; súpplices procumbunt in (*on*) genua; O genua, quam valde vacillatis! in genibus est magna vis.

English-Latin.

The man's knee is strong; strong knees have vigour; are thy knees strong? the woods resound with the horrible sound of thunder; the sound of thunder greatly moves the animals; thunder is feared by strong beasts; I have weak knees; has your father weak knees? no, my father has strong knees; I am greatly moved by much lightning; the roaring of thunder greatly moves the suppliants; the suppliant points out the beautiful house.

Summus, *highest*; medius, *middle*; imus, *lowest*; reliquus, *remaining*; ultimus, extremus, *last*, &c. These adjectives agree in number, case, and gender with their nouns, though in English they appear to have the force of nouns, and consequently to require the construction of nouns. Thus the Latins say, summus mons, that is, *the highest mountain*; meaning, *the top of the mountain, the highest part of the mountain, the mountain*, that is, *where it is highest*. I subjoin some instances with forms for practice.

Instances: ima quercus, *the bottom of the oak*; reliquum opus, *the remainder of the work*; primum limen, *the edge of the threshold*; extremum bellum, *the end of the war*; [illegible] ver, *the beginning of spring*; media aestas, *the middle of summer*; summa aqua, *the surface of the water*; intima philosophia, *the recesses of philosophy*; reliqua Aegyptus, *the rest of Egypt*. Decline each of these instances according to the proper models; thus:—

Cases.		*Singular.*	
Nom.	summus mons	media aestas	reliquum opus
Gen.	summi montis	mediae aestátis	reliqui opĕris
Dat.	summo monti	mediae aestati	reliquo operi
Acc.	summum montem	mediam aestatem	reliquum opus
Voc.	summe mons	media aestas	reliquum opus
Abl.	summo monte	media aestate	reliquo opere
Cases.		*Plural.*	
Nom.	summi montes	mediae aestates	reliqua opera
Gen.	summorum montium	mediarum aestatum	reliquorum operum
Dat.	summis montibus	mediis aestatibus	reliquis operibus
Acc.	summos montes	medias aestates	reliqua opera
Voc.	summi montes	mediae aestates	reliqua opera
Abl.	summis montibus	mediis aestatibus	reliquis operibus

So in English, instead of "the middle of summer," we say after the Latin manner, mid-summer, that is middle summer; also mid-day; mid-night; mid-way, &c.

The student is required to find out English words derived from the Latin words just used; and the Latin words derived from the English words which follow:

Acute; archery; parturition; peculiar; fructify; domestic; alienate; sensual; voluptuary; generic; grateful; puerile; sweet; variously; nature; antecedent; vacillation.

With these English words, other English words are connected so that when you know the import of these, you easily learn the import of the connected or related terms. Thus from the adjective *acute* comes the adverb *acutely* and the noun *acuteness*; with the verb *alienate* is connected the noun *alien*; *voluptuary* has corresponding forms in *voluptuous* and *voluptuousness*; *grateful* also has *gratitude* and *gratefully*.

Find the Latin terms which occur in the instructions in the third declension, from which are derived these English words; namely: *to err; maternal; guttural; terrify* (the *fy* represents the Latin facio, *I do* or *cause*); *nominal; corpulent; floral; cardinal; luminous; decorous; to judge; to reign; legal; gregarious; military; civic; marine; aviary; acrid; sweet; audacious; mortal; virtue; hostile.*

Commit to memory these lines which compose the feminine nouns of the fourth declension.

Feminine: these nouns in *us*: tribus, acus, portĭcus.
Domus, nurus, socrus, anus: idus, quercus, ficus, manus.

LESSONS IN ENGLISH GRAMMAR.—No. VII.

CASES OF NOUNS—*Continued.*

In former lessons we stated that nouns have two Numbers, the singular and the plural;—three Genders, the masculine, the feminine, and the neuter; and three Cases; the *Nominative*, denoting the name of a person or thing, or the subject of a proposition; the *Possessive*, denoting relation, ownership or possession; and the *Objective*, which indicates the object of some act. We proceed to speak more particularly of this latter.

The Objective Case of Nouns describes a person or thing that is the object of any pursuit, or of any action that another person or thing performs. Suppose you were to read of some gentleman who, on returning to his home, found his little girl asleep on the ground, exposed to a strong wind,—"He *lifted her* up, and *placed her* on a *chair*, and then he wrapped a cloak *round her*." In this case the gentleman might have either of the pronouns *he* and *him* applied to him, and the little girl either of the pronouns *she* and *her*. But it would have been both incorrect and vulgar to have said, "*him* lifted *her*," or "*him* lifted *she*," or *him* wrapped a cloak round *she*." In correct composition, when the words *he*, *him*, *she*, and *her* are used, we shall find, on examination, that *when something is done to a person*, the pronouns *him* or *her* are used; but *when a person does something*, the pronouns *he* and *she* are generally employed. The gentleman "lifted" his daughter—that was doing something to her; and as the gentleman did it, it was proper to say, "*he* lifted *her*:" *her* is the objective case of the pronoun *she*. Again, the word "*lifted*" describes an action which produces an effect on something which is the *object* of the action: the gentleman is the *doer* of the act of lifting—the girl is the *object* on which the *action* takes effect. A verb such as "*lifted*" is called a *transitive* verb, and must have an *object* after it, which is put in the *objective* case. A *preposition* also causes a noun or pronoun immediately following it to be in the *objective* case; as, "he wrapped a cloak *round* her:" the noun or pronoun in such cases is the object of some relation expressed by the preposition; the preposition "*round*" shows the relation of the cloak, or the wrapping of it, to the child. The nouns "*cloak*" and "*chair*" are also considered to be in the objective case;—the cloak has the action of *wrapping* done to it; and the *chair* is shown by the preposition "*on*" to be in a certain relation to the child.

In nouns, the nominative and objective cases are alike; as may be seen in the following sentence,—*The bear bit the man.*" Here *bear* is in the nominative, and *man* is in the objective case; but the sentence may be so turned as to reverse the cases, while it still has the same meaning: thus,—*The man was bitten by the bear*; in this sentence *man* is the subject, or nominative; *bear* is in the objective case, being put in that case by the preposition *by*; yet there is no change in the words *man* or *bear* by which the objective case may be distinguished. Perhaps, strictly speaking, there is no objective case in the English noun, though there is in the pronoun; and some writers on English Grammar omit the objective case altogether; but in considering the form of sentences, and the nature of the various relations which exist among their parts, it is useful to make the distinction *in meaning*, though it may not be made *in form*, especially as the distinction in *form* is still retained in the pronouns.

The objective case generally *follows* what are called *transitive verbs* and participles, and prepositions;* as, honesty pays *debts*; fraud increases *them*; or, praise *Him* from *whom* all blessings flow; there are, however, exceptions: in the following sentence the noun *precedes* the verb which puts it in the objective case;—"*Whom*, therefore, ye ignorantly *worship*, *him declare* I unto you."

Remember, then, that a noun is in the objective case when it has some action performed upon it by a transitive, or active, verb

* These will be explained in future lessons.

preceding it, or when placed in relation to something else by a preposition put before it; in most instances, when it follows *immediately after* an active verb or a preposition. In the example given above,—"*The man was bitten by the bear;* the *man* has an action performed upon him, and yet *man* is not in the objective case. You will observe that the word *man* is placed before the verb describing the action, and that it is evidently the subject or *nominative* of the sentence. If we were to substitute a pronoun for the noun *man*, it would be the pronoun *he*. The verb in this case is said to be *passive* and not *active*.

The objective case of the pronouns are, *me, him, her, us, them*, and *whom*. In the pronouns *you* and *it*, the nominative and objective cases are alike.

It is not uncommon for a person when asked, *who is there?* to answer, it is *me*; this is an error; the answer should be, *it is I;* or, *it is Henry*, or whatever your name may be. If it were right to say, it is *me*, it would also be right to say, *me* is here; yet no one would say so, except an infant just lisping. It is wrong, also, though common, to say, *us* two will go for it;—it should be, *we* two will go for it. It sounds still worse for a married man to say, I and *her* will attend to it; it should be, I and *she*, &c.; but, I *and my wife* would be *still* better. It is equally erroneous to say *to we*, instead of *to us*.

Before dismissing the subject of cases of nouns, the following mode of ascertaining them may be stated.

The NOMINATIVE	answers the	questions	*Who?*	or *what?*
The POSSESSIVE	"	"	*Whose?*	or *of what?*
The OBJECTIVE	"	"	*Whom?*	or *what?*

EXAMPLE: *Charles Perkins married his master's daughter.*
Who married his master's daughter?
Charles Perkins ..... the Nominative.
Whose daughter did Charles Perkins marry?
His master's..... the Possessive.
Whom did Charles Perkins marry?
His master's daughter ..... the Objective.

In the following sentence from Shakspeare, *all the cases* may be found: let our pupils search them out, and assign to each its proper name:—

"As imagination bodies forth
The forms of things unknown; the Poet's pen
Turns them to shapes, and gives to airy nothing
A local habitation and a name."

By DECLENSION of NOUNS is shown the inflections, or changes, to which nouns are subjected. A noun is said to be *declined* when it is gone through in order, so as to exhibit its different parts. A few examples are given as follows:—

	Singular.	*Plural.*
Nominative case	Man	Men
Possessive case	Man's	Men's
Objective case	Man	Men
Nominative case	Parent	Parents
Possessive case	Parent's	Parents'
Objective case	Parent	Parents
Nominative case	Book	Books
Possessive case	Book's	Books'
Objective case	Book	Books
Nominative case	Master	Masters
Possessive case	Master's	Masters'
Objective case	Master	Masters

In the following lines there are *nine* common nouns; which, if our first lessons on nouns be remembered, our pupils will have no difficulty in finding out.

Man, like a flower, at morn appears,
And blooms, perhaps, a few short years:
The flatterer, Hope, still leads him on
In quest of pleasure, finding none;
Or, if he finds it for a day,
It soon takes wings and flies away.

In the following passage, from Sir Walter Scott, nouns will be found in almost every line:—

"The sun is rising dimly red,
The wind is wailing, low and dread;
From his cliff the eagle sallies;
Leaves the wolf his darksome vallies;
In the mist the ravens hover,
Peep the wild dogs from the cover,
Screaming, croaking, baying, yelling,
Each in his wild accents telling,
'Soon we feast on dead and dying,
Fair-hair'd Harold's flag is flying.'

Many a crest on air is streaming;
Many a helmet darkly gleaming;
Many an arm the axe uprears,
Doom'd to hew the wood of spears.
All along the crowded ranks,
Horses neigh, and armour clanks;
Chiefs are shouting, clarions ringing,
Louder still the Bard is singing,—
'Gather footmen, gather horsemen,
To the field, ye valiant Norsemen!'"

QUESTIONS ON THE FOREGOING LESSON.

What is meant by the objective case of nouns?
Do the nominative and objective cases resemble each other?
In what connexion do active verbs and participles, and prepositions stand to the objective case?
Give an example.
What are the objective cases of pronouns?
Is it correct to say, "Us two will go for it?" If not correct what should be said?
How may the cases of nouns be ascertained?
In what case are nouns answering to who? or what?
Furnish an example illustrating the three cases.
What is meant by declining a noun?
Decline the noun "Parent."
Point out the nouns in the verses at the end of this Lesson.

LESSONS IN FRENCH.—No. VII.

By Professor LOUIS FASQUELLE, LL.D.

SECTION XV.

1. Adjectives and adverbs are always compared in French, as they often are in English, by means of adverbs.

Plus beau, plus souvent. *Handsomer, oftener.*

2. The comparative of equality is expressed by:

Aussi—que, *As*, or *as much—as* } before an adjective, an adverb, or a pronoun.

Aussi aimé que son frère. *As much loved as his brother.*

Autant de—que de, *As much* or *as many—as,* } before a substantive.

Autant de crayons que de plumes. *As many pencils as pens.*
Autant de science que de modestie. *As much science as modesty.*

3. The comparative of superiority is expressed by:

Plus—que, *More—than,* } before an adjective, an adverb, or a pronoun.

Il est plus docile que son frère. *He is more docile than his brother.*

Plus de—que de, *More—than* } before a noun.

Plus de bonté que de jugement. *More goodness than judgment.*

4. The comparative of inferiority is expressed by:

Pas si; pas aussi; moins—que, *Not so; not so; less—than,* } before an adjective, an adverb, or a personal pronoun

Vous n'êtes pas si grand que votre sœur. *You are not so tall as your sister.*
Il est moins poli que son cousin. *He is less polite than his cousin*

Pas tant de; pas autant de; moins de—que de, *Not so much*, or *so many; less; fewer—than* } before a substantive, a demonstrative, or possessive pronoun.

Il n'a pas tant de courage que de patience. *He has not so much courage as patience.*
Il a moins d'argent que de viande. *He has less money than meat.*

5. Tout autant—que, is used for *quite as many—as; as much, just as much*, or *as many*.

J'en ai tout autant que vous. *I have quite as many as you.*

Résumé of Examples.

Avez vous autant de livres anglais, que de livres italiens ?	*Have you as many English books, as Italian books?*
J'en ai tout autant.	*I have just as many.*
J'ai autant de ceux-ci que de ceux-là.	*I have as many of these as of those.*
Il est aussi heureux que vous.	*He is as happy as you.*
Avez vous plus d'assiettes que de plats ?	*Have you more plates than dishes?*
J'ai plus de ceux-ci que de ceux-là.	*I have more of these than of those.*
Est-il plus complaisant que ses frères ?	*Is he more obliging than his brothers?*
Le Français a-t-il moins de légumes que de fruits ?	*Has the Frenchman fewer vegetables than fruits?*
Il a moins de livres que de manuscrits.	*He has fewer books than manuscripts.*
Il n'a pas autant de ceux-ci que de ceux-là ?	*He has not so many of these as of those.*
En a-t-il moins que votre frère ?	*Has he less (of them) than your brother?*
Il en a tout autant.	*He has quite as many.*

Exercise 29.

Bleu, -e, *blue.*	Fer, m. *iron.*	Manuscrit, m. *manuscript.*
Courage, m. *courage.*	Fromage, m. *cheese.*	Maréchal, m. *blacksmith.*
Davantage,* *more.*	Hollandais, m. *Dutchman.*	Modestie, f. *modesty.*
Drap, m. *cloth.*	Italien, -ne, *Italian.*	Soie, f. *silk.*
Ennemi, m. *enemy.*	Jardin, m. *garden.*	Très, *very.*
Espagnol, -e, *Spaniard.*	Manteau, m. *cloak.*	Verre, m. *glass.*
Estampe, f. *engraving.*		

1. Etes vous aussi content que votre frère ? 2. Je suis aussi content que votre frère. 3. Votre père a-t-il autant de courage que de modestie ? 4. Il a moins de modestie que de courage. 5. Le libraire a-t-il autant de manuscrits que d'estampes ? 6. Il a plus de celles-ci que de ceux-là. 7. A-t-il autant d'amis que d'ennemis ? 8. Il a plus de ceux-ci que de ceux-là. 9. A-t-il autant de pain que de fromage ? 10. Il a tout autant de celui-ci que de celui-là. 11. Le maréchal a-t-il plus de chevaux que votre frère. 12. Il en a plus que mon père et plus que mon frère. 13. N'avez vous pas froid ? 14. Non, Monsieur, je n'ai pas froid, j'ai très chaud. 15. Avez vous deux manteaux de drap. 16. J'en ai un de drap et un de velours bleu. 17. N'avez vous pas plus de verres que d'assiettes ? 18. Nous en avons davantage.* 19. Le maréchal a-t-il plus de fer que d'acier ? 20. Il n'a pas autant de celui-ci que de celui-là. 21. Il a moins de celui-ci que de celui-là ? 22. Les Hollandais ont ils de beaux jardins ? 23. Leurs jardins sont très beaux. 24. Les jardins des Italiens sont plus beaux que ceux des Espagnols.

Exercise 30.

1. Are you more attentive than your sister ? 2. I am not so attentive as your brother. 3. Have you more courage than my brother ? 4. I have quite as much. 5. Has the blacksmith as much money as iron ? 6. He has more of the latter than of the former [Sect. 8, R. 5]. 7. Has he more modesty than the Spaniard ? 8. He has more. 9. He has more than your friend's sister. 10. Are you not cold, Sir ? 11. No, Sir, but I am afraid and sleepy. 12. Has the Dutchman more cheese than the Italian ? 13. He has more cheese and more money. 14. Have you as much English silk as Italian silk ? 15. I have more of this than of that. 16. Who has more friends than the Spaniard ? 17. Your friend has more. 18. Has the Spaniard as much of your money as of his ? 19. He has less of mine than of his. 20. Have we more silk cloaks than cloth cloaks ? 21. We have more of these than of those. 22. Have you good cloaks ? 23. Yes, Sir, I have good cloaks, good hats, and good leather shoes. 24. Have you more plates than dishes ? 25. I have not more plates than dishes ; but I have more glasses than plates. 26. Are you not very cold ? 27. No, Sir, I am neither cold nor warm. 28. Has your carpenter wood ? 29. Yes, Sir, he has wood, money, cheese, and meat. 30. Who has more money than the carpenter ? 31. The Dutchman has more. 32. Who has more engravings than books ? 33. The bookseller has more of these than of those. 34. Are you as attentive as your friend ? 35. I am more attentive than my friend.

* Davantage means *more*. It can never be placed before a noun ; it may be used instead of plus, at the end of a sentence.

Section XVI.

Comparison—Encore, &c.

The superlative absolute is formed by placing très, fort, or bien, *very*, before the adjective [§ 14, 11].

Ces chandeliers sont très utiles.	*These candlesticks are very useful.*
Notre tailleur est bien obligeant.	*Our tailor is very obliging.*

2. The superlative relative is formed by adding the article le, la, les, to a comparative [§ 14 (9)].

Votre neveu est le plus savant de tous. *Your nephew is the most learned of all.*

3. Encore is used in French in the sense of *more, some more, any more, still*—used affirmatively and interrogatively, *but not negatively.*

Avez vous encore du café ?	*Have you any more coffee?*
J'ai encore du café.	*I have more (or some more) coffee.*
J'en ai encore.	*I have some more, or some left.*

4. Ne—plus is used in the sense of *not any more*, and *no more*, or *none left.*

Je n'ai plus de livres.	*I have no more books.*
Je n'ai plus de chocolat.	*I have no chocolate left.*

5. Ne—guère means *but little, but few.*

Je n'ai guère d'amis.	*I have but few friends.*
Je n'en ai guère.	*I have but few—but little.*

6. The pronouns moi, toi, lui, eux, are used instead of the nominative pronouns je, tu, il, ils, after the *que* of a comparison, and when the verb is understood.

Vous êtes plus heureux que moi.	*You are happier than I.*
Vous avez plus de mérite que lui.	*You have more merit than he.*

Résumé of Examples.

Votre marchand est bien obligeant.	*Your merchant is very obliging.*
Voilà le meilleur de ces garçons.	*That is the best of those boys.*
Nous avons encore des amis.	*We have some more (or still) friends.*
Vous avez encore du crédit.	*You have still (or yet) credit.*
Avez vous encore une piastre ?	*Have you a dollar left?*
Le maçon a-t-il encore des briques ?	*Has the mason more bricks?*
Il n'en a plus.	*He has no more—he has none left.*
Il n'a plus de briques.	*He has no more bricks.*
Il n'en a guère.	*He has but few.*
Il n'en a plus guère.	*He has but few left.*
Je n'ai guère de livres.	*I have but few books.*
Avez vous plus de courage que lui ?	*Have you more courage than he?*
Il a moins de courage que moi.	*He has less courage than I?*
Combien de piastres avez vous encore ?	*How many dollars have you still, or have you left?*

Exercise 31.

Correct, -e, *correct.*	Neveu, m. *nephew.*	Sœur, f. *sister.*
Crédit, m. *credit.*	Nièce, f. *niece.*	Salade, f. *salad.*
Beaucoup, *much.*	Nouvelles, f. *news.*	Tante, f. *aunt.*
Boyer, *Boyer.*	Quel, *which, which one.*	Tous, *all.*
Dictionnaire, m. *dictionary.*	Savant, -e, *learned.*	Ville, f. *town, city.*

1. Votre dictionnaire est il très correct ? 2. Il est plus correct que celui de Boyer. 3. Votre dictionnaire est le plus correct de tous. 4. Quel est le meilleur de ces jardins ? 5. Celui-ci est le meilleur de tous les jardins de la ville. 6. Avez vous encore de l'argent ? 7. Je n'ai plus d'argent, mais j'ai encore du crédit ? 8. Avons nous encore de la salade ? 9. Nous n'en avons plus. 10. Nous n'avons plus de viande. 11. Qui en a encore ? 12. Mes frères et mes sœurs en ont encore. 13. En avez vous encore beaucoup ? 14. Je n'en ai plus guère. 15. Votre tante a-t-elle plus de robes que votre nièce ? 16. Elle n'en a pas beaucoup. 17. Votre neveu est il plus savant que votre nièce ? 18. Il n'est pas aussi savant qu'elle. 19. Elle est plus savante que lui. 20. Avez vous encore froid ? 21. Je n'ai plus froid, j'ai bien chaud. 22. N'avez vous plus de nouvelles ? 23. Je n'en ai plus. 24. En avez vous beaucoup ? 25. Je n'en ai guère.

Exercise 32.

Has your brother a very good dictionary ? 2. His dictionary is not very correct. 3. Has your father more courage than he ? 4. He has much more courage than your nephew. 5. Have your brothers credit ? 6. They have but little credit, but they have money. 7. Is your aunt obliging ? 8. My aunt is very obliging ? 9. Have you still books, pens, and paper ? 10. I have no more books, but I have still good pens and excellent English paper. 11. Who has still paper ? 12. I have no more

but my brother has some more. 13. Have you any news, Sir? 14. No, Madam, I have none to-day. 15. Have you as much wood as my brother's son? 16. I have more than you or he. 17. Are you still wrong? 18. No, Sir, I am no longer (*plus*) wrong, I am right. 19. Are your sisters still hungry? 20. They are neither hungry nor thirsty, but they are still sleepy. 21. Is your niece as learned as he? 22. She is more learned than he and (*que*) his aunt. 23. Have you no news, Sir? 24. No, Madam, I have no more news. 25. Who has news? 26. I have no more. 27. Have you them all? 28. Yes, Sir, I have them all. 29. Has your aunt much of it left? 30. She has but little more of it? 31. Has your brother any more English horses? 32. He has no more. 33. He has two more. 34. Have you a handsome French shawl left? 35. I have no more French shawls, but I have an English one.

Section XVII.

1. The adverbs of quantity, combien, *how much, how many*; trop, *too much, too many*; beaucoup, *much, many*; assez, *enough*; peu, *little, few*; guère, *but little, few*; and the word pas, meaning *so*, when coming before a noun or an adjective, are followed by the preposition *de*.

Combien de fleurs avez vous?	*How many flowers have you?*
J'ai beaucoup de fleurs.	*I have many flowers.*
Vous avez trop de loisir.	*You have too much leisure.*
Votre sœur a assez de temps.	*Your sister has time enough.*

2. The adverb bien, used in the sense of beaucoup (*much, many*), is followed by the preposition de, joined to or blended with the article le, la, les [Sect. 4].

Vous avez bien de la complaisance.	*You have much kindness.*
Elle a bien des amis.	*She has many friends.*

3. Quelque chose, *something, anything* [Sect. 5, 6], and rien, *nothing, not anything*, take *de* before an adjective.

Votre ami a quelque chose d'agréable.	*Your friend has something pleasant.*
Avez vous quelque chose de bon?	*Have you anything good?*
Je n'ai rien de bon.	*I have nothing (not anything) good.*

4. Quel, *m.*, quelle, *f.*, quels, *m. p.*, quelles, *f. p.*, are used interrogatively for *which* or *what* before a noun.

Quelle serviette avez vous?	*What* or *which napkin have you?*
Quelles bourses votre ami a-t-il?	*What purses has your friend?*

5. Que is used for *what* before a verb,

Qu'avez vous?	*What is the matter with you?*

6. Lequel, *m.*, laquelle, *f.*, lesquels, *m. p.*, lesquelles, *f. p.*, are used absolutely for the word *which*, not followed by a noun, and equivalent to *which one, which ones*.

Lequel votre fils a-t-il?	*Which (one) has your son?*
Lesquelles avons nous?	*Which (ones) have we?*

7. Quelques is used before a plural noun for *a few, some*; quelques uns, *m.*, quelques unes, *f.*, are used absolutely, with the same meaning—Plusieurs means *several*, and is invariable.

Le Danois a-t-il quelques pommes?	*Has the Dane a few apples?*
Il en a quelques unes.	*He has a few.*
Il en a plusieurs.	*He has several.*

Résumé of Examples.

Combien de poires avez vous?	*How many pears have you?*
Nous avons beaucoup de poires.	*We have many pears.*
Nous en avons beaucoup.	*We have many (of them).*
Nous avons assez de cerises.	*We have cherries enough.*
Nous n'en avons pas assez.	*We have not enough (of them).*
Vous n'avez guère de pêches.	*You have but few peaches.*
Votre jardinier a bien des pêches.	*Your gardener has many peaches.*
N'avez vous pas de pêches?	*Have you no peaches?*
J'ai beaucoup de pêches et d'abricots.	*I have many peaches and apricots.*
Le boucher a-t-il quelque chose de bon.	*Has the butcher anything good.*
Il a quelque chose de bon et de mauvais.	*He has something good and bad.*
Il n'a rien de bon.	*He has not anything (nothing) good.*
Quelles poires *f.* avez vous?	*What* or *which pears have you?*
Nous avons celles de votre sœur?	*We have your sister's.*
Quel habit *m.* avez vous?	*Which* or *what coat have you?*
Nous avons celui du tailleur.	*We have the tailor's.*
Qu'avez vous de bon?	*What have you good?*
Lequel avez vous?	*Which (one) have you?*
Lesquels votre frère a-t-il?	*Which (ones) has your brother?*

Exercise 33.

Abricot, m. *apricot.*	Fleur, *f. flower.*	Pomme, *f. apple.*
Ananas, m. *pineapple.*	Légume, m. *vegetable.*	Pomme-de-terre, *f. potato.*
Beurre, m. *butter.*	Magasin, m. *warehouse.*	
Cerise, *f. cherry.*	Oncle, m. *uncle.*	Prune, *f. plum.*
Epicier, m. *grocer.*	Poire, *f. pear.*	Sucre, m. *sugar.*
Etranger, –e, *foreign.*	Poivre, m. *pepper.*	Thé, m. *tea.*
Jardin, m. *garden.*		

1. Combien de pommes-de-terre votre frère a-t-il? 2. Il n'en a pas beaucoup. 3. L'épicier a-t-il beaucoup de sucre dans son magasin? 4. Il n'en a guère, mais il a beaucoup de beurre et de poivre. 5. Votre jardinier a-t-il beaucoup de cerises? 6. Il a plus de cerises que de prunes. 7. Les prunes sont elles meilleures que les cerises? 8. Les cerises sont meilleures que les prunes. 9. Avez vous quelques poires mûres? 10. Nous en avons quelques unes, nous avons aussi beaucoup d'ananas et d'abricots. 11. Votre oncle a-t-il quelque chose de bon dans son jardin? 12. Il a quelque chose de bon et de beau. 13. Il a de beaux légumes et de belles fleurs. 14. Avez vous des fleurs étrangères? 15. J'en ai quelques unes. 16. Lesquelles avez vous? 17. J'ai celles de votre frère et celles de votre jardinier. 18. N'avez vous pas aussi les miennes? 19. Non, Monsieur, je ne les ai pas. 20. Qui en a beaucoup? 21. Personne n'en a beaucoup. 22. J'en ai quelques unes. 23. Avez vous assez de thé? 24. J'en ai assez. 25. J'en ai plus que lui.

Exercise 34.

1. Has your gardener many vegetables? 2. Yes, Sir, he has many. 3. How many gardens has he? 4. He has several gardens and several houses. 5. Have you many books? 6. I have but few, but my friend has many. 7. What coat has your brother? 8. He has a good cloth coat. 9. Has your uncle many peaches? 10. He has but few peaches, but he has many cherries. 11. How many plums has the tailor? 12. The tailor has no plums, he has cloth and silk. 13. What silk has your friend the merchant? 14. He has a great deal (*beaucoup*) of silk, and a great deal of money. 15. Has the gardener anything good in (*dans*) his garden? 16. He has many pineapples. 17. Has he more vegetables than fruit? 18. He has more of this than of those. 19. Has your uncle many pears and cherries? 20. He has a few, and he has many apples and plums. 21. Have you a few? 22. I have still many, but my brother has no more. 23. Which peaches has he? 24. He has large (*grosses*) peaches. 25. Which (ones) have you? 26. I have the best peaches. 27. Has the merchant anything good in his warehouse? 28. He has nothing good in his warehouse, but he has something good in his garden. 29. How many potatoes has the foreigner? 30. He has not many. 31. Has he good vegetables? 32. He has good vegetables. 33. Is he right or wrong? 34. He is right, but you are wrong. 35. He has neither this book nor that, he has the bookseller's.

LESSONS IN BOTANY.—No. IV.

THE CORN PLANTS—*Continued.*

In our last lesson, it was shown that *corn plants* are cultivated grasses; we have now to consider a few more examples.

Maize, or Indian corn, was cultivated in America before the discovery of that country by Columbus, and indeed from time immemorial. It is a plant of much larger growth, in the leaves, the ear, and the grain, than any other sort of corn. See fig. 1, next page.

Indian corn is also known by the name of Turkey-corn; this name being given to it from the circumstance that maize is cultivated in that country. It is the largest and handsomest of all the grasses cultivated for food. When growing luxuriantly, it attains a height of from five to six feet; while its broad leaves, springing from its straight thick stem, and its elegant spike of flowers at the summit, present a form which is rarely surpassed. Next to rice it supplies food to the greatest number of the human race. It forms the staple crop in North America, where the farmers make it answer a great number of purposes, besides supplying their families with bread. Maize is also very extensively cultivated in Mexico; and from the genial nature of the climate, and the general fer-

tility of the soil, the returns yielded to the farmer are most abundant.

stalk is of such great height, as to present the appearance of a tree in miniature.

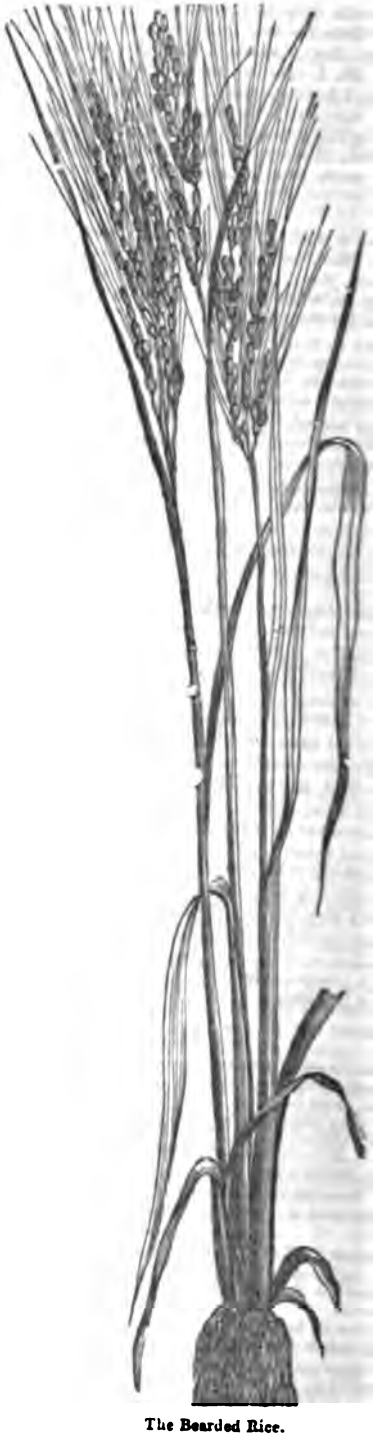
Fig. 1.

Ear of Indian Corn.

Fig. 3.

Rice.

Fig. 4.



The Bearded Rice.

Fig. 2.

Maize.

The engraving, fig. 2, shows the tendency of the maize to send forth a number of little roots from its lower knots. The

Rice is well known as an agreeable and nutritious vegetable, and in the East it supplies food to millions of people. In most

countries it is sown on lands which are absolutely flooded for weeks together; and when the grain has germinated, the water is drawn off. The fields are left dry for a month or more, till the young plants are three or four inches high, when the plantations are again flooded, and left in that state for two or three weeks. This soaking destroys the weeds which have sprung up with the rice. After this, the plants are left dry till the ears are formed, (see fig. 3), being repeatedly hoed between and kept clear of weeds; the watering is again removed, and the flood is left on the ground till the grain is ripe. "The verdure of the young plant," says Heber, when visiting Ceylon, "is particularly fine; and the fields are really a beautiful sight, when surrounded by, and contrasted with, the magnificent mountain-scenery."

Rye is used by several nations of Europe as bread-corn. It is not so much liked by birds as many other plants, and of this some farmers take advantage. They sow a narrow border of rye round their fields of wheat and other grain; and when thus fenced they are not attacked by poultry, nor even by the wild birds. As these seldom alight in the centre of corn-fields, but confine their depredations to the outer boundary, they visit the rye, and finding what they do not like they proceed no further. The bread made on the continent from rye, is very black, and as leaven is used instead of yeast it is sour, and to a stranger accustomed to better food extremely unpalatable. That which is sold in London by some bakers as rye-bread is, on the contrary, well-flavoured and very good; similar, in fact, to brown wheaten-bread.

In addition to the corn-plants already mentioned, there are others belonging to the large family of the grasses, which might be employed as food, and which are only neglected from the smallness of their seeds. None are unwholesome in their natural state except *darnel*, a common weed in many parts of England. This is one of the vegetable products reserved by Providence for other purposes.

How many plants, we call these weeds,
Against our wishes grow,
And scatter wide their various seeds
With all the winds that blow.

Man grumbles when he sees them rise,
To foul his husbandry;
Kind providence this way supplies
His lesser family.

Scattered and small, they 'scape our eye,
But are not wasted there;
Safe they in clefts and furrows lie,
The little birds find where.

It is worthy also of remark that the tall sugar-canes and gigantic bamboos of tropical climates are only grasses on a larger scale, agreeing with our own in every essential particular, and differing mostly in size. They afford to the Indian savage almost all he wants, except the food which he derives from his rice or his maize. "With their lightest shoots he makes his arrows; the fibres of the wood form bow-strings; and from the larger stems he fabricates a bow; a long and slender shoot affords him a lance-shaft, and he finds its hardened point a natural head for the weapon. With the hardened stems he builds the walls and roof of his house; its leaves afford him an impenetrable thatch; split into narrow stripe, it gives him the material for weaving his floor-mats, and other articles of domestic convenience; its fibre furnishes him with twine, and its leaves provide him with paper, when he becomes sensible of the utility of such a material. Would he commit himself to the waves, the stems form the hull of his boat, which by a few skins stretched over it is rendered water-tight; they also give him masts, and their slips of wood become cordage or are woven into sails. In China, India, and Japan, bamboos are used for a great number of useful purposes.

LESSONS IN ARITHMETIC.—No. VIII.

In our last number, we intended to annex to the Rule of Multiplication, some theorems of frequent occurrence, and of considerable use in practice. These we now proceed to give. Take any two numbers, say 12 and 8, and find their sum and difference, namely, 20 and 4; then, multiply these quantities together, and the *product* is 80. Next, find the squares of the two numbers 12 and 8, namely, 144 and 64; find their difference, and the *result* is also 80. These results will take place with any two numbers; a fact, of the truth of which you may be satisfied, by trying as many pairs of numbers as you please. This invariable result is expressed in general terms, in the words of the following theorem:—

1. *The product of the sum and difference of any two numbers is equal to the difference of their squares.*

Again, take any two numbers, say 12 and 8 as before, and find their sum and difference, namely, 20 and 4; then find the squares of these numbers, namely, 400 and 16. Next, find the squares of the two assumed numbers 12 and 8, and twice their product, namely, 144, 64, and 192. Find the sum of these two squares, namely, 208; then, add to this, the double product 192, and the sum is 400; subtract from it the same product, and the remainder or difference is 16. The same results will take place with any other two numbers you choose to try. Hence, we deduce the two following general theorems:—

2. *The square of the sum of any two numbers is equal to the sum of their squares, increased by twice their product.*

3. *The square of the difference of any two numbers is equal to the sum of their squares, diminished by twice their product.*

Our object in presenting these theorems, as well as those appended to the rule of subtraction, is to lead the student by degrees to the consideration of some general rules, which are equally true of all numbers, and are not confined to particular instances such as those by which they were illustrated. By help of a few new definitions, these theorems may be made a means of introduction to the universal language of algebra. In this science, the letters of the alphabet are employed to represent numbers, not fixed numbers, but any numbers whatever; and therefore, all theorems which can be demonstrated by means of letters, must be considered as universally true, and equally applicable to all numbers. In addition to the definitions, and explanation of signs already given in No. III., page 36, we may add the following relating to universal arithmetic:

1. When numbers are represented by letters, they are usually called *quantities*; when a particular value is given to them in any problem or question, they are then called *known quantities*; when their value is not given, but required in any problem or question, they are then called *unknown quantities*. The former are denoted by the *initial (beginning)* letters of the alphabet, as a, b, c, &c.; and the latter by the *terminal (ending)* letters of the alphabet, as z, y, x, &c. In expressing general theorems, however, either of these kinds of letters may be employed.

2. The arithmetical signs are used to denote that the arithmetical operations are to be performed upon the numbers represented by the letters. Thus the expression $a+b=c$, means that the *sum* of the two numbers represented by a and b is equal to the number represented by c. The expression $a-b=c$, means that the *difference* of the two numbers represented by a and b is equal to the number represented by c. The expression $a \times b = c$, means that the product of the two numbers represented by a and b is equal to the number represented by c. Very often, and mark this particularly, very often the sign $\times$ is omitted; that is, $ab=c$ means the same as $a+b=c$. The expressions $a \div b = c$, or $\frac{a}{b}=c$, or $a : b = c$, all mean the same thing,—namely, that the number represented by a divided by the number represented by b, gives for a quotient the number represented by c.

3. When numbers or quantities are enclosed in a parenthesis, thus $(a+b)$, $(a-b)$, &c., the expression signifies that the number or quantities so included are to be treated as a simple number or quantity, or rather that the operation of the signs applied to them are to be performed, and that the result is to be treated, as it is in reality, like a simple number or quantity. Thus, the expression $(a+b) \times c = d$, means that the *sum* of the quantities a and b is to be multiplied by the quantity c, and that the product is equal to the quantity d. In like manner the expression $(a+b) \times (c+d) = e$, means that the *sum* of the quantities a and b, is to be multiplied by the *sum* of the quantities c and d, and that the *product* of these *sums* is equal to e.

4. Applying these symbols of numbers and of operation to the general theorems in No. V, page 67, they will stand thus:—

(1) $(a+b)+(a-b)=2a$
(2) $(a+b)-(a-b)=2b$

In these expressions a denotes the greater number and b the less, and reasoning upon them generally we shall be convinced of the universality of their application. Thus, in theorem (1), we are to add $a+b$

to $a-b$; that is, we are *first*, to add b to a; *second*, to substract b from a; and *third*, to add the results. Now, we know that if we add a to a, we shall have *twice* a, or $2a$; but if we add something, viz., b to the one a, and take away the same thing, viz., b from the other a, we shall still have *twice* a or $2a$; because what we add to the one we take away from the other, and therefore the sum will neither be increased nor diminished, that is, the sum will still be the same as if we had only added the two together.

5. Again, in theorem (2), we are to subtract $a-b$ from $a+b$; that is, we are *first*, to add b to a; *second*, to subtract b from a; and *third*, to subtract the latter result from the former. Now, we know that if we subtract a from a, we shall have nothing left; but, if we add something, viz., b, to the one a, and take away the same thing, viz., b, from the other a, we shall have twice b, or $2b$ left; because, what we add to the one, we take away from the other; and therefore, in taking the latter a away from the former a, we *take away too much* by the quantity b, and therefore *we must add this* b to the former b, in order to obtain the full remainder.

6. As we have defined the *square* of a number in our last lesson, we may now inform the student how it is denoted, or *marked* on the number itself. As the same factor occurs *twice* in the product called the *square*, this occurrence is indicated by placing the number 2 on the right of the number or quantity, in a smaller character, and on a higher level than the latter; thus 6^2 denotes the square of 6, or 36; and a^2 denotes the square of a, or $a \times a$. In like manner, $(10+2)^2$ denotes the square of $10+2$, or of 12; and $(a+b)^2$ denotes the square of $a+b$, or of the *sum* of the quantities a and b. Again, $(4+5+6)^2$ denotes the square of $4+5+6$, or of 15; and $(a+b+c)^2$ denotes the square of $a+b+c$, or of the *sum* of a, b, and c.

7. Applying the symbols of numbers and of operation to the general theorems, placed near the beginning of this lesson, they will stand thus:—

(1) $(a \times b) \times (a-b) = a^2 - b^2$
(2) $(a+b)^2 = a^2 + b^2 + 2ab$.
(3) $(a-b)^2 = a^2 + b^2 - 2ab$.

In these expressions, still a denotes the greater number, and b the less, and we may now reason upon them in a general way, as we did on the expressions, taken from the theorems in page 67. Thus, in theorem (1) we are to multiply the *sum* $(a+b)$ of any two quantities a and b, by their difference $(a-b)$, and find the product; now, if we multiply the sum $(a+b)$ by one of the quantities a, of the difference $(a-b)$, we shall have the product a^2-ab; for $a \times a = a^2$, and $b \times a = ab$; and adding these products, we have a^2+ab, by the general principle of Rule 4 in Multiplication. But this product by a must be diminished by the product of the same sum by b, as it is the product of the sum $(a+b)$ by the difference of a and b, that is required. Now, if we multiply the sum $(a+b)$ by the quantity b of the difference $(a-b)$, we shall have the product $ab+b^2$; for $a \times b = ab$, and $b \times b = b^2$; and adding these products, we have $ab+b^2$, by the general principle above mentioned. Subtracting this product, therefore, from the former product, we have a^2-b^2; inasmuch as $ab-ab=0$; the principle of this operation being that *the product of the sum of any two numbers by their difference, is equal to the difference of the products of the sum by each of the numbers.* This principle is a natural consequence of that given in Rule 4 of Multiplication, when applied to a multiplier divided into two parts.

8. In like manner, in theorem (2), we are to multiply the sum $(a+b)$ of any two quantities a and b, by the sum $(a+b)$ of the same quantities, and find the product; now, if we multiply the sum $(a+b)$ by one of the quantities a of the sum $(a+b)$, we shall have the product a^2+ab, as before; but this product by a must be *increased* by the product of the same sum by b, as it is the product of the sum $(a+b)$, by the sum of a and b that is required. Now, if we multiply the sum $(a+b)$ by the quantity b of the sum $(a+b)$, we shall have the product $ab+b^2$, as before; and adding this product to the former product, we have a^2+b^2+2ab, for $ab+ab = 2ab$.

9. Lastly, in theorem (3) we are to multiply the difference $(a-b)$ of any two quantities a and b, by the difference $(a-b)$ of the same quantities, and find the product. Now, if we multiply the difference $(a-b)$ by one of the quantities a of the difference $(a-b)$, we shall have the product a^2-ab; for, $a \times a = a^2$, and $b \times a = ab$; and subtracting the latter product from the former we have a^2-ab; that this subtraction is necessary, is obvious, because it is not the complete product of a by a that is wanted, but the product of the difference between a and b by a; here, the general principle is that *the product of the difference of any two numbers by a third number is equal to the difference of the products of those two numbers by the third number*;* but this product a must be *diminished* by the product of the same difference by b, as it is the product of the difference $(a-b)$ by the difference of a and b, that is required. Now, if we multiply the difference $(a-b)$ by the quantity b of the difference $(a-b)$, we shall have the product $ab-b^2$, as above; and subtracting this product from the former product a^2-ab, we have a^2+b^2-2ab; for, if we subtract what makes $a^2-ab-ab$, or a^2-2ab (since ab is to be subtracted *twice*), we have subtracted too much by b^2; we must therefore add b^2 to the result in order to obtain the true remainder, viz., a^2+b^2-2ab.

10. Another theorem of great importance, is necessary: given here, as it is an extension of theorems (2) and (3) of art. 7, to the combination of several numbers by the signs of addition or subtraction: viz.—

The square of the sum of several numbers, is equal to the sum of the squares of those numbers, and twice the product of the number by all that follow it; twice the product of the second number by all that follow it; and so on, to the last number. Thus, let the several numbers, 4, 6, and 10; their sum is 20, and its square is 400. Now, this square of 400, is equal to the sum of the squares of the numbers 4, 6, and 10; viz. 16, 36, and 100; with twice the product of 4 by 6, and by 10, viz. 48 and 80; and twice the product of 6 by 10, viz. 120; for $16+36+100+48+80+120$. Expressed symbolically, this operation stands as follow: $(4+6+10)^2 = 4^2+6^2+10^2+(2\times4\times6)+(2\times4\times10)+(2\times6\times10)$, or, $20^2 = 400 = 16+36+100+48+80+120$.

Applying to this theorem, the symbols of numbers and of operation, it will, in the case of four quantities, a, b, c, d, stand thus $(a+b+c+d)^2 = a^2+b^2+c^2+d^2+2ab+2ac+2ad+2bc+2bd+2cd$. The operation indicated here, is that the sum $(a+b+c+d)$ be multiplied by itself; now, if we multiply $(a+b+c+d)$ by the first part, we have $a^2+ab+ac+ad$; if we multiply by the second part, we have $ab+b^2+bc+bd$; by c, the third part, we have $ac+bc+c^2+cd$; and by d, the fourth part, we have $ad+bd+cd+d^2$. But, as the whole product is the sum of all these parts, we have first, $a^2+b^2+c^2+d^2$, the sum of the squares of the parts; then, we have $ab+ab$, or $2ab$; $ac+ac$, or $2ac$; $ad+ad$, or $2ad$; $bc+bc$, or $2bc$; $bd+bd$, or $2bd$; $cd+cd$, or $2cd$; whence, we have for the second, $2ab+2ac+2ad+2bc+2bd+2cd$, the sum of the products of twice each part by all that follow it. Hence, the complete square of $(a+b+c+d)$ is $a^2+b^2+c^2+d^2+2ab+2ac+2ad+2bc+2bd+2cd$; and the truth of the principle is manifest.

The rule for squaring a quantity consisting of several parts deduced from the preceding principle is simply this: *Square the first term, and multiply all the terms that come after it by twice the term; do the same with the second term; and so on, to the last term. The sum of all these products is the answer.*

Questions on the Preceding Lesson.

1. What is meant by a quantity? How is it represented? What is meant by a known quantity? How is it represented? What is meant by an unknown quantity? How is it represented? When the sum of two numbers or quantities is added to their difference, what is the result? When the difference of two numbers or quantities is taken from their sum, what is their result? When the sum and difference of two numbers or quantities are multiplied together, what is their product? What is the square of the sum of two numbers or quantities equal to? What is the square of the difference of two numbers or quantities equal to? What is the square of the sum of several numbers or quantities equal to?

Add the quantities $x+y$ and $x-y$ together.
Subtract the quantity $x-y$ from the quantity $x+y$.
Multiply $x+y$ by $x-y$, and tell the product.
Find the squares of $x+y$ and of $x-y$.
Find the squares of $x+y+a+m$, and of $a+b+c+d+e$.
What are the sum and difference of m and n?
What is the product of the sum and difference of m and n?
What are squares of the sum and difference of m and n?
What are the factors of p^2-q^2?
What are the factors of p^2+q^2+2pq and of p^2+q^2-2pq?

* This principle is merely a generalisation of that given in the preceding paragraph.

BIOGRAPHY.—No. III.

JAMES BRINDLEY.

JAMES BRINDLEY was born at Tunsted, in the county of Derby, in the year 1716. The extreme poverty to which his father had reduced himself by his dissipated habits, exposed his family to great privation and suffering;—a case which should operate as a warning against the commission of such an evil, since he who indulges in it, not only does harm to *himself*, but often inflicts incalculable injury on *others*. One consequence of his father's vicious life was, that James had scarcely any instruction; and even to the end of life, after having been raised by his talents and energy to very different circumstances, he was hardly able to read, while his ability to write went but little beyond the power of signing his name.

In childhood, and in youth, he was employed in ordinary country labour, but conscious that he was fitted for something better, he bound himself apprentice to a millwright, named Bennet, who was living at Macclesfield, not far from Tunsted. He had now a special opportunity for that thoughtfulness to which he appears to have been strongly inclined, as well as for all the skill he could put forth; for even in the early part of his apprenticeship, his master left him for weeks together to execute works for the execution of which he had received no instructions. It is easy to imagine how indolent and careless some young men would have been in such circumstances; not only would work intrusted to them have made little or no progress, but they would have been at "the shop" as little as possible, while business would have fallen off, and injury in various ways have been inevitably sustained. The contrary was the case with Brindley; for on his master's return from time to time, he not only found the work done, but was astonished at the improvements his apprentice made in doing it, and frequently asked him how he could have gained his knowledge. The wise answer was, doubtless, that he was always thinking about his work, and turned whatever he met with on any subject to the utmost advantage. Observation, combined with sagacity, is often the seed-corn of a rich and plenteous harvest.

A fact which occurred at this time is not a little significant of his future progress. Bennet was engaged to make the machinery of a paper-mill, and as he had never seen one, he took a journey for the purpose of inspecting a mill that might serve as a model; but it appears he might as well have remained at home, for on his return, a stranger, who observed what he was doing, remarked in the neighbourhood that he was only throwing away his employer's money. This gave rise to various reports, which led Brindley on hearing them to determine what he would do; he started on Saturday evening to see the mill which his master had visited in vain, returned on Monday morning, having accomplished the journey of fifty miles on foot, and in due time completed the machine—with many improvements of his own—to the entire satisfaction of Bennet's employer.

Already the millers, wherever Brindley was at work, chose him in preference to any other artisan; and, before his apprenticeship expired (at which time Bennet, who was advanced in life, grew unable to work), he kept up the business with credit, and even supported in comfort his master and his family. He subsequently started in business on his own account; but, for some time, he was only known in the neighbourhood of the place where he lived; gradually, however, his connexions became more extensive, and at length he undertook all kinds of engineering. Still there were difficulties in his way; he was a sort of intruder in his present profession, for which he had not been regularly trained; and, if some regarded him with feelings of jealousy, others did not treat him with the confidence to which he was fully entitled.

In 1752 he erected a water-engine for draining a coal mine at Clifton, in Lancashire; a work of great difficulty, and which he accomplished by bringing the water, as the moving power of the engine, through a tunnel cut in the solid rock, a distance of six hundred yards. About three years after, Brindley was engaged to make the larger wheels and other parts of a new silk-mill at Congleton, in Cheshire, while another person was appointed to execute the superior portions of the work. He however committed various mistakes which Brindley was employed to rectify; but having done this, the proprietors wished him to return to the inferior position he had previously occupied. Brindley refused to do so; and the result was, that the entire work was committed to him, and he completed it with his usual distinguished ability. Among his ingenious contrivances was one for cutting all his tooth and pinion wheels by machinery, instead of having them executed by hand, thus enabling him to accomplish as much of that kind of work in one day as had previously been done in fourteen. At length he was applied to by the Duke of Bridgewater, in reference to a project, which, thenceforward, formed the chief part of his pursuits.

The duke, having considered the pecuniary advantage he should derive from a canal connecting his estate at Worsley, which contained valuable coal-mines, with the town of Manchester, as well as the benefit that would accrue to others, called in the advice and practical ability of Brindley. An Act of Parliament was consequently obtained in 1759, to carry a canal over the river Irwell, near Barton-bridge, in Manchester, and to conduct a branch to Longford-bridge in Stratford.

One peculiarity was to mark this work. A *lock* is the barrier of a canal which confines the water—consisting of a dam, banks, or walls, with two gates, or pairs of gates, which may be opened and shut at pleasure. By means of such locks vessels are transferred from a higher to a lower level of water, or from a lower to a higher. Whenever a canal changes its level on account of an ascent or descent of the ground through which it passes, the place where the change occurs is usually commanded by a *lock*. But this canal was to be accomplished without the aid of locks, by preserving the same level throughout the course of the canal. After many difficulties had been surmounted, of sufficient magnitude to deter an ordinary man from the undertaking, Brindley commenced that which was by far the most gigantic part of the work; to carry the canal over the river Irwell, at a height of thirty-nine feet above the surface of the water.

Confident as Brindley felt of the practicability of the design, he wished the Duke to take the opinion of some eminent engineer before making the attempt; for, though such an enterprise has since been common, it was at that time an absolute novelty. The scheme appeared, however, to the gentleman consulted, as rather calling for ridicule than deliberation, and he is stated to have said, "he had often heard of castles in the air, but was never before shown where any might be erected." But neither Brindley's confidence nor that of the duke, in his judgment, was shaken by the reply; and the work was happily completed. The canal began at Worsley-mill, where a basin was cut, capable of holding not only all the boats required to carry the coals, but a great body of water, which serves as a reservoir or head of the navigation. The canal runs through a hill by a subterranean passage, large enough for the admission of long flat-bottomed boats, which are towed by hand-rails on each side, near three-quarters of a mile under ground, to the coal-works. There the passage divides into two channels, one of which goes five hundred yards to the right, and the other as many to the left; both being left to be continued at pleasure. The ingenuity displayed in carrying forward this great work is worthy of remembrance. The smith's forges, and carpenter's and mason's workshops were covered barges, which floated on the canals, and followed the work as it went on, so that there was no hindrance of business; and as the duke had all the materials in his possession—timber, stone, and lime for mortar, as well as coals from his own estate, all close by, he was at little expense besides labour. Nor was this all: the refuse of one part of the work was made to serve in the construction of another; thus the stones dug up to make the basin for the boats, at the foot of the mountain, as well as others taken out of the rock to make the tunnel, were hewn into the proper forms to build bridges over rivers, brooks, and highways. And the clay, gravel, and earth, taken up to preserve the level of one place, were carried down the canal to raise the land in another, or reserved to make bricks for other uses. In this way grandeur and elegance were successfully combined with economy. The aqueduct—at that time a most astonishing work—was completed in about ten months. The canal was then extended to Manchester, where Brindley's ingenuity in diminishing labour by mechanical contrivances was exhibited in a machine for landing coals on the top of a hill.

Many and great were the advantages obtained by this canal, afterwards extended to Liverpool. Before it was commenced, the price of water-carriage by the old navigation on the rivers Mersey and Irwell, from Liverpool to Manchester, was twelve shillings per ton; land-carriage was forty shillings per ton; and not less than two thousand tons were carried, on an average, yearly. Coals were retailed to the poor at Manchester at sevenpence per hundredweight, and often at a still higher charge. The cost of carriage by the duke's canal was six shillings per ton—the conveyance was much quicker—and the poor had their coals supplied at threepence-halfpenny for a hundredweight of seven score.

In the execution of every part of this remarkable navigation, Brindley displayed extraordinary skill; and he produced many valuable machines to facilitate the object he had in view. His economy and foresight were peculiarly discernible in the stops or floodgates, fixed in the canal, where it is above the level of the land; these being so constructed that, if any of the banks were to give way, and occasion a current, the adjoining gates would rise merely by that motion, and prevent any other part of the water from escaping but that which was near the breach between the two gates.

Encouraged by the results that had now been achieved, other enterprises were commenced and carried out by different persons, but under Brindley's direction. Among these were the Grand Trunk Canal—forty-six miles in length—connecting Bristol with Liverpool and Hull; a canal from Birmingham—twenty-six miles in length—uniting with the Staffordshire and Worcestershire canal, near Wolverhampton; and the canal from Droitwich to the Severn. He planned also the Coventry navigation; and a short time before his death he began the Oxfordshire canal, which, uniting with that at Coventry, serves as a continuation of the Grand Trunk navigation to Oxford, and from thence by the Thames, to London.

Such was Brindley's established reputation, that few works of this kind were undertaken without his advice; but his labours are too numerous to be particularised. It may, however, be added, that he gave the corporation of Liverpool a plan for clearing their docks of mud, which was successfully practised; and prepared a method, no less effective, of building walls against the sea without mortar. His last invention was a machine for drawing water out of mines by a peculiar kind of bucket, which he afterwards employed with advantage in raising coals.

Such was the enthusiasm of this extraordinary man in all that related to inland navigation, that it is said, when he was asked, at an examination before the House of Commons, for what purpose he thought rivers were created, he replied, "to feed navigable canals." He refrained from what are ordinarily regarded as "amusements," on the ground that they unfitted his mind for business. On the works intrusted to him, stupendous as many of them were—and frequently the first attempted of their kind—he was constantly intent, and to the persevering and sagacious employment of his remarkable powers, he was indebted entirely for his success and his fame. His labours appear, however, to have overtasked his frame; he suffered from a hectic fever, with little or no intermission for several years, and his earthly course was terminated in the fifty-sixth year of his age.

There can be little doubt that his want of early instruction rendered his labours far more wearisome and exhausting than they would otherwise have been. As he had no resource except in his surprisingly inventive mind, this was constantly and violently tasked. It was his practice when engaging in a new project to retire to bed for one, two, or three days, there completely to arrange all his plans, and this being done he rose and set scores or hundreds of men to work, without any memorandum of what he had determined, nor did he ever use a drawing or a model, except for the satisfaction of his employers. His memory thus largely trusted must have been proportionately burdened. Arithmetic, had he known it, would have been of immense value, but this was an attainment he had not been able to make, as the poor, hardworking son of a drunken and profligate father, at a time when instruction was not easily procured. In his calculations of the powers of any machine, therefore, he was accustomed to pass through some mental process which none knew but himself, and which, perhaps, he would have been unable to communicate to others. After certain intervals of consideration, he noted down the result at which he had arrived in figures, and then proceeded to work out the complete solution, and, strange to say, he was generally right. Those who knew him well highly respected him for his uniform and unshaken integrity, as well as for the vast range of his understanding. He appears also to have cherished kindly and liberal dispositions, in accordance with his conduct to his master and his family when rising into life.

LESSONS IN NATURAL HISTORY.—No. II.

THE TIGER.

The animal next in order in the *Feline* or cat-tribe, which claims the attention of the naturalist, is the tiger. Like the lion it is carnivorous; and for size and fierceness little inferior. In height and general conformation the tiger resembles the lioness; while in the features and outward appearance it is pre-eminently feline. In fact, the domestic cat may be taken as a miniature resemblance of this fierce and revengeful quadruped. The neck of the tiger is short, and the skin, which is soft and smooth and of a tawny-brown colour, is marked all over in spotty stripes. The eyes are small, round, and bright; the teeth, twenty-eight in number, are sharp and strong; the feet, like those of the cat, are furnished with crooked claws; and the tail, long and slightly tapering, is altogether deficient of the shaggy tuft which distinguishes the lion. The tiger is maneless, with a flat head and retreating frontal bone; the ears are short and set far back from the eyes; the jaws are large, powerful, and furnished with strong pliable muscles; while the suppleness of its spine and the freedom of its limbs render it eminently fitted for attack or retreat. To the sagacity and agility of the cat is added the strength and ferocity of the lion: it is distinguished by a cruel and revengeful disposition, and is altogether deficient of the noble and magnanimous spirit said to characterise the king of beasts. The female tiger has generally two cubs at a birth; and, unlike the lioness, appears to entertain but little affection for its young,—having been known to devour its offspring even when possessing plenty of food in its den.

The tiger is found in Asia, Africa, and America; but in each continent it differs slightly in its outward appearance. The East Indian tiger is fallow-coloured on the back, grey on its sides, and white beneath; marked with numerous black stripes, the largest of which is not less than an inch broad. Some of the stripes are disposed in the form of a girdle round its body; but in general they are short, irregular, and slanting forward from the tail. One of this kind was killed by Captain Hamilton in the Sundah Rajah's dominions, and when dead was measured. Its length, from the tip of the nose to the extremity of the tail, was five feet nine inches; its height, from the end of its fore paw to the top of its shoulder, was three feet seven inches; and the fore leg, measured directly under the shoulder, was above two feet and a half in circumference, the rest of the body being large in proportion. The tail was two feet ten inches in length, and nine inches in thickness at the largest part, gradually decreasing to the extremity, which was very slender. It was encompassed with irregularly-marked rings of the same colour as the rest of the body, but of a darker hue. Its head was fifteen inches and a-half in length, and ten in diameter: the two sides of the forehead appeared to rise up above the skull, leaving a considerable cavity in the centre, which ran down from the ears to the muzzle. The lower part of the neck was covered with a long narrow stripe, whence several others of a rather lighter tawny colour proceeded, turning downwards towards the legs. The top of the trunk was marked with a series of disjointed blackish stripes; which, dividing and parting from each other from the centre of the back downwards, reunited in a single stripe in the middle of the upper part of the neck. The mouth was very large, furnished with teeth of formidable dimensions, and being decorated on each side with large feelers or whiskers like those of the cat. The East Indian, or Asiatic tiger, is common to many parts of China and the uncultivated jungles of the tropics. It is a fierce, cruel, and rapacious beast; possesses immense strength, and is considered the largest and most ferocious of its tribe.

The American tiger is also a very fierce and mischievous

animal, of a graceful form and handsome appearance,—rather smaller than his brother of the East, of a fallow colour, and with a longer tail in proportion to his size. In America everything is on a grand scale but the animals. Her mountains, rivers, cataracts, forests, and prairies are the most extensive in the world; but the fish that swim in her rivers, and the wild beasts that wander over her forests are, compared with those of the old world, by no means so large or ferocious. The American lion is maneless, and but little larger than a Newfoundland dog, while the tigers that prowl about the woods and mountains, seldom exceed three feet in length from tail to snout.

The tiger of Africa differs little from that of Asia in size and characteristic cruelty of disposition; but instead of irregular black stripes, it is marked with yellow and blackish spots on its back and sides, which take the form more or less of stripes according to the age of the animal. In many parts of the interior of this continent the natives hunt the tiger for the sake of his flesh, which is said to be white, tender, and by no means ill-flavoured.

However much the tigers of the three continents may differ from each other in outward appearance, their main characteristics are precisely similar. In the woods and jungles of Asia, in the forests and plains of America, or in the acrid deserts of Africa, the animal is found to be an equally fierce and implacable enemy; and, although it is common wherever he is found to hunt and to kill him, the sport is rather exciting than safe. Mounted on elephants and horses, the Europeans resident in India, attended by large bodies of natives, make regular incursions into the interior of the country in search of the lordly brute; and it is no uncommon thing for one or more lives to be lost in these exciting sports. But the wild excitement of the chase, no less than the desire to rid the country of such dangerous neighbours, is sufficient reason to explain the almost universal desire that men feel to destroy wild animals wherever they are found. The perils of the pursuit are more than counterbalanced by the pride of success, and the terrors of encounter are overcome by the unconquerable love of adventure inherent in the breasts of most men, but more especially Europeans. The East India Company formerly offered a reward of ten rupees (about 20s. English) for every tiger destroyed within their dominions, but of late years it has been found that the species has so far decreased that the reward is no longer necessary. In fact, wherever man advances, the denizens of the forest retreat. In some parts of India the tiger was formerly held in reverence by the natives, who, instead of endeavouring to prevent his inroads, actually prepared, whenever one of the species came within sight of a village, various kinds of fruits and rice to tempt his especial palate, by way of appeasing, as they said, the manes of their fathers or grandfathers,—for the Hindoos are strict believers in the doctrine of the transmigration of souls; and therefore imagine that while destroying the tiger they might be killing a near relation. Lady Raffles relates an instance of this superstitious reverence among the natives:—The Coolies, passing through a forest, she tells us, came to a tiger, crouching in the path. They immediately stopped and addressed the creature in terms of supplication, assuring him that they were poor people, carrying the great man's luggage, who would be very angry if they did not arrive in time, and imploring permission to be allowed to go on their way in peace. The tiger being startled at the appearance of the great multitude, stared at them for a minute, and then moving away, walked quietly off into the wood again; and the natives proceeded on their journey, satisfied that their prayers had appeased the savage monster. The howl of the tiger when he has made sure of his prey is one of the most terrific and appalling sounds which can strike on the human ear. His mode of attack is to creep silently along the grass of the jungle; and then, bending downwards for an instant, to spring with one fell bound on the man or beast that may happen to be in his path. In some parts of India, it is dangerous to pass through a forest except in large companies; and though the tiger seldom attacks mankind unless provoked, such is his strength and agility, that horses and buffaloes fall beneath his relentless jaws. This animal is said to be the only one which dares to attack the crocodile. Those who have witnessed the encounter between the tiger and the crocodile describe it as a fearful scene. The crocodile raises his head above the water to seize the tiger as he comes to the river-side to drink, as he does cows, horses, and other animals. When this happens, the tiger plunges his

THE TIGER AND THE LEOPARD.

claws into the eyes of the amphibious beast; a fearful struggle then ensues—the crocodile sometimes drags the tiger under the water, and an encounter takes place which ends in the death of the river monster.

Though the tiger is said to be untameable, instances have occurred in which the power of man has overcome the natural fierceness of the brute. The late Mr. Van Amburgh used to exhibit several tigers and panthers in a complete state of subjection; and it is said—however truly we cannot vouch—that Charles James Fox had a young animal of the tiger breed which followed him about like a dog. He had possessed the tiger from its infancy, and fed it entirely on milk and vegetables. One day, however, while he was sitting reading, the tiger came up and licked his hand, which was hanging over the back of his chair. The roughness of the animal's tongue scraped away the skin before its owner was aware of the fact. Happening, however, to turn round his head, he discovered with horror that the animal's eyes were glaring, and its whole spirit was aroused at this first taste of blood. But he did not lose his presence of mind. Gently rising from his seat, without withdrawing his hand from the tiger's mouth, he led it with endearing words into the next room, over the chimney-piece of which was hanging a loaded pistol. The blood began to flow more rapidly, and the tiger's eyes to glow more fiercely; when, taking the pistol in his right hand, he levelled it at the brute's head, and killed it on the spot.

The tiger will not feed on dead carcasses, but always hunts and kills his prey; and sometimes, when he is more than usually fortunate in meeting with antelopes, sheep, and other animals, he will destroy several; and, instead of devouring the bodies of any one of them, content himself with sucking their blood. Many specimens of the animal have been brought to this country: one very fine pair in the gardens of the Zoological Society, having been brought from Bengal, and presented by Captain E. Mangles.

THE LEOPARD, OR PANTHER.

We have left ourselves but small space to speak of the leopard, which is seen in the background of our engraving. This animal differs little from the tiger except in size, and the markings of its coat. It is much smaller and not quite so ferocious; and, instead of stripes, its fur is marked with irregularly-shaped spots of a blackish hue. In various parts of Asia and Africa, it is so far tamed as to be occasionally used in the chase like a dog—hunting hares, antelopes, and foxes, with a dexterity, courage, and faithfulness quite surprising. The leopard, or panther, has a long body, bright shining eyes, a great mouth filled with sharp teeth, round ears, and a tawny skin covered with spots, which decrease in intensity of colour as they approach the under part of its stomach. The jaguar of South America is only another variety of the leopard, but possessing little of its courage and ferocity, seldom daring to attack man and the larger beasts unless much pressed by hunger. Like other carnivorous animals of the cat tribe both the tiger and the leopard are provided with soft spongy feet, which allow them to come up noiselessly with their prey, on which they spring from a crouching position. Both the leopard and the jaguar can swim well, and Sonini relates that he once saw a jaguar drag the body of a horse along the banks of a river for more than sixty yards, and then swim across with it to a wood where he might devour it in safety. The panther of America, which is sometimes called the "tree-tiger," from his facility in climbing trees in pursuit of his prey, is not much larger than a greyhound, and is of a reddish colour, and fierce, lively disposition. His flesh is sometimes eaten by the Indians, who affirm that it is delicate food. The skins of the tiger tribe are imported into this and other countries, where, after being properly dressed, they are used as carriage-mats, &c. In Russia the skin of the leopard is occasionally tanned and made into gloves and shoes. In the Great Exhibition of 1851 many specimens of tiger and leopard skins were shown on both the English and foreign sides of the building.

In our next lesson we shall be enabled to describe other members of the feline tribe. Their general characteristics are: smooth glossy skins; bright piercing eyes, capable of great dilatation in the dark; active dispositions and fondness for hunting their prey—all very similar to the animals just described, excepting that they vary greatly in size.

LESSONS IN GEOGRAPHY.—No. I.

EARLY NOTIONS.

The term Geography is derived from the Greek word *Geographia*, and simply means *a description of the earth's surface*; it is therefore rightly applied to that science which treats of the natural outline and extent, the political division and construction, the civil and social condition, and the industrial wealth and population of the various countries, kingdoms, and states which have appeared, or which now exist on the face of the globe. Geography includes also the description of the form of the earth, its motions, its place in the solar system, the great circles supposed to be drawn on its surface, and its position in the heavens by which it is on all sides surrounded; of the diversified nature of its surface, as seen in its mountains, valleys, plains, rivers, seas, and oceans, and in the constitution and phenomena of the atmosphere by which it is enveloped, as in a swaddling band; and of the different races of animals including man, and the various kinds of vegetable and mineral productions which are distributed over its surface.

It will be sufficient for our purpose, in this first lesson, to state generally that the form or shape of the earth is that of a globe or ball, and that the height of the highest mountain on its surface is so small in comparison with the size of the earth, and interfere so little with its rotundity (roundness), that its height has about the same proportion to the diameter of the earth, which the thickness of common writing-paper has to the diameter of a twelve-inch terrestrial globe. The ancients had no such knowledge of the earth as we now possess; and though some of the most brilliant of the philosophic minds of Greece are supposed to have reached the notion of its globular form, such as the famous Pythagoras, it was buried under a cloud of errors and extravagances. To the most extensive view which the human eye can take of any part of the surface of the earth, even from the highest eminence found on its surface, it appears to be one vast and illimitable plain, diversified by hill and dale, land and water, mountain and valley. The heavens appear above his head to be a luminous dome, at night bespangled with stars, and they seem to rest on the surface of the earth at an immense and immeasurable distance. He feels as if he would be afraid to travel so far, either by land or sea, as to reach the limit which he supposes must ultimately be found to this surface, lest he fall over into the interminable abyss; and he supposes that the phenomena of the heavens are confined to the upper and visible concave which he beholds, while his imagination dooms all beneath his feet, to death and everlasting oblivion. Such were the limited notions which prevailed at an early period in the history of the world; and it is one great proof of the antiquity and authenticity of the Sacred Scriptures, that they describe men as they really were in ancient times, and as possessing those antiquated notions in science, particularly in geography and astronomy, which the uninstructed tribes of Africa, Australasia, and Polynesia, possess at the present day.

"The Hebrews," says an eminent writer, "obviously never attempted to form any scientific theory respecting the structure of the earth. The natural impression which represents it as a flat surface, with the heaven as a firmament or curtain spread over it, is found to be universally prevalent. Beneath us is conceived to be a deep pit, the abode of darkness and the shadow of death. In one place we find the grand image of the earth being *hung upon nothing*; but elsewhere the *pillars* of the earth are repeatedly mentioned; and sometimes the *pillars* of heaven. In short, it is evident that every writer caught the idea impressed on his senses and imagination by the view of these grand objects, without endeavouring to arrange them into any regular system." We have quoted this passage as a specimen of the loose style of writing and thinking regarding the science of the sacred Scriptures. The style of these writings, in the places above referred to, is highly poetical; and who, we would ask, expects to find didactic theories in a poem? The poet seizes the phenomena of nature as they appear to the eye, and enlarges, magnifies, or arranges them at pleasure; he is not tied to rules, nor confined to the language of the schools. To do so, would destroy his poetry, and reduce his imagination to an automaton. The book of Job, in which these grand expressions are found, is the oldest book in the world. It was written long before the time of Moses;

though found in the Hebrew language, it was evidently not written by a Hebrew. It is curious, however, that the writer of this book should have lighted upon such a striking fact, as that the *earth hangs upon nothing!* Had this been found in a Chinese or a Hindoo book, possessing such claims to antiquity as the Hebrew book, it would have been lauded to the skies as a proof of superior knowledge, and would have been held as an infallible proof that the Chinese or the Hindoos, ages ago, were actually acquainted with the facts of modern science!

The same writer looks to Phenicia for the origin of Geographical knowledge; and there can be no doubt that, being among the earliest merchants and traders both by sea and land, the Phenicians must have been among the first nations of the world who acquired some knowledge of its surface, and of the countries it then contained. It is admitted that the tenth chapter of Genesis contains a view of the known divisions of the earth at an early period, and that it agrees in some striking particulars with the records of profane history! It is also acknowledged that Ezekiel visited Tyre, as Herodotus did Babylon, with the eye of an intelligent observer; and it is considered probable that he held intercourse with the best-informed men in that great school of commerce and navigation! The geographical boundaries to which he alludes, are considered as placed at the farthest limits of their knowledge, viz., Tarshish, Ophir, the Isles, Sheba and Dedan, the River, Gog and Magog, and the North.

Tarshish is deemed, with very great probability, to have been a name used in Scripture for *Africa*. It appears to have belonged originally to a great African city, called *Carthage* in later times, and well known from its rivalry to Rome; it was afterwards extended to the whole continent of which that city might be considered the metropolis; but especially to that division of it, now known by the name of Northern Africa, exclusive of Egypt and the countries adjacent to the Arabian Gulf. This division was called by the Romans *Africa Propria*, that is, Africa Proper, and included Carthage; and Jerome calls a voyage to Tarshish an "African voyage." This also solves a difficulty which has been found in the scriptural accounts of two different voyages to Tarshish; the one up the Mediterannean, from the straits of Gibraltar, bringing iron, silver, lead, and tin, the produce of Spain and Britain (Ezekiel xxvii. 12); and the other, up the Red Sea, or Arabian Gulf, from the straits of Babelmandeb, bringing gold and silver, ivory and apes, and peacocks, the produce of Central Africa (1 Kings x. 22).

Ophir, as being connected with Tarshish and Sheba in the voyages of Solomon's ships for gold and other produce, is rightly considered as a part of *Africa*, which indeed appears highly probable from the similarity of the name. The eastern coast is the quarter to which all the indications seem evidently to point. In the voyage to Tarshish by the Red Sea, the name of Ophir is also mentioned, and in one case the latter is substituted for the former, (2 Chron. ix. 10). But we have seen that Tarshish is a name for one part of Africa; now, Ophir is a name for another part of the same continent. As gold is the produce of Ophir, we must look to that part where it is to be found. This, for the sake of consistency in the history of the voyage, can only be *Sofala*, where abundance of gold is said to exist, and whence it could easily be brought in ships through the Red Sea to Sheba in Arabia; from the straits of Babelmandeb, it could either be carried overland through this country to Jerusalem, or it could be transported up the gulf to the place now called Suez, whence it could readily be brought into the palace of Solomon the king.

The *Isles*, the isles of the gentiles, the isles of the sea, the isles of Chittim and of Elisha, all point out the islands which abound in the Mediterranean, which is called "the sea" and "the great sea" in Scripture. These are acknowledged to be Sicily and the other islands belonging to Italy and Spain; the islands of Greece, a country almost wholly insular and peninsular; and the islands of Cyprus and Crete (Candia) with various other smaller islands scattered through the Archipelago and lying on the west of Asia Minor.

Arabia Felix, or *Arabia the Happy*, is considered to be the country anciently called *Sheba* or *Sabæa*. Its trade was in gold and incense; and it was carried on by caravans which came from the coast, where they had been imported from Ophir. The "companies of Sheba" are mentioned in Job—a fact which shows the antiquity of its commerce; and the "multitude of its camels," are spoken of in Isaiah, another fact which shows its value and long continuance. The commerce of *Dedan* rivalled that of Sheba. It came up the Persian Gulf from the Straits of Ormuz. The imports were ivory and ebony, and precious cloths for chariots. These were the commodities of India, and they were carried across the desert of Arabia, or Arabia Deserta, into *Petra*, the capital of Arabia Petræa, or *Arabia the Stony*, which consisted chiefly of the ancient country of Idumea or Edom. The inhabitants of Dedan were only the merchants who brought the produce of India to the capital of Edom, as a depôt for the supply of the countries lying to the north and the west of it, and "the travelling companies of Dedanim" might consist of native Hindoo or Asiatic traders, whose home was on the deep.

The *River*, meant the great river, the river Euphrates. On its banks stood the mighty capitals of Assyria and Babylon, and there flourished the most renowned empires of antiquity. Here also was supposed to have been the seat of Paradise, or the garden of Eden. Thus saith the poet:—

> "Seek not for Paradise, with curious eye,
> In Asiatic climes, where Tigris' wave
> Mix'd with Euphrates, in tumultuous joy,
> Doth the broad plains of Babylonia lave,
> 'Tis gone with all its charms, and like a dream,
> Like Babylon itself, is swept away;
> Bestow one tear upon the mournful theme,
> But let it not thy gentle heart dismay.
> For know, wherever love and virtue guide,
> They lead us to a state of heavenly peace;
> Where bliss unknown to guilt and shame preside,
> And pleasures unalloy'd each hour increase."

Along the countries situated between the Euphrates and the Tigris, and on both sides of these rivers, Ezekiel mentions a number of cities, as Haran, Canneh, Eden, Ashur, &c., from which great caravans proceeded to Tyre with cloths and other valuable commodities. These appear to have been brought overland across the countries of Asia, and probably by interior caravans from Hindostan and the borders of China, the native country of silk.

The *North*, with Gog and Magog, described in such a terror-struck manner by Ezekiel, have been considered as denoting the Scythian hordes of warriors who invaded the south, and carried away "silver and gold and a great spoil." But it is with more reason supposed to refer to the high table-lands in the interior and the north of Asia Minor, Phrygia, Galatia, Cappadocia, and Paphlagonia. The imports from these regions were "vessels of brass and persons of men;" these countries are famous for their produce in copper, iron, and steel to this day; and their trade in slaves for the supply of harems is equally notorious. Horses and mules are also mentioned as brought from the same quarter; and this trade also has been found a branch of the traffic carried on in the upland tracts of Paphlagonia. Thus we have given a succinct view of the ancient geography recognised in the Scriptures.

LITERARY NOTICES.

SUPERIOR EDITION OF THE POPULAR EDUCATOR.—No publication has ever been welcomed with such tokens of approval from heads of families as the POPULAR EDUCATOR. A circulation of nearly one hundred thousand has already been attained. To meet the urgent wishes of numerous families and individuals, JOHN CASSELL has determined to publish an EXTRA EDITION upon superior paper, at 1½d. per Number, or in Monthly Parts, containing Four Numbers in a neat wrapper, 7d., or when Five Numbers, 8½d. This Extra Edition will be published without the weekly headings. Persons wishing to have this superior paper edition, must give their orders expressly for "*the Extra Edition of* THE POPULAR EDUCATOR;" they will otherwise receive the common edition. The First Part of the Extra Edition is ready, price 7d.; and all the Numbers may be obtained, price 1½d. each.

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ANSWERS TO CORRESPONDENTS.

D. D. (Sheffield).—Sound *ère*, *ère*, &c., as two syllables; but if a stem, such as *ame* or *doc*, be prefixed, then sound the words as three syllables, viz., amare, docere, &c.

CENOTAPH.—He will find some lessons on Drawing in the article on the "Elements of Design," in the ILLUSTRATED EXHIBITOR, No. IX., new series. There is a corporate body or society of schoolmasters, already in existence.

DARER.—We really do not see how French can be thoroughly learned, unless the Rules laid down in the Lessons are properly committed to memory.

M. W. (Lincoln's Inn).—We thank him for his corrections, they shall be carefully attended to in future editions.

G. J. T., (St. Mark's-road).—The term *Messiah*, though a scriptural one, is neither the *only* nor the *first* one applied to the wonderful person called *Christ*. Being found in some prophecies relating to him, it was adopted by the Jews as an exclusive term descriptive of his office, and of their expectations concerning him. This term, which signifies, according to *Gesenius*, "ANOINTED—that is, *prince consecrated by anointing*"—was endeared to the captive Jews by the glorious prophecies of Daniel concerning him, and was cherished by them for at least 490 years before his advent, as containing in itself, as it were, the sum and substance of their future hope,—namely, *universal dominion* over all their enemies, and over the whole world. Hence their frantic rage at the assumption of this name by *Jesus Christ*; for *Christ* in Greek signifies *Messiah* in Hebrew. The first place where the term Messiah occurs is in the song of Hannah, the mother of Samuel. (Sam. i., chap. 2, ver. 1—10.) The concluding sentence reads thus:

"Jehovah shall judge the ends of the earth,
And he shall give strength unto his king,
And he shall exalt the power of his *Messiah*."

On reading the whole song or psalm of praise put into the mouth of Hannah, we cannot fail to discover that a greater than Samuel, or Saul, or David, or Solomon, is here. Such is the nature of prophesy.

The word *Messiah* is frequently used after this period in the history of Israel, to signify the *anointed of the Lord*, whether it refers to an earthly king, or to him who was afterwards spitefully and contemptuously called the *king of the Jews*. In the *second* psalm, the whole transaction of the crucifixion is vividly portrayed in the glorious and striking language of prophesy:

"Why do the heathen [Pilate and the Romans] rage? And the people [the Jews] imagine a vain thing? The kings of the earth [the Romans] set themselves, and the rulers [the chief priests and scribes] take counsel together against Jehovah, and against his *Messiah*," &c.

There are certain psalms, in fact, which so clearly describe the coming of Christ and the nature of his kingdom, that they are called *Messianic* psalms. But the clearest reference to the Messiah by name is contained in the book of Daniel, chap. ix., ver. 26: but read the context from ver. 24 to ver. 27, inclusive. For a full and satisfactory account of this interesting inquiry, we refer to Dr. Pye Smith's "Scripture Testimony to the Messiah," Book II.

R. Mc F. GREENOCK—C. A. S.—The verbs *taceo* and *gaudeo*, are called *neuter* verbs, because they express *neither* action nor suffering, that is, they are neither *active* nor *passive* in their signification, but express simply the state of their subjects. They are therefore *intransitive*, that is, they convey no *action* to an *object*. Taceo, however, is sometimes used *transitively* by Cicero, when it means *to be silent with regard to any thing*, i.e. *to keep it secret*. These verbs are very rarely used passively.

C. B. AND OTHERS.—The best rule for the aspiration of h is to observe the practice of good writers and speakers. In the case of *nouns*, wherever the article *a* is used before a noun beginning with h, this letter must be aspirated; as *a hand*, *a hinge*, *a hound*, *a heat*, &c. But wherever the article *an* is used before a noun beginning with h, this letter must be silent or not aspirated; as *an honour*, *an hour*, *an heir*, &c. Generally, the verbs from which such nouns are derived, follow the same rule with regard to the aspiration of h, as the nouns themselves; as in the verb *to heat*, it is aspirated; but in the verb *to honour*, it is not aspirated.

J. S. R.—Z. P.—The *nor* in No. III. page 36, line 2, is a misprint in some copies, it should be *non*. The same is true of *ta census* it should be *tacensus*. The English pronouncing dictionary, usually referred to as an authority, is Walker's.

*** Correct solutions of query 7, No. II., have been received from Eureka; J. S. F.; W. F.; A. Scott; Jacobus, Perth; P. M. C., Aberdeen; G. W. Perry; Thomas Daines; L. R. J., Leeds; D. Keay, Dundee; J. B., Leith; J. H. E—d, Middleton; A. B. C., Pembroke-dock; T. E. R—s; Whetstone; and others.

Correct and ingenious solutions of query 8, No. II., have been received from Eureka; Matthew Spears; Henry Hill; E. Lord; J. L. N., Dublin; a Scholar, Cambridge; J. K. L., Belfast; J. W. CARD; and A. B. C., Pembroke-dock.

AMICUS (Bromley)—F. Y. Z. (Wolverhampton).—Yes.

TWO READERS—T. W. (Oldham)—J. W.—Gramma—D. (Shields)—Pallio—W. S.—H. C.—Everything they mention in its own order.

Solutions incomplete, incorrect, or not according to the data: query 7.—T. B., Durham; Douglas; W. W. G.; C. K.; J. P., Dudley; T. H. S.; C. W. H.; J. P., Summertown; A. W., Tiree; W. E. D., Watling-street; J. Howell; J. K. S., Belfast; H. M—s; and others. query 8.—E. C. H.; F. T—y; W. F.; A. W.; T. L—l; and others.

The case of J. S. M., Glasgow, is that of too many of our readers want of time. But this is not a reason, why we should alter our plan for those that have time. Besides a variety of subjects is necessary a variety of readers, and what does not please one may please another and even what does not please our subscribers at one time, may please them at another. People often change their mind, and often for the better. We advise our friends who have little time, to take things easy by so doing they will get through a great deal more than if they worried themselves about it. We commend J. S. M. for his good, but wrong determination, *not to look at the next lesson till he is fully acquainted with the former*. Still, having the next lesson in his library cannot do him no harm, neither will it do us any. In fact, it may do him good for it will act as a spur, if he does not take a wrong view of the matter. He will also recollect that he is not alone, and that many thousands of our readers are similarly circumstanced.

J. C.—If he has time let him study English and Latin together: English and French together. If he wishes science, let him study English and Arithmetic together, in preference to either of their pairs. Two studies together will relieve each other, and they are enough for all the evenings of the week, after 6 P.M. If he has less time, let him take only one study, viz. that which he likes best.

MECHANICUS (Witney).—Question 1: answer, no. Question 2: answer, yes. Question 3: answer, yes.—J. STUART, Aberdeen: yes.—R. W., Newcastle-on-Tyne; yes.—T. H. S.—Yes, if you have time.—W. T., North Shields; the question is not algebraical, nothing there for solution is given.—UN JEUNE HOMME; yes.—F. MARKS; Yes. *I bind*; a few inaccuracies exist in his translation.—J. K. C. L., the German grammar is that by Dr. Tiarks.

E. C. H. (Leard-street).—As to his fourth sound of *a*, we think it near that of *a* in *an*, that it may be counted the same. It is very convisable to multiply the sounds of the same letter.

G. J. T. (St. Mark's-road).—He will find a more complete solution inserted in this number. His remarks on the glossary are correct. The optical question will be explained at a future period.

A correspondent at Burton-on-Trent is right.

W. Y. Z.—Valde means *very*, *very much*, *greatly*, &c. His lesson is tolerably correct; only he should not spell *bonus* with double n.

R. J. (Liverpool).—He should look for the place where the ship was spoken, in a map of the sea, which is called a *chart*. Charts are constructed for various seas and oceans, as the Baltic sea, the Atlantic ocean, &c. In quoting the latitude, he has left out N. or S., so that we cannot tell whether he means *north* or *south*; and E. or W., so that we are in the same dilemma for *east* or *west*. To "double the cape" means "to sail round it." A ship sails to Australia, first on a south-west course, then on a south-easterly course, varying both within certain points of the compass, as the direction of the wind may require.

R. M.—It is our intention sooner or later to enable our readers to ascend the "Alpine peaks and snowy mountains" of learning, which he mentions.

G. W.—He will find his queries answered elsewhere. Let him try both together if his leisure will permit.

HENRY CATER.—Most young men have acquaintances. Let some young man in a given neighbourhood speak to his acquaintances, proposing the formation of a society for *co-destruction*, (a new name and a very good one,) and let him act as secretary *pro tempore*, by calling a *pro re nata* meeting. When the meeting has taken place, let him get some elderly and respectable person to take the chair *by acclamation*, and let the chairman shortly announce to the meeting the purpose for which it is called. Let the *pro tem.* secretary then state his views as clearly as he can, and proceed to take down the names of those who are willing to join the society. Let a committee be then appointed to carry the plan into effect, and let a second meeting be appointed of the *members only* who have joined the society, which may be called a *Co-destruction Society* of the place or district wherever it may be formed. At this second meeting let a very few rules be drawn up and submitted to the meeting, on the questions of expense for a room to meet in, and the plan to be followed in the management of the future meetings. Let all things be done decently, and in order, and success will attend the effort. Let the meeting then agree (*not differ*) on the subject to be studied, and let them at once follow the method recommended in No. 5, in the answer to H. King. The phrase *pro tempore* means *for the present time or occasion*; and that of *pro re nata* means *profane*, or *before anything has been done*. *By acclamation*, means *by the unanimously expressed wish of the meeting*. *Ipso facto* means *by the very act itself, by the deed itself*. We shall be glad to announce the formation of the societies for different districts throughout the kingdom in the POPULAR EDUCATOR.

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LESSONS IN MUSIC.—No. IV.

By JOHN CURWEN.

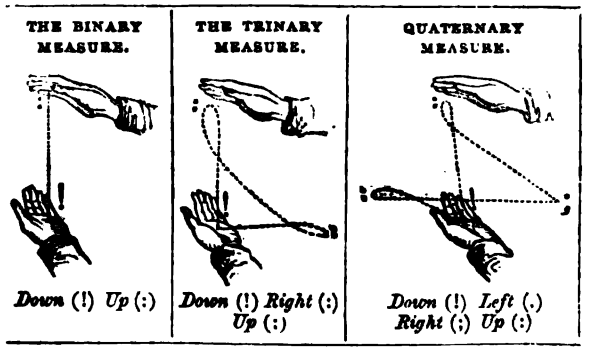
THE learner must be careful not to let his thoughts be confused by the different uses of the word "time" in ordinary musical language. You will meet with the phrases "common time," "triple time," &c. The word "time," then, refers to the orderly recurrence of accents—*the "measure."* In the phrases "quick time," "slow time," &c., it means *rate of movement*, the speed with which the accents recur. And when we are requested to "keep the time," it is commonly meant that (though we may have been correct in the rate of movement, and accurate in the recurrence of accents) we have *not given the exact proportionate length of each note.* It is known that the swings of the same pendulum are of equal length in time, whether they are long or short in respect of the distance traversed; and that the longer the pendulum, the slower its movement; and the shorter the pendulum, the quicker its movement. This gives us the means of regulating the "rate of movement" in music as well as in clockwork. There is an instrument called a METRONOME or "measure"-ruler, the pendulum of which can be lengthened or shortened according to a graduated scale, so as to swing any required number of times in a minute. Let each swing of the metronome correspond with an aliquot or "pulse" of the measure, or in the quick senary measure, with the loud and medium accents. Then, if the number at which the weight is set, on the graduated scale of the metronome, be given in the signature or title of the tune, it will indicate to others the rate at which that tune should be sung. Thus, "M. 66," placed at the head of a tune, signifies that, while this tune is sung, the metronome should swing at the rate of sixty-six swings a minute; and that each aliquot of the measure should keep pace with a swing of the metronome. The larger metronome, which is kept in motion by clockwork and "ticks" to every accent of the measure, costs 30s. and upward—that which strikes a bell on the recurrence of each stronger accent being much more expensive. The smaller metronomes, which simply oscillate without noise, are sold at 8s. and upward. Very much cheaper instruments will no doubt be made for schools when there is a demand. Meantime, each teacher and scholar too may make his *string pendulum*, which will answer the end very fairly. For this purpose, fasten a penny or some such weight at the end of a piece of string. Then, at four inches and five-eighths from the weight, tie a double knot. Hold the string by this knot, and the weight will swing at the rate of 160 swings a minute, and make your pendulum correspond with M. 160. At 6¼ inches tie a single knot; and that length of pendulum will correspond with M. 138. The double knots may mark the distances most used, and the single knots those used occasionally between them. The rest of the pendulum may be constructed to the following table—S. standing for single, and D. for double knot.

1st D. at 4½ inches from	weight	= M. 160.
1st S. at 6¼ in.	,,	= M. 138.
2nd D. at 9¼ in.	,,	= M. 112.
2nd S. at 1 foot 1⅛ in.	,,	= M. 96.
3rd D. at 1 foot 7½ in.	,,	= M. 80.
3rd S. at 2 feet 6⅛ n.	,,	= M. 66.
4th D. at 3 feet 10⅛ in.	,,	= M. 50.

A silk tape with the metronome figures marked at the proper distances would be preferable to the string. A lath of wood might be graduated in a similar manner, with holes punctured or the points of suspension, but it would require different distances according to its own weight.

The "string pendulum" which is here recommended for its convenience of measurement by a common carpenter's rule, is slightly inaccurate, though quite near enough to the truth for all practical purposes; but, as many may not like the trouble of making such an instrument, it is well to mention that "portable metronomes" are now sold by Mr. Edward Greaves, 57, South-street, Sheffield (at 5s. and upward); and Mr. D. Scholefield, Stationer, Huddersfield (at 6s. and 4s.); any of which can be sent by post. Some such instrument should be used by every pupil. Though it need not be always used for the exercises, it should be constantly referred to as a standard, and strict attention should be given to it in the earlier lessons. When you have learnt to sing *the notes* of a tune correctly, then set your metronome swinging, and practise singing the tune at the proper rate, or "in the right time." After considerable practice has taught you to keep the accents at regular and *equal* distances, you will only need your "pendulum" to give you a correct idea of the "rate of movement," *before* you commence singing a tune. An accomplished solo singer, or instrumentalist, need not confine himself to strict clock-time, but should vary the rate of movement according to the emotional expression. You, however, are a long way from that position, and should carefully practise yourself with this instrument until you have established in your mind and ear a *sense* of time.

It is not an easy thing for an unpractised singer to keep *an equal rate of movement* throughout a tune without aid, but he must learn to do it; and we are persuaded that a careful and frequent use of the pendulum is the best means hitherto proposed for the attainment of this power;—but it is customary to recommend the practice of "beating time." To those who may wish to adopt this plan, the diagrams below—explaining the method of "beating time" for the different measures—may be of use. But we are persuaded that to many persons this is no help at all, but only a hindrance. Let us keep in mind that the object to be gained is—first, a *mental perception* of equal movement, or the regular recurrence of the pulses, and secondly, a *mental command*, by which the muscles of the larynx are made to obey the conceptions of the mind. Both these may be gained by careful practice, discipline, and effort on the part of the pupil. If a regular movement of the muscles of the arm is easier to him than a regular movement of the muscles of the larynx, then let him use the first as a guide to the second—not otherwise. It is, however, frequently necessary, when many sing together, that the leader of the band should beat time, either with a wand, or by the movement of his own hands. The SENARY measure may be beaten in the same way as the *binary*.



"To enable a number of performers," says Dr. Bryce, "to *keep time*, it is usual for a leader to guide them by a preconcerted movement of his hand. This is called *beating* time. * * Though it is most essential that every learner should

be made to *keep time*,—that is, *follow his leader*, it is by no means necessary that he should *at first* be able to *beat* time, that is, *act as leader*. It may be said that he requires to keep time when singing alone. This is true. But if his mental conception of time cannot guide him to a correct and regular movement of the muscles of the larynx, neither will it guide him to a correct and regular movement of the muscles of the arm. On the contrary, by making him first to regulate the motion of the arm by his mental feeling of time, and then to regulate the motions of his organ of sound by that of his arm, we give him two things to do instead of one, and therefore double the chance of going wrong by the very measures we take to keep him right. There can, therefore, be no greater practical blunder in teaching, than the premature attempt to teach the *beating* of time to those who are yet struggling with the difficulties of the scale; and, instead of being any assistance to them in *keeping* time, it is the most effective hindrance. Dr. Burney, in his "Dissertation on the Music of the Ancients," prefixed to his "General History of Music," seems to have proved satisfactorily that one of the greatest improvements of modern music is, that we have learned to keep time with less external flourishing and hammering than was necessary in ruder ages, whose music was little more than an exaggerated way of marking the feet of the poetry to which it was sung. He concludes his account of the operations of the ancient Coryphæus, or leader of a choir, in the following words:—"It was not only with the feet that the ancients beat the time, but with all the fingers of the right hand upon the hollow of the left; and he who marked the time or rhythm in this manner was called MANU-DUCTOR. For this purpose they used oyster-shells and the shells of other fish, as well as the bones of animals, in beating time, as we do castanets, tabors, &c. Both Hesychius and the Scholiast of Aristophanes furnish passages to confirm this assertion. What a noisy and barbarous music; all rhythm and no sound! * * It would afford us no very favourable idea of the abilities of modern musicians if they required so much parade and noise in keeping together. 'The more time is *beaten*,' says M. Rousseau, 'the less it is *kept*.'" Rousseau's opinion is, perhaps, too strongly expressed; but I think no person of good taste can doubt that it is, in the main, well founded. The practice of making a whole class beat time while they sing, is a return to barbarism. The proper mode of teaching this part of practical music would be to make the members of the class act as leaders in turn; or, if the class be large, one or two at once might be taken out, placed in front of the others, and employed to beat the time—first with the assistance of the teacher, and afterwards by themselves. See Dr. Bryce's "Rational Introduction to Music."

The peculiarities of the old notation on the staff of five lines will be explained as we come to them, and at the proper period of his course our pupil will be more systematically introduced to them. He is already acquainted with most of the points relating to our "interpreting notation." They are, however, repeated below for the sake of distinctness. Observe that the notation of "slurs, repeats, and expression," applies alike to both notations.

NOTATION OF THE RELATIVE LENGTH OF NOTES.—As the accents recur at equal intervals of time throughout a tune, marking aliquot parts of the measure, the relative length of notes can be clearly indicated by showing what proportion of the measure each note occupies. This is done by first placing the accent marks at equal distances along the page, thus | : | : | : or thus : | : : | : : | : or thus | : : | : &c. and then observing the following rules.

a. A note placed alone immediately after an accent mark is supposed to occupy the time from that accent to the next. Thus | d : d : d | d : d : d | d or thus | d : r : m : d

b. A stroke — indicates the continuance of the previous note through another aliquot (or pulse), thus | d : d | d : — or thus : d | d : d : d | d : — : — | d : — : d | d : —

c. A dot divides an aliquot into equal parts and shows that the note before it fills half the time from one accent to the next, leaving only half an aliquot to the note or notes which follow, thus | d : d.d | d : d | d : d.d | d : — or | d : m.r | d : s_1 | d : m r | d .— | l_1 : d | s_1 : m | m.r : d.t_1 | d : —

d. The dot after a mark of continuance shows that the previous note is to be continued through half that aliquot, thus | d.r : m.f | m : d | d :-.f | m : d

e. A comma signifies that the note before it fills a quarter of the time from one accent to the next. The last note in an aliquot does not require a mark after it, as the proportion left to it is sufficiently evident. Thus, | d : d.d,d | d : d or | d : t_1.d,r | d : d

f. The dot and comma together show that the note before them fill three-quarters of the time from one accent to the next, thus | d.,r : m.,f | m.,r : d

g. This mark , indicates that the note before it fills one-third of the time from one accent to the next, thus

: d | s : l,.f | m : r | d

h. An aliquot or any part of an aliquot left unfilled indicates a pause of the voice, thus | d : | r : | m : | : | d (hark! hark! hark! while in-) : d | r : r | m :— or thus, | d :-.f | m : d | d : .f (fant voices sing.) | m : d

NOTATION OF SLURS, REPEATS, AND EXPRESSION.

a. When two or more notes are sung to the same syllable, they are said to be slurred. The slur is indicated by a curve beneath the notes.

b. In some tunes it is required to repeat certain parts of the strain. The manner in which this is done is indicated by the following signs:—

D. C. abbreviated from the Italian *Da Capo*, means "Return to the beginning."

D. S. abbreviated from *Dal Segno*, means "Return, and sing from the sign."

𝄋 is used for the Sign, and

R. abbreviated from *Fine*, shows where such repetitions *end*.

𝄆 placed over a note shows that a repetition of words commences there.

c. Greater "expression" is sometimes given to music by regulating the degree of force with which certain parts of the strain are to be delivered. This is done by means of the following signs placed over the notes:—

f. abbreviated from *forte*, signifies *loud*.

p. from *piano*, signifies *soft*.

ff. *very loud*.

pp. *very soft*.

d. Sometimes it is needful to indicate the manner in which that force is to be thrown in. For this purpose the following marks are used:—

<> denotes a *swell*, the voice commencing softly—becoming louder—and then closing softly.

< denotes increasing force.

> denotes diminishing force.

! or · over a note shows that it should be sung abruptly and with accent.

e. The same piece of music often requires to be sung with different expression, according to the different words with which it may be used. In that case the marks of expression should be placed on the words. It is proposed that—

CAPITAL LETTERS, in printing, or double lines under the word in writing, should distinguish words to be sung *louder* than others; that

Italic letters, in printing, or a single line under the word in writing, should indicate *softness*; that

The acute accent ´ should denote special abruptness and decision of voice; that

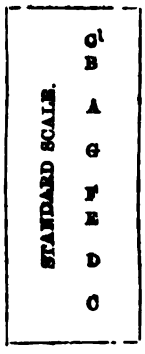
A stroke above the words, in printing, a succession of little strokes over or a stroke through the word in writing, should show a *heavy movement*; the accents being dragged along, and the lighter ones little distinguished from the stronger: and that

The grave accent ` placed on the words, which fall to the strong accent of the music, should indicate a *spirited movement*, with marked attention to accent.

A *slower* or *quicker* movement may be expressed by the words *slowly* or *quickly*. The "heavy movement" mentioned above necessarily tends to slacken, as the "spirited movement" does to quicken the pace of the singer.

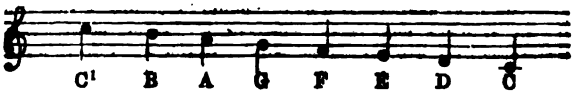
In the first number of the "Tonic Solfa Reporter" will be found a selection of hymns marked for "expression" on the plan here proposed. An analysis of those markings has elicited the following principles, which may be of use to the student:—Passages should be marked to be sung *softly* in which (1) any peculiarly solemn or awe-inspiring thought is expressed; (2) a change from praise to reflection, or (3) from reflection to prayer. Passages should be marked to be sung *loudly* which express (1) joyful praise, (2) strong desire, (3) ardent gratitude, (4) high resolve, or (5) some inspiring thought.

THE STANDARD SCALE.—A certain note "about midway between the highest and the lowest that can be perceived by the ear" is fixed on by musicians as the standard of PITCH, and the notes arranged upon it, according to the order of the "common mode" or scale already described, are called THE STANDARD SCALE. This note is called C. The second note of the scale is called D; the third E; the fourth F; the fifth G; the sixth A; the seventh B; and the replicate or octave C again. A note something less than half a tone higher than any one of these notes is said to be that note *sharpened*, as "G sharp." A note something less than half a tone lower than any one of these notes is said to be that note *flattened* as "B flat." M. Fetis (a well-known French writer) truly observes that "a sound cannot be altered or substituted for another without ceasing to exist. Do (or C) sharp is no longer DO (or C). It is a mere error so to call it, and it is one of those errors which have tended to render music obscure." But so *it is* called and we must be content with this warning against the dangers of obscurity. The particular pitch assigned to this note C and consequently to the other notes of its scale is called "concert pitch." The moderns generally fix the sound of C as that which would be produced by 256 vibrations of a sonorous body. The accepted "concert pitch" has been gradually *rising* to this standard within the last few years, so that Handel's music (unless we lower the key) is sung nearly a tone higher than he meant it to be.

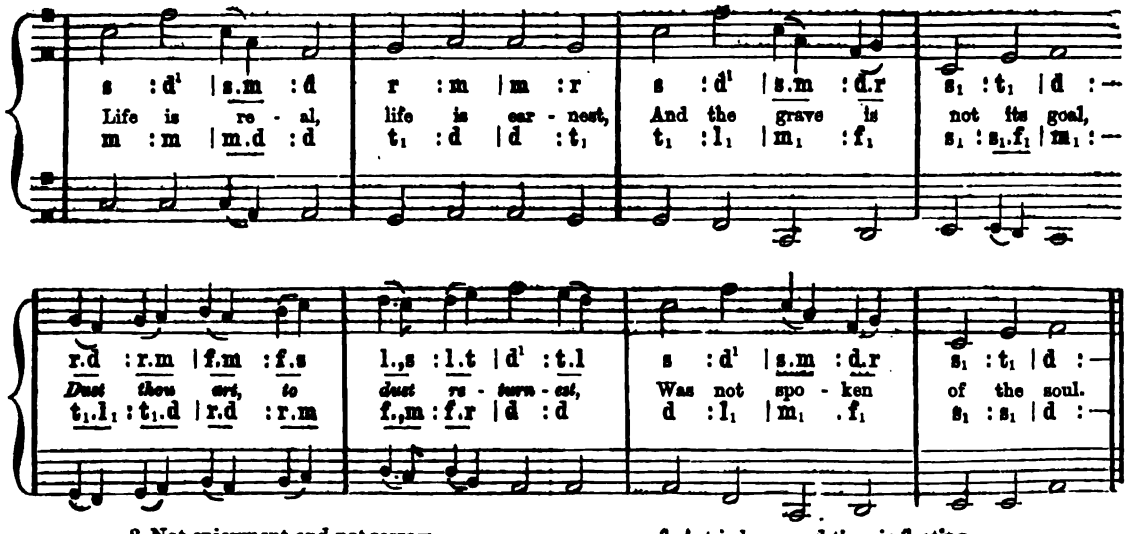


The pitch of the key-note may be given in the heading or title of a tune, thus "key A," "key C," "key B flat," &c. In "pitching a tune" it is usual to take the *upper* C¹ of the standard scale from the TUNING FORK or the pitch pipe to descend to the pitch-note required, and then give its sound to the syllable DOH. DOH, thus fixed, establishes the relative position of all the other notes of a tune. Suppose the "pitch-note" required is D. Then you would take C¹ from the tuning fork, and run down till you come to D, which you would "swell out" a little, and then sing the same sound to DOH, taking the "chord" afterwards. Thus:—

| C¹ : — | B : A | G : F | E : D | — : — | DOH : — |
DOH : ME | SOH : —

If you find any difficulty in singing your A B C backwards, remember that after sounding the C¹ you have only to spell the words BAG and FED. To pitch B flat, sing the C¹ to the syllable SOH, and striking FAH, which will be B flat, call it DOH. The *upper* C¹ is used in pitching because the higher sounds are found to be more distinctly and correctly appreciable by the ear. Tuning forks can now be obtained for a shilling or eighteen pence. The wholesale price is 10s. a dozen. We mention this to stimulate our friends to the purchase of these useful instruments. With a small sized one in his pocket the good solfaer is ready to take up a tune-book and make out a tune without the need of any other instrument. After a time he will become, with a little practice to that end, quite independent even of the tuning fork. He will soon learn to recall the pitch note C¹ at will. Those who are studying the old notation will like to see the Standard Scale represented on the staff. It stands thus:—

But a man's voice, taking the C from the tuning fork, would sing the scale an octave lower, thus:—

EXERCISE 15. **GRIFFIN.** KEY F. METRONOME, *Minim*=58.

(Music by H. BURNEY, Esq., Manchester. Words from LONGFELLOW.)

s :d¹ |s.m :d | r :m |m :r | s :d¹ |s.m :d.r | s₁ :t₁ |d :—
Life is re - al, life is ear - nest, And the grave is not its goal,
m :m |m.d :d | t₁ :d |d :t₁ | t₁ :l₁ |m₁ :f₁ | s₁ :s₁.f₁ |m₁ :—
r.d :r.m |f.m :f.s | l.,s :l.t |d¹ :t.l | s :d¹ |s.m :d.r | s₁ :t₁ |d :—
Dust thou art, to dust re - turn - est, Was not spo - ken of the soul.
t₁.l₁ :t₁.d |r.d :r.m | f.,m :f.r |d :d | d :l₁ |m₁ .f₁ | s₁ :s₁ |d :—

2 Not enjoyment and not sorrow
Is our destined end or way,
But to act that each to-morrow
Finds us further than to-day.

3 Art is long, and time is fleeting,
And our hearts, though stout and brave,
Still, like muffled drums, are beating
Funeral marches to the grave.

4 Trust no future, howe'er pleasant
Let the dead past bury its dead,
Act, act, in the LIVING PRESENT,
Heart within, and God o'er head.

5 Let us then be up and doing,
With a heart for any fate;
Still achieving, still pursuing,
Learn to labour and to wait.

NOTE.—The pupil will now pitch his own key-note as indicated in the title. If, however, he is not yet provided with a tuning fork, let him take DOH at a rather low pitch. A stroke beneath two or more notes, shows that they are to be sung to one syllable of the words, or "slurred." The comma, after a note, gives it a quarter of an aliquot;—the dot and comma, three quarters. Be careful in singing this correctly. Exercise yourself in singing the two notes first with a dot only, and then with a dot and comma between them. The tune is Mr. Burnet's copyright. It may be found harmonised for four voices, in "People's Service of Song." All the early exercises in this course are given in two-part harmony, because we are persuaded that, by two-part harmony, the ear is best taught to understand that which is more complex. These exercises should be sung by "equal voices;" that is, by two male voices, or by two female or children's voices. It will not sound quite so well if the air (or upper part) being sung by a female voice, the lower part is sung by a male. For the male and female voice are naturally an octave apart, and the intervals cannot be so "close" and sweet. [When you have traced and solfaed this tune from the modulator perfectly, your next step will be to "figure" it;—that is, sing it to the words "one, two, three, four, five, six, seven, eight. One, two, three, four, five, six, seven, &c." As you know these words very familiarly, your attention will not be distracted by them (as it might be by other words) while you try to strike the intervals correctly, without that help to the memory which the solfa syllables give. You may afterwards sing the words; but remember that this tune must be sung *with spirit* (abrupt decision) or not at all. A curve over, or under two or more notes, indicates a slur. In previous exercises we have had a black note (crotchet) to correspond with an aliquot or pulse of the measure. In this tune, we have used an open note (a minim) for the aliquot. We prefer using the crotchet as the standard aliquot; but, as it is not always so used, we have made this change to indicate that fact. It makes no difference to the music. There are still four pulses to the measure, and they move at the rate indicated by the metronome.]

LESSONS IN LATIN.—No. VIII.

By JOHN R. BEARD, D.D.

NOUNS, SUBSTANTIVE AND ADJECTIVE—*Continued.*

ALL the nouns of the fifth declension end in *es* in the nominative singular. This ending arises from the addition of the termination *s* to the characteristic vowel of the stem,—namely, *ĕ*, which thus becomes *es*. This characteristic vowel *ĕ* appears in all the cases. The ablative ending in *ē* is blended with the *ē* of the stem. All the nouns of this declension are feminine, except dies, *a day*, and its compound, meridies, *mid-day, the south*. Dies, in good prose, is used as a feminine only when it signifies generally *a time*, or *duration*, or *a fixed day, an appointed time*; as dies dicta, dies constituta, *an appointed day*; longa dies, *a long period*; damnosa dies, *a time of suffering*; dies perexigua, *a very brief period*. In the plural, dies and meridies are masculine.

FIFTH DECLENSION.

Sign EI *in the Genitive Singular.*

CASE-ENDINGS AND EXAMPLE.

Cases.	*Singular.*		*Cases.*	*Plural.*	
Nom.	ē-s	dies, *a day*	Nom.	ē-s	dies, *days*
Gen.	ē-i	diēi, *of a day*	Gen.	ē-rum	diērum, *of days.*
Dat.	ē-i	diēi, *to a day*	Dat.	ē-bus	diēbus, *to days*
Acc.	ē-m	diem, *a day*	Acc.	ē-s	dies, *days*
Voc.	ē-s	dies, *O day*	Voc.	ē-s	dies, *O days*
Abl.	ē-ē	diē, *by a day*	Abl.	ē-bus	diēbus, *by days*

In the genitive and dative singular,—namely, *ēi*, the *e* is short when it follows a consonant, as rēi, fidēi, and long when it follows a vowel as diēi, faciēi.

Only two words in this declension,—namely, res and dies, have all the cases in both the singular and the plural; all other words are without the genitive, dative, and ablative plural.

Species is commonly added to res and dies, as having all the cases, but Cicero pronounces the genitive and dative of species as not good Latin.

Of these nouns—namely, acies, *an edge, line,* or *sword*; facies, *an appearance*; glacies, *glass*; effigies, *an effigy* or *likeness*; progenies, *a progeny* or *offspring*; series, *a series*; and spes, *hope*; only the nominative and accusative plural are found in good prose writers.

VOCABULARY.

Spes, ei, *f. hope*; solatium, i, n. *solace, comfort*; tempus, ŏris, n. *time*; aerumna, ae, *f. wretchedness, misery*; conditio, ōnis, f. *a state or condition*; adversus, a, um, *against*; vita, ae, *f. life*; res adversæ, *adverse things, adversity, misfortune*; certus, a, um, *certain, fixed*; incertus, a, um, *uncertain*; dulcis, e, *sweet*; dubius, a, um, *doubtful*; humānus, a, um, *human*; vanus, a, um, *empty, vain*; felicior, fēlicius, gen. oris, *happier*; afflicto 1, *I beat down, afflict, grieve*; recreo 1, *I recreate, quicken, refresh*; amitto 3, *I lose*; oppōno 3, *I set against*; fere, adv. *easily*; miser, a, um, *wretched.*

EXERCISE.—LATIN-ENGLISH.

Spes est incerta et dubia; vis spei est magna in animis hominum; nonne magna est vis spei in animo tuo? facile indulgent spei vanæ pueri; spem feliciorum temporum non debemus amittere in aerumnis vitæ; O spes, dulci solatio animos miserorum hominum recreas! spe vanā sæpe fallimur; res humanæ sunt incertæ et dubiæ; conditio rerum humanarum est dubia; rebus adversis re tutem debes opponere; sapiens non extimescit res adversas; O, res humanæ, quam sæpe animos hominum fallitis! animus sapientis non afflictatur rebus adversis.

ENGLISH-LATIN.

The hope of life is uncertain; the hope of a long life is vain; I refresh my mind with hope; the wise man is not easily beaten down in wretchedness; adversity beats down the minds of brave men; the minds of brave men are beaten down by adversity; by the solace of hope the mind of a sage is refreshed; we ought not to lose virtue in the miseries of life; the wretchedness of the condition beats down the man; he loses the hope of a happier time.

VOCABULARY.

Fides, ei, *f. fidelity*; amicitia, ae, *f. friendship*; exemplum, i, n. *an example*; salus, ūtis, *f. health, safety*; ver, veris, n. *spring*; adventus, ūs, m. *advent, coming*; portus, ūs, m. *an harbour, port*; incorruptus, a, um, *incorrupt*; rarus, a, um, *rare, seldom*; serenus, a, um, *serene, fine, bright*; tutus, a, um, *safe*; verus, a, um, *true*; tristis, e, *sad*; avŏlo 1, *I fly away*; convŏco 1, *I call together*; exspecto 1, *I expect, await*; servo 1, *I keep*; conquiesco 3, *I am at peace*; debeo 2, *I owe*; cito, adv. *quickly*; cupide, adv. *desirously*; etiam, conj. *also.*

EXERCISE.—LATIN-ENGLISH.

Amicitiæ fides animos recreat in aerumnis vitæ; verus amicitiæ exempla rara sunt; amicorum fidei debemus salutem in adversis rebus; verus amicus etiam in aerumnis amici servat fidem; fides etiam miseris portum parat; paratur mihi portus tutus; incorruptus amicus rarus est in rebus adversis; in fide amicorum requiescit; veris adventus suavis est; cito avolant dies; dies serenæ rari sunt in vere; die constitutā milites in urbem convocat; certā die amici in domum meam convocantur; tristes sunt dies miserorum.

ENGLISH-LATIN.

True friends keep fidelity in the miseries of life; the fidelity of friendship is not a vain hope; is the fidelity of an incorrupt friend a rare example? in adversity we owe (are indebted for) a part to true friends; the solace of true friendship calls together fine days quickly fly away; on a certain day the generals call together (their) bands; the soldiers are called together by the king on an appointed day; I await the coming of spring desiringly; a sad day in spring is rare.

We have now gone through the five declensions; and here present, in a tabular view, the several variations:—

Declension.	Singular.						Plural.			
	N.	G.	D.	A.	V.	Ab.	N.&V.	G.	D.&Ab.	A.
1	a	ae	ae	am	a	â	ae	arum	is	as
2	us, er, ir, um (n.)	i	o	um	e, er, ir, um	o	i a	orum	is	os a
3	(various)	is	i	em im	(various)	e i	es a ia	um ium	ibus	es a ia
4	us u (n.)	ûs	ui	um	us	u	us ua	uum	ibus ubus	us ua
5	es	ei	ei	em	es	e	es	erum	ebus	es

In this summary view, many facts regarding gender, number, and case, are of necessity omitted. They may be found in the works to which reference has already been made. It seems, however, desirable to add, that grammarians recognise in Latin what is called a common gender. Those nouns are said to be of the common gender (c.), which may be applied indifferently, either to a male or a female. Such nouns are hospes, *a guest*; hostis, *an enemy*; incŏla, *an inhabitant*; parens, *a parent*; sacerdos, *a priest* or *priestess*; testis, a *witness*; bos, *a bull* or *a cow*; canis, *a dog* or *a bitch*; lepus, *a hare*; mus, a *mouse*, &c.

General Exercises on the Five Declensions.

Vocabulary.

Hŭmidus, a, um, *humid, wet*; hiems, hiĕmis, *f. winter*; divitiae, arum, *f. riches*; ultĭmus, a, um, *the last*; lepus, ŏris, m. *a hare*; caducus, a, um, *falling, frail*; pavidus, a, um, *fearful, timid*; barbarus, a, um, *barbarous*; sermo, ōnis, m. *speech*; Lătinus, a, um, *Latin*; Graecus, a, um, *Greek*; exoptatus, a, um, *wished for, desired*; quies, quietis, *f. rest, quiet*: tumidus, a, um, *tumid, swelling*; profundus, a, um, *deep*; inspiratus, a, um, *unhoped for*; nox, noctis, *f. night*; frigidus, a, um, *cold*; magnificus, a, um, *magnificent*; ligneus, a, um, *wooden*; commŏdus, a, um, *convenient*; glacies, ei, *f. ice*; lubrĭcus, a, um, *slippery*; nemo, neminis, c. *no one*; felix, felĭcis, *happy*; credulus, a, um, *credulous, too believing*; palus, palŭdis, *f. a marsh*; clarus, a, um, *clear, distinguished*; gelidus, a, um, *cold*; gradus, ûs, m. *a step*; potens, potentis, *powerful*; nunquam, adv. *never*; avārus, a, um, *avaricious*; fames, is, *f. hunger*; sitis, is, *f. thirst*; rotundus, a, um, *round*: infidus, a, um, *unfaithful*; sempiternus, a, um, *everlasting*; tardus, a, um, *slow*; contentus, a um, *satisfied*; limpidus, a, um, *limpid, bright*; exiguus, a, um, *short, narrow*; acutus, a um, sharp; humus, i, f. the *ground* or *soil*; eximius, a, um, *eminent, remarkable*; morosus, a, um, *morose, ill-tempered*; semper, adv. *always*.

Latin-English.

Est mihi amicus fidus et carus; infidus est servus tuus; terra est rotunda; vera amicitia est sempiterna; fames et sitis sunt molestae; avārus nunquam est contentus; rex est potens; gradus tuus tardus est; virtus patris tui est eximia; fons est clarus et gelidus; nomen clarum est ducibus; amnis limpĭdus delectat omnes; cervo sunt alta cornua; res est magna et insolita; hic sunt vastae paludes; opes credŭla fallit pueros; hominibus exigua est dies; nemo semper felix est; glacies est lubrĭca; pons ligneus custodĭtur; non omnes milites sunt fortes; magnificae portĭcus defenduntur; portus est commŏdus; dentibus acutis edimus; nox est longa et frigida; bonus laudatur, improbus vituperatur; senectus saepe est morosa; insperata salus venit; mare est vastum, profundum, tumidum; quies valde exoptata facile amittitur; sermonem Latinum discimus; nonne doces Graecam linguam? gentes barbarae remotae sunt; lepŏres pavidi evolant; flos est caducus; hora ultima venit; incertae sunt divitiae; mores antiquos amat mater mea; verba tua sunt dura; quam humida est humus! non facile in hieme agri arantur.

English-Latin.

Faithful friends are loved; I have great riches; they lose wished-for friendship; the ground is wet; wet ground injures; hares have sharp teeth; with sharp teeth we all eat; thy soldiers are brave; are thy father's soldiers brave? they delight in (abl.) credulous hope; the horns of the bull are strong; the virtues of the king are remarkable; how beautiful is the portico; you ought to learn Latin; men fear the last hour; the house is guarded by a strong band; avaricious men are avoided; ill-tempered women are never loved; the ill-tempered are troublesome; is friendship eternal? hope is eternal; how slow are thy steps! ice is slippery in winter; no one loves hunger and thirst; quiet quickly flies away; the harbour is convenient for ships; the fearful are never safe; art thou satisfied with the speech of thy father? they strike a powerful prince; falling flowers are gathered (lego 3); he gathers flowers in the march; the Greek language is beautiful; swelling seas are often found; the rest and solace of true friendship are wished for; no one is always happy.

To how large an extent Latin words enter into the composition of our present English is strikingly seen in the last vocabulary. These words found therein have their English representatives.

Latin.	E. R.
Humidus	*Humid, humidity*
Barbarus	*Barbarous, barbarism, barbarity*
Quies	*Quiet, quietness, quietly*
Tumidus	*Tumid, tumidity, tumour*
Profundus	*Profound, profundity*
Nox	*Nocturnal, equinox*
Frigĭdus	*Frigid, frigidity*
Magnificus	*Magnificent, magnificence*
Commŏdus	*Commodity, commode*
Lubrĭcus	*Lubricate*
Felix	*Felicity, felicitate*
Credulus	*Credulous, credulity, incredulity*
Clarus	*Clear, clearness, clarify*
Gelidus	*Jelly*
Gradus	*Grade, graduate*
Potens	*Potent, potentate, potency*
Avārus	*Avaricious, avariciously*
Fames	*Famish, famine*
Rotundus	*Rotund, rotundity*
Infidus	*Infidel, infidelity*
Sempiternus	*Sempiternal*
Tardus	*Tardy*
Contentus	*Content, contentedness*
Limpidus	*Limpid*
Acutus	*Acute, acutely*
Morosus	*Morose, moroseness*

The student of Latin will be greatly assisted, if before he attempts to commit a Latin word to memory, he tries to find an English word which is derived from it, and with which he may associate it in his mind.

LESSONS ON PHYSIOLOGY.—No. V.

MAN.

We wish to make our lessons so simple and plain, that you may thoroughly understand them. In treating of digestion, we showed you that the process begins with taking our food into the mouth. It is there masticated or chewed; in being chewed, it becomes mixed with the saliva of the mouth, until it takes on the character of a soft pulp. It is then swallowed; passes down the œsophagus into the stomach, where it comes in contact with the gastric juice. By the action of this fluid, it is converted into chyme. This chyme passes gradually into the duodenum, where it meets the bile and the pancreatic juice, undergoes a complete chemical change, and reappears in the form of a white milky liquid, known by the name of chyle. This is taken up by the lacteals, and by them poured into the thoracic duct or canal, which is in communication with the greater portion of the absorbent vessels of the body. In this canal the chyle becomes mixed with the lymph, and is thence conveyed into the vein which passes under the left clavicle, and mingling with the venous blood, is carried to the heart and lungs to receive its vital and life-giving properties.

If the food which we eat is thus at last converted into blood, and if it be the blood which builds up every individual part of the body, it is of great importance that our food should be good

and wholesome. The blood can contribute to growth and health only as it exists in a pure and healthy condition. If this precious vital fluid be itself diseased, it cannot fail to communicate the disease to the various parts or organs which it has to supply with their appropriate nutriment. For example:—If a fit of passion may suddenly and immediately occasion such a change in the milk of a nurse as to render it a rank poison to the little dependant infant, there is nothing to contradict the theory, that the blood itself may undergo such changes as to convert it from a wholesome nutriment and stimulus to vital action, into a most violent poison, fatal even to life itself. Another example:—In vaccination, a surgeon introduces into the arm of a child a very minute portion of virus, which in some way or other, not well known, affects and alters the whole of the blood; and this morbid state of the blood continues for a length of time. Or, again, suppose a student in the course of dissection should prick his finger, the putrid matter thus introduced may so effectually get into his system as to poison the blood and occasion death itself. It follows that a man may wilfully and knowingly induce disease, and injure his system. A drunkard is never a healthy man. Some men may more easily and for a longer period resist the effects of intemperance than others; but that the free use of ardent spirits is prejudicial to health is a truth which all the facts of physiology but too clearly demonstrate. An intemperate man does everything to contravene nature. He is working against God, and against the most beneficent laws of his universe. The great Creator has introduced into the blood all those elements which are adapted to preserve it pure and uncorrupt. What other end can we conceive to be involved in the fact, that in the blood is to be found a certain portion of saline matter? The presence of such an agent in the circulating fluid must be regarded as a beautiful and beneficent provision to prevent its decomposition. Were the blood to decompose in the body, it would cease to possess any vital property; and, deprived of its vitality, it could no longer minister to the nutriment and growth of a single structure.

The blood is a liquid of a beautiful red colour, and of a peculiar odour. In some animals this odour is very marked. Take blood from a cow, and by the smell of the fluid you can tell from what animal it has been drawn. In its living state, the blood is a transparent liquid, holding in suspension certain little bodies, of which some are colourless, but the greater portion of which have a red colour, and are known by the name of blood-globules. Now, to understand how these little bodies are adapted to nourish and build up the body of the strongest and most powerful, we shall try to set before you the component parts of this precious fluid. Let us open a vein, and take from the body a portion of blood. If we allow it to remain at rest for ten or fifteen minutes, it begins to congeal and take on a more solid form like that of a soft jelly. The fluid has become a solid, and this is the only change which is yet palpable to our senses. After a few hours we find that the clot has a greater degree of consistence, and, as the effect of this contraction, is surrounded with a transparent yellow fluid, which is named serum. Now what is there in this blood to produce this coagulation? Why does it not remain in a fluid state, as when first drawn from the vein? There must be some peculiar law to account for this change. In itself, and as it is seen flowing in the veins of a living creature, it appears a colourless fluid, with minute red particles which give the blood its beautiful scarlet hue; and so long as it is in a fluid state it holds in solution a particular substance called fibrine, which, in its ultimate composition, differs little or nothing from albumen, or the white of an egg. This substance is distributed through the whole body, but is found chiefly in the blood, because the blood, in its course and flow, supplies to every individual part of the complex structure the materials of its growth and development. Take the blood from the living structure, and the fibrine remains no longer in solution. Instead of being diffused, it coagulates and contracts, till it has pressed out the serum by the mutual attraction of its own particles. Now if we look at this clot or congealed blood through a microscope, we shall find that it presents a peculiar arrangement. It is not a mere aggregation or promiscuous accumulation of particles, but a beautiful disposition of fibres crossing one another in every direction. This arrangement may be seen in the common egg-shell, which is nothing more than so many layers of fibrous tissue enveloping the albumen, and forming the thin membrane which comes between the outer shell and the inner substance. These fibres constitute the first and simplest forms of animal tissue. If this solid earth, which we tread with so firm a step, be but an aggregation of particles or atoms, held together by the one great law of attraction, our bodies are nothing more than a mere combination and union of elements under the law of organisation. Nor is it difficult to become in some degree acquainted with these elementary or component parts, with their physical, chemical, and vital properties. Since the growth of the cell is dependant on its absorbing certain particles of matter from the fluid which surrounds it,—in this nutrient fluid, in the process of organisation, or before the process begins, we must look for the components of the animal structure, with their essential or peculiar properties.

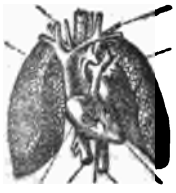
Blood-globule.

But the blood is not more dependant on the character of the food which we eat, than on the purity of the air which we breathe. The heart, from which the blood issues in a condition to nourish the body, is situated between the right and the left lung, and with the lungs fills up the whole cavity of the chest, as may be seen by the accompanying cut. Each lung is made up of a countless number of cells or vesicles, which

are always full of air derived by inspirations from the atmosphere which surrounds us. These cells communicate freely the one with the other; and it is in these air-cells of the lungs that the dark venous blood, by coming into contact with the oxygen, is converted into arterial. Impure air, therefore, cannot but be prejudicial to the quality of the blood; and in the degree in which the blood is affected, must the body, with all its peculiar functions, be more or less disordered. No one should sleep in a room into which air has no admission, for it is possible that during the night he may exhaust the whole of the vital air necessary for respiration contained in the apartment, and the consequence must be suffocation. Nor should we leave our sleeping-room in the morning without throwing open the window and allowing a free current to pass through it. Not only is it important to eat food which is wholesome and easy of digestion, but to breathe the freest and the purest air. No one should choose a house in a crowded, confined, and thickly-peopled neighbourhood. The atmosphere of such a neighbourhood is always more or less impure. Every inspiration which we take, or every breath which we draw, we take a portion of this air into the lungs, and the blood in its passage through the lungs so filled, must to a certain extent become tainted, and may set up disease in the system. Hence the importance of daily exercise in the open air. The farther we can get away from the smoke, and dust, and surcharged atmo-

sphere of large and crowded towns the better. God made the country, and no one can ramble for a single day amid its fields and woods, its hills and vales, without feeling the stream of life bounding through his system with a freer, fresher, mightier, and more living force than before.

All organised bodies are subject to decay, even while actively engaged in performing the functions of life. One of the chief products of that decay is carbonic acid, the removal of which from the system is essential to health and vital action. This removal is affected by the agency of the lungs, which are made up of a countless number of little air-cells. Now between the atmospheric air, which is taken into the lungs at every breath which we draw, and the blood, there is nothing interposed but a very thin and delicate membrane. The carbon discharged from the lungs of a man in good health is from eight to nine ounces in the twenty-four hours. Let a hundred such individuals be shut up together in a room for three hours, and during that space of time not fewer than one hundred ounces of carbonic acid must be evolved; and what is the consequence? The air which is breathed being impregnated with carbonic acid, the quantity of carbon exhaled, becomes, with every successive respiration, less and less. It has been found by experiment, that, when fresh air is taken in at each inspiration, thirty-two cubic inches of carbonic acid may be exhaled in a minute; while, in those cases in which the same air is breathed repeatedly, the quantity of carbonic acid emitted in the same period may not amount to one-third. And if it be true that however often the same air may be respired—should it be respired till it is no longer capable of sustaining life—it never becomes charged with more than ten per cent. of carbonic acid, we see the necessity of a constant supply of fresh air by means of free ventilation. The discomfort inseparable from a crowded audience in a church, lecture-room, or theatre, which is not provided with sufficient ventilation, is due in great part to the continued respiration of the same air, which has become loaded with carbonic acid. Nor can it be denied that the habitual respiration of such air in the narrow and pent-up dwellings of the poor, or in crowded factories and workshops, has a tendency to impair health, diminish mental activity, and even deteriorate the moral sensibilities.



Repeated experiments have brought out the fact, that the blood comes to the lungs charged with carbonic acid, which it gives up, and receives oxygen in its stead. According to the law of mutual diffusion, the quantity of oxygen absorbed, or drawn from the atmospheric air, exactly replaces the quantity of carbonic acid set free. But for this change in the composition of the blood, all the functions of life would soon be arrested. Put a fish in water which is impregnated with carbonic acid, and its death is almost instantaneous. Introduce the human being into some crowded room, in the atmosphere of which there is wanting a due proportion of oxygen, or in which there is the presence of carbonic acid in excess, and fainting ensues. Let the blood be denied its contact with the atmospheric air, and life will speedily ebb and disappear. The blood stagnates in the small capillary vessels of the lungs—the heart has not sufficient force to drive the blood through those capillaries—the air included in the lungs loses more of its oxygen, and becomes overcharged with carbon, and at last the blood becomes so venous, that the pulmonary circulation is altogether suspended, and death follows.

Questions for Examination.

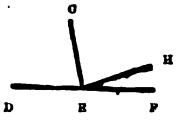
Can you describe the process of digestion?
How is health affected by the condition of the blood?
Give an example of how the blood becomes tainted or corrupted?
What bodies does the blood hold in suspension?
What change takes place in the blood after it is drawn from the vein?
What is the peculiar substance in the blood which goes to build up the various tissues of the body?
Why should we be careful as to the character of the food which we take?
How is the blood affected by the air, and how does it come into contact with the atmosphere?
Of what are the lungs composed, and where are they situated?
What is the acid which they throw off, and what is the element which they take from the air?
What is the effect of impure air on the health?
Show wherein it is injurious.
Give an example of the bad effect of an excess of carbonic acid on inferior animals.

LESSONS IN GEOMETRY.—No. IV.

PROBLEMS IN PRACTICAL GEOMETRY—*Continued.*

10. *Given two angles of a triangle to find the third angle.* Draw a straight line D F (fig. 11), and take any point E in it. Then, at the point E, in the straight line E D, make the angle D E C equal to one of the given angles; and at the point E in the straight line E C, make the angle C E H equal to the other given angle; and H E F, will be the third angle required.

Fig. 11.



The reason of this construction is plain, from Prop. XXXII., Book I., Euclid, which asserts that *the three angles of every triangle are equal to two right angles;* and from Prop. XIII., Book I., which asserts that *the angles which one straight line makes with another upon one side of it, are either two right angles, or are together equal to two right angles.*

The proof of the latter proposition is very easy; for by referring to figs. 12 and 13, it will be seen at once, that the

Fig. 12.

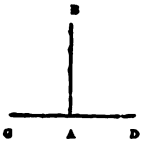
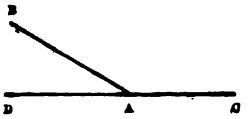


Fig. 13.

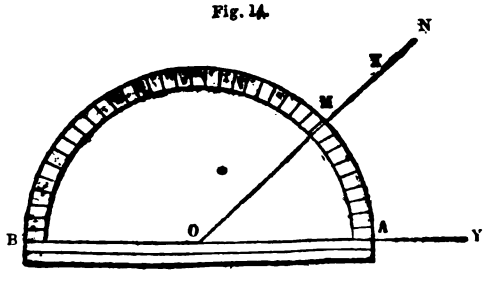


angles which one straight line makes with another are either *right* angles or *oblique* angles; and that the oblique angles are equal to the right angles is plain, because they occupy exactly the same space about the point A; in other words, it is evident in fig. 13, that whatever the angle D A B *wants* of a right angle, the angle C A B has just exactly that quantity *more* than a right angle; and consequently the two together are just equal to two right angles. From this argument, it is likewise evident, that whatever be the number of straight lines which meet at the same point E, in the straight line D F (fig. 11 above), on the same side of it, all the angles which they make, taken together, are only equal to two right angles.

The proof of the 32nd proposition of Book I. is not quite so easy; but a palpable proof of it may be obtained by any student for himself as follows:—First, accurately construct a triangle of any kind, on a piece of paper or card, and then cut it out entire; next draw a straight line, and cutting off the three angles of the triangles at about half the length of each side, apply their three angular points to any point in this straight line, so that the legs of the angles shall be *contiguous (in contact with)* to each other, and one of the exterior legs contiguous to the straight line; when it will be found that the other exterior leg is also contiguous to it; thus showing that the three angles fill up the space of two right angles, and are therefore equal to two right angles.

Another mode of proof may be had from the use of the protractor, fig. 14, described at p. 50, No. 4. Draw any triangle

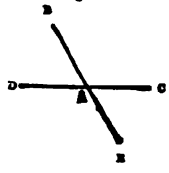
Fig. 14.



as before; measure each of the three angles by the protractor in degrees; add the numbers of the degrees obtained by these three measurements together; and if they have been carefully measured, they will always make 180°; for one right angle makes 90°, therefore two right angles make 180°. Thus, if one angle of a triangle measures 57°, and another measures 75°, then the third must measure 48°, because 57+75+48=180.

From the 13th proposition of Book I., the 15th is easily inferred; viz., that *if two straight lines intersect each other, the vertical or opposite angles are equal.* One angle is said to be *vertical* or opposite to another, when the legs of the former proceed from the point of intersection or meeting, in directions exactly opposite to those of the latter. Thus in fig. 15 let the straight lines B E, C D, intersect each other in the point A; then the angle B A D formed by the production of the legs B A, C A, of the angle C A E, in opposite directions A E, A D, through the point of intersection A, is said to be *vertical* or opposite to the angle C A E. In like manner the angle C A E is said to be opposite or vertical to the angle D A E. The proof of this proposition is manifest, for by turning over the angle B A D upon the angle C A E, they would coincide, and they are therefore equal. Otherwise it is shown that they are equal, because either of them together with the angle B A C makes two right angles.

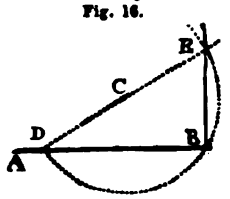
Fig. 15.



Definition 1.—When two angles are together equal to *two* right angles, the one angle is said to be the *supplement* of the other. Thus, in the preceding figure, the angle B A C is the *supplement* of either of the angles B A D or C A E. In like manner, the angle B A D is the supplement of either of the angles B A C or D A E. If the angle B A D contained 30°, then the angle B A C must contain 150°.

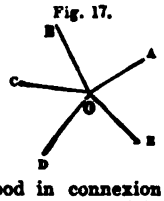
Definition 2.—When two angles are together equal to *one* right angles, the one angle is said to be the complement of the other. Thus in fig. 16, the three angles of the triangle B E D are equal to two right angles; but the angle B E D is a right angle by construction; it, therefore, follows that the other two angles B E D, B D E are together equal to a right angle, and the angle B E D is the complement of the angle B D E; or the angle B D E is the complement of the angle B E D. If the angle B D E contained 40°, then the angle B E D must contain 50°.

Fig. 16.



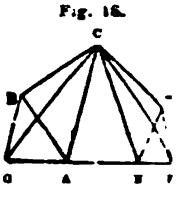
From the propositions above mentioned, it evidently follows, that *when two straight lines intersect each other, the four angles thus formed at the point of intersection, are together equal to four right angles*; that is, in fig. 15, the four angles B A C, B A D, D A E, and E A C, are together equal to four right angles. It is also evident, *that all the angles formed by any number of straight lines meeting together in a point, are together equal to four right angles.* Thus, in fig. 17, let any number of straight lines A O, B O, C O, D O, E O, meet together in the point O; then all the angles, A O B, B O C, C O D, D O E, and E O A, are together equal to four right angles.

Fig. 17.



From the 32nd proposition, Book I., Euclid, two very important *corollaries* are deduced, which we now proceed to explain, as they are necessary to be understood in connexion with some practical problems. But first we must explain what is meant by *corollary*. The Latin word *corollarium*, from which it is derived, signifies an overplus, or surplus, or something in addition which may be considered as a gratuity. In geometry it means an *inference* or *deduction* easily drawn from a proposition just demonstrated. The *first* corollary which Euclid draws from the 32nd proposition is, that *all the interior angles of any convex rectilineal figure or polygon are, together, equal to twice as many right angles as the figure or polygon has sides, wanting four right angles.* Thus, in the polygon A B C D E, fig. 18, all the interior angles A B C, B C D, C D E, D E A, and E A B, are, together, equal to twice as many right angles as the figure has sides, wanting four right angles; for this figure has five sides,—viz., A B, B C, C D, D E, and E A; and *twice five* sides are *ten* sides. Now, taking away *four* right angles from ten right angles, leaves *six* right angles; and this is the number of right angles to which the five angles of the figure,—viz., A B C, B C D, C D E, D E A, and E A B, are, together, equal. The proof of this is very evident, for, by drawing straight lines C A, C E, from any angle A to the other angles of the figure, there are *three* triangles, A B C, A C E, and C E D formed within it. Now, by the 32nd proposition, all the angles of these triangles are equal to *twice three* right angles, that is, to *six* right angles, as before. The same thing could be proved of any other polygon, B C D F G. In like manner, whatever be the number of sides in the polygon, it may be shown that the truth of the proposition is manifest, for the addition of *another side* to the figure would only add *another pair* of right angles to the number of right angles it previously contained; and that whatever was the number of sides, there would always be *four* right angles *wanting* in order to make up twice as many right angles as the figure has sides. This truth may be exhibited in another way. By drawing straight lines from any angle in a polygon to the other angles of the figure, we draw as many straight lines as the figure has sides, wanting *two*, seeing that, in drawing these straight lines, we draw *two* that must coincide with *two* of its sides already drawn; hence we construct in the interior of the figure as many triangles as the figure has sides, *wanting* two. It is plain, therefore, that it will then contain only *twice* as many right angles as the figure has sides, wanting *four* right angles.

Fig. 18.



From this corollary another may be drawn regarding *regular* polygons. Since all the sides and angles of regular polygons are equal to each other; that is, the sides equal to one another, and the angles equal to one another, it is plain that the value of each of the angles can be determined. Thus: double the number of sides, call them right angles, and subtract *four* right angles, the remainder will be the number of right angles it contains. divide this remainder by the number of sides, and the quotient will be the value of each angle. Example: In a regular pentagon there are 5 sides; twice five are 10; from 10 right angles, subtract 4 right angles, and 6 right angles remain; divide 6 by 5, and the quotient is *one and one-fifth*; hence, every angle in a regular pentagon is equal to *one* right angle and *one-fifth* of a right angle, or 108°.

The second *corollary* which Euclid draws from the 32nd proposition, is that *all the exterior angles of any rectilineal figure or polygon are together equal to four right angles.* By the *exterior* angles here, is meant those which arise from producing each of the sides of the figure in one direction only, say from right to left, in going round the figure. The truth of this proposition is manifest, from the consideration that through any point external to the polygon straight lines can be drawn parallel to the productions of the sides, and forming with each other angles equal to those formed by the production of each side and the adjacent side; now all the angles which can be formed by any number of straight lines meeting in a point are equal to *four* right angles; therefore, all the angles formed by the production of each side, and the adjacent side,—that is, all the *exterior* angles of any polygon, are together equal to four right angles. This might also be inferred from another consideration,—viz., that as the magnitudes of the *exterior* angles would not be altered by the size of the figure, provided its interior angles remained of the same value, neither would they be altered if the figure were ever so small, say reduced to a point; and the exterior angles would then be the angles about a point, and therefore equal to *four* right angles.

Questions on the Preceding Lesson.

How many right angles are equal to all the angles of any triangle taken together? How is it proved mechanically that all the angles of any triangle are together equal to two right angles? If one straight line makes angles with another on one side of it, how many right angles are they equal to? If on both sides of it how many? What is the supplement of an angle? What the complement? What is the meaning of the word corollary? What are the two very important corollaries which Euclid has drawn from the 32nd Prop of his 1st Book? How are they demonstrated? What is the value of each angle of a regular hexagon?

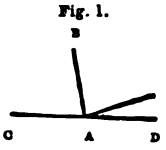
GEOMETRICAL THEOREMS.

THE demonstration of all the six cases of the Pythagorean theorem has been received from several of our mathematical correspondents. As the extension of the 14th proposition of the First Book of Euclid, adverted to in No. 7, has not been understood, owing to the mode in which it is expressed, we here give the enunciation in a more distinct form, and add the demonstration of it. We consider it as a lemma; that is, a preliminary proposition to the extension of the 47th proposition of the First Book.

If at a point in a straight line two other straight lines make the two angles on opposite sides of it, together equal to two right angles, these two straight lines shall be in the same straight line; but if they make two right angles on the same side of it, they shall coincide with each other.

At the point A, in the straight line C D, fig. 1, let the straight line A B make the two angles B A C, B A D, on opposite sides of it, equal to two right angles, then A C, A D, are in the same straight line.

Fig. 1.



For if A D is not in the same straight line with A C, let A E be in the same straight line with it. Then, by the 13th proposition of Book I., the two angles, B A C, B A E, are equal to two right angles; but the angles B A C, B A D, are, by hypothesis (*i.e.*, supposition), equal to two right angles; therefore the two angles B A C, B A E, are, by Axiom I., Book I., equal to the two angles B A C, B A D; take away from these equals the common angle B A C, and by Axiom III., Book I., the remaining angle B A E is equal to the remaining angle B A D; that is, the less equal to the greater, which is impossible; therefore A E is not in the same straight line with A C. In the same manner it may be shown that no other straight line can be in the same straight line with A C but A D; therefore A D is in the same straight line with A C.

Again, at the point A in the straight line C D, let the straight line A B make the two angles B A E, B A D, on the same side of it, two right angles, then A D, A E, coincide with each other. For, if possible, let them not coincide with each other. Produce A D to C; then, by the 13th proposition of Book I., the two angles B A D, B A C, are equal to two right angles; but the angle B A D is, by hypothesis, a right angle; therefore, the angle B A C is a right angle; now, by hypothesis, the angle B A E is also a right angle; therefore, the two angles B A E, B A C, are equal to two right angles; wherefore, by what was demonstrated above, A C, A E, are in the same straight line; but, by construction, A C, A D, are also in the same straight line; therefore, the straight line A E coincides with the straight line A D; for if A E, A D, do not coincide, they have a common segment A C, which, by Euclid's corollary to the 13th proposition of Book I., is impossible; wherefore the straight lines A E, A D, coincide with each other.

Remarks.—That the latter case of the preceding proposition is absolutely necessary for the *clear understanding* of the various cases of the Pythagorean theorem, we hold to be undeniable. Otherwise, how are we to know that the sides of the two smaller squares A C, A G, fig. 2, page 110, No. 7, coincide with each other. It might be stated indeed as a sufficient reason for this, that *all right angles are equal to another*; for if the one angle did not coincide with the other, then, of course, one of them must be greater than the other, which is contrary to the hypothesis. This to many would appear a sufficient demonstration.

LESSONS IN ANCIENT HISTORY.—No. V.

By ROBERT FERGUSON, LL.D.

BY the conquest of Cambyses, the far-famed land of Egypt became a province of the Persian empire. But, before we pursue the history of conquest any farther, it will be both interesting and instructive to turn our thoughts to the state of the arts and sciences at this earliest period of human and earthly development.

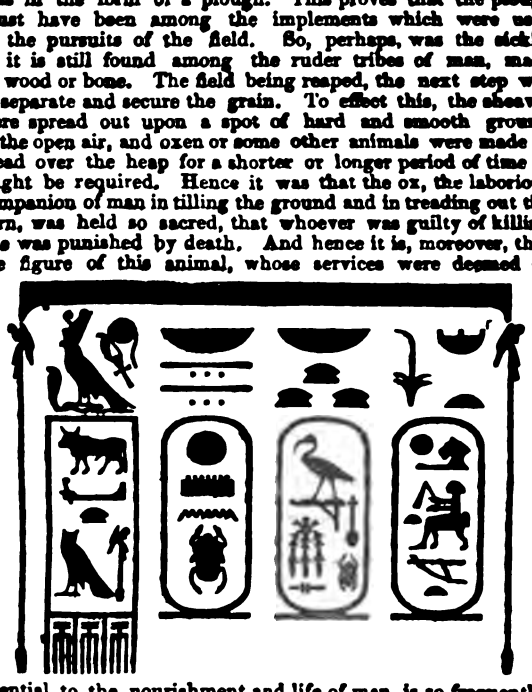
Among those arts the first place must be given to AGRICULTURE. This is the most ancient as well as the most useful. After his fall, man was sent forth TO TILL THE GROUND; and thus what in itself bore the nature of a punishment and a curse, became, by the ever-merciful goodness of God, "the mother and nurse of the human race." It is the source of the most solid wealth, and of the most exhaustless treasure. For nearly six thousand years has this little earth of ours been tilled, and sown, and reaped, and yet never was its produce richer or more abundant than at this moment. "Though mines of gold and silver should be exhausted, and the moneys made of them lost; though pearls and diamonds should remain hid in the womb of the earth and sea; though commerce should be prohibited; though all arts, which have no other object than embellishment and splendour, should be abolished; the fertility of the earth alone would afford an abundant supply" for every possible condition of the world and of society. Hence it is that agriculture was held in such esteem among the ancients. It was the earliest employment of man; and the wonderful length of life which those enjoyed who lived before the flood, could not be other than favourable to the progress and improvement of this interesting art. Nor is there anything very extravagant in the conjecture, that, as Noah laid up food in the Ark for himself and those who were with him, he was also careful to preserve various seeds of corn and vegetable with which to sow the earth when the waters should subside; whilst his knowledge of reaping, sifting, and grinding the grain, would be made the common property of his family and their posterity.

The Egyptians, the most ancient people on earth who have a history and an historical life, seem to have been well acquainted with agriculture. Not only was the population very numerous, but the land was so well cultivated as to be able to support its own inhabitants, and to export large quantities of grain to other countries. Its wonderful fertility was owing chiefly to the overflowing of the Nile, that largest and noblest river in the old world, and the only one that flowed from ten to twelve hundred miles without receiving a single tributary stream. A distinguished traveller has thus described the phenomena connected with the overflow of this great river:—"The air is so much rarefied by the sun during the time that he remains almost stationary over the tropic of Capricorn, that the winds, loaded with vapours, rush in upon the land from the Atlantic Ocean on the west, the Indian Ocean on the east, and the cold Southern Ocean beyond the Cape. Thus a great quantity of vapour is gathered, as it were, into a focus; and, as the same causes continue to operate during the progress of the sun northward, a vast train of clouds proceeds from south to north, which are sometimes extended much farther than at other times. In April, all the rivers in the south of Abyssinia begin to swell; in the beginning of June they are all full, and continue so while the sun remains stationary in the tropic of Cancer. This excessive rain, which would sweep off the whole soil of Egypt into the sea were it to continue without intermission, begins to abate as the sun turns southward; and, on his arrival at the zenith of each place, on his passage towards that quarter, they cease entirely. Immediately after the sun has passed the line, he begins the rainy season to the southward. The rise of the Nile at Cairo, does not commence till June, the green colour produced either by the influx of corrupt or stagnant water, or by the action of the hot south winds on the sluggish stream, appearing about the twelfth day of that month. The red appearance, occasioned by the arrival of the Abyssinian waters, takes place early in July, from which the rise of the river may property be dated, as it then begins to increase rapidly. By the middle of August, it reaches half its greatest height, and it attains its maximum towards the end of September. From the twenty-fourth of that month, the waters are supposed to decline, but maintain nearly the same level till the middle of October. By the tenth day of November, they have sunk about half, and from that period continue to subside very slowly till they reach their minimum in April."

Some writers have fallen into the error that this periodical inundation is the only means which the greater part of the country possess for irrigation or being watered; but when it is said that no rain falls in Egypt, it must be understood of Upper Egypt, or the Thebaid;—in Lower Egypt, and on the sea-coast, the rains are frequent and heavy. The land is not destitute of water, and the dews fall rich and copiously. Dr. Clarke says—"The vegetation of Egypt—even the redundant produce of the Delta—is not owing solely to partial inundation

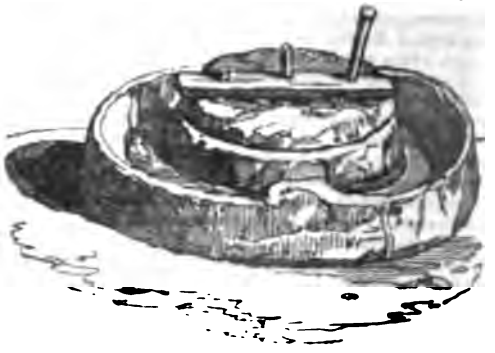
from the Nile, or to artificial irrigation. It is doubtful whether any other country receives so regular a supply of moisture from above. Even the sands of the desert partake largely of the dew of heaven, and in a certain degree of the fatness of the earth. In all this sandy desert, palm-trees are very abundant, and their presence is a never-failing indication of water below the surface. Wheresoever they are found, a brackish and muddy pool may be speedily found by digging a well near the roots. The natives are chiefly engaged in the care of these trees, tying up their blossoms with bands formed of the foliage, to prevent their being torn off, and scattered with the wind."

As the waters of the Nile subsided, they left behind them a species of loam, which so enriched the land, that it required but little tillage, and made Egypt the most fruitful country on the face of the earth. The fact that the Egyptians sometimes ate the Ethiopian plant, known by the name of MESENTA, whose stalk when boiled, has the taste of the best wheaten bread not perfectly baked, and which, if eaten with milk or butter, is wholesome, nourishing, and easily digested,—or that they at other times did eat the LOTUS, or water-lily, whose root, of the size and shape of an apple, is of an agreeable flavour, and the seed of whose flower, which resembles that of the poppy, they baked and made into a kind of bread; shows that they were dependant on plants for their subsistence. Agriculture had made considerable progress in the time of Joseph, and such was the estimation in which husbandry was held among the Egyptians, that the sceptre of the Pharaohs was in the form of a plough. This proves that the plough must have been among the implements which were used in the pursuits of the field. So, perhaps, was the sickle, as it is still found among the ruder tribes of man, made of wood or bone. The field being reaped, the next step was to separate and secure the grain. To effect this, the sheaves were spread out upon a spot of hard and smooth ground in the open air, and oxen or some other animals were made to tread over the heap for a shorter or longer period of time as might be required. Hence it was that the ox, the laborious companion of man in tilling the ground and in treading out the corn, was held so sacred, that whoever was guilty of killing one was punished by death. And hence it is, moreover, that the figure of this animal, whose services were deemed so



essential to the nourishment and life of man, is so frequently found among the mysterious symbols and sacred engravings of that ancient people, and that one of their most famous temples was dedicated to its worship.

The grain being thus trodden out, the next process was to winnow it; which was done either by making a current of air to pass over it, or by shaking it in a coarse sieve made of the filaments of the PAPYRUS plant, or of the most delicate species of rush. It is not unlikely that it was sometimes used without being subjected to any sifting process whatever—that the meal and the bran were eaten together as they are by some unpolished nations at the present day. The practice of roasting the grain before it is eaten belongs to the earliest times. The action of the fire served not only to detach the grain from the husk, but gave to it a very pleasant flavour; and in later times, when grinding came into use, it rendered the process much more easy. Hand-mills were used in Palestine more than four hundred years before the exodus of the children of Israel from Egypt, and, therefore, could not be unknown in Egypt itself. Those mills were worked by slaves



AN EGYPTIAN MILL.

or the lowest grade of servants. In the East this duty devolves on the women. When at Nazareth, our own countryman, Dr. Clarke, says—"We saw two women grinding at the mill. Seated upon the ground, opposite each other, they held between them two flat round stones. In the centre of the upper stone was a cavity for pouring in the corn, and by the side of this an upright wooden handle for moving the stone. As the operation began, one of the women with her right hand pushed this handle to the woman opposite, who again sent it to her companion, thus communicating a rotatory and very rapid motion to the upper stone, their left hands being all the while employed in supplying fresh corn as fast as the bran and flour escaped from the sides of the machine." On reading this who is not reminded of the words of our blessed Saviour, when in foretelling the impending doom and coming destruction of Jerusalem, he says—"Two women shall be grinding at the mill; the one shall be taken, and the other shall be left!"

By what method the Egyptians converted their meal into bread, we know not. Their bread might consist of a simple admixture of flour and water, or this flour and water might be boiled, and thus correspond to the farro of the Italians, or the porridge of the Scotch; or it might be baked into cakes. The process of baking was very simple. Having taken the flour and water, with a little salt, and made it into a dough, this dough was laid in thin cakes on the hearth, covered up with hot ashes, and allowed to remain in that state for some time. It was thus that Sarah prepared the bread which Abraham set before the angels who came to him on an errand of divine love.

QUESTIONS FOR EXAMINATION.

Who are the men whom we should hold as the great benefactors of their race and of the world?
Why is agriculture entitled to the first place among the arts?
How was the earth sown after the flood?
To what did the Egyptians owe the fertility of their land?
In what way did the overflowing of the Nile benefit the soil?
What proof have we that the Egyptians used the plough?
What other implements of husbandry had they?
How did they prepare their grain so as to make it fit for use?
Why was the ox held so sacred among that people?
What peculiar homage was paid to this animal?
By whom were the mills worked among the Egyptians, and by whom in the East?
Is there any passage of Scripture which bears on this fact?
Describe the early process of baking bread.
What proof have we to confirm this?
For what end did angels visit this our world?

LESSONS IN FRENCH.—No. VIII.

By Professor LOUIS FASQUELLE, LL.D.

SECTION XVIII.

1. THE relative pronoun, que, *whom*, *which*, *that*, and the conjunction, que, *that*, are never omitted in French, and must be repeated before every verb depending on them. [§ 189.]

Les crayons que j'ai sont meilleurs que ceux que vous avez. *The pencils (which) I have are better than those (which) you have.*

2. Ne, before the verb, and que after it, are used in the sense of *only, but.*

Je n'ai qu'un ami.	*I have but one friend.*

3. L'un et l'autre, means *both*; les uns et les autres, *these and those, the latter and the former.*

Vous avez l'un et l'autre.	*You have both.*

4. CARDINAL AND ORDINAL NUMBERS AS FAR AS TWENTY. [§ 22, 23.]

Cardinal.		*Ordinal.*	
Un, m, une, f.	*One.*	Premier, m. e, f.	*First.*
Deux,	*Two.*	Second, m. e, f. / Deuxième,	*Second.*
Trois,	*Three.*	Troisième,	*Third.*
Quatre,	*Four.*	Quatrième,	*Fourth.*
Cinq,	*Five.*	Cinquième,	*Fifth.*
Six,	*Six.*	Sixième,	*Sixth.*
Sept,	*Seven.*	Septième,	*Seventh.*
Huit,	*Eight.*	Huitième,	*Eighth.*
Neuf,	*Nine.*	Neuvième,	*Ninth.*
Dix,	*Ten.*	Dixième,	*Tenth.*
Onze,	*Eleven.*	Onzième,	*Eleventh.*
Douze,	*Twelve*	Douzième,	*Twelfth.*
Treize,	*Thirteen.*	Treizième,	*Thirteenth.*
Quatorze,	*Fourteen.*	Quatorzième,	*Fourteenth.*
Quinze,	*Fifteen.*	Quinzième,	*Fifteenth.*
Seize,	*Sixteen.*	Seizième,	*Sixteenth.*
Dix-sept,	*Seventeen.*	Dix-septième,	*Seventeenth.*
Dix-huit,	*Eighteen.*	Dix-huitième,	*Eighteenth.*
Dix-neuf,	*Nineteen.*	Dix-neuvième,	*Nineteenth.*
Vingt,	*Twenty.*	Vingtième,	*Twentieth.*

5. The cardinal numbers are used, in French for the day of the month, except the *first*, for which the ordinal number premier is substituted:—

Le dix août, le cinq juillet,	*The tenth of August, the fifth of July.*
Le premier du mois prochain,	*The first of next month.*

6. The verb avoir, *to have*, is used actively [§ 26 (1)] for the day of the month. The verb être may also be used:—

Quel jour du mois avons nous?	*What day of the month have we?*
Nous avons le vingt.	*We have the twentieth.*
C'est aujourd'hui le dix.	*To-day is the tenth.*

7. Before the word onze, the article le or la is not elided. [§ 146.]:—

Nous avons le onze de décembre.	*We have (it is) the tenth of December.*

RÉSUMÉ OF EXAMPLES.

L'ouvrier a-t-il les outils que vous avez?	*Has the workman the tools which you have?*
Les maisons que j'ai sont elles aussi bonnes que celles que vous avez?	*Are the houses which I have as good as those which you have?*
Combien de francs avez vous?	*How many francs have you?*
Je n'ai que dix francs, mais mon frère en a plus de vingt.	*I have only ten francs, but my brother has more than twenty (of them).*
Avons nous le quartorze du mois?	*Have we the fifteenth day of the month?*
Non, Monsieur, nous n'avons que le onze.	*No, Sir, we have only the eleventh.*
Lequel de ces deux volumes avez vous?	*Which of these two volumes have you?*
J'ai l'un et l'autre.	*I have both.*
Avez vous la première place ou la deuxième?	*Have you the first or the second place?*
J'ai la première, et mon frère a la deuxième.	*I have the first, and my brother has the second.*

EXERCISE 35.

Aujourd'hui, *to-day.*	Février, m. *February.*	Outil, m. *tool.*
Canelle, f. *cinnamon.*	Franc, m. *franc.*	Ouvrage, m. *work.*
Centime, m. *centime—the 100th part of a franc.*	Histoire, f. *history.*	Oeuvres, f. *works.*
	Italien, m *Italian.*	Place, f. *place.*
Combien, *how much, how many.*	Kilogramme, m. *kilogramme—about two pounds.*	Quart, m. *quarter.*
		Septembre, m. *September.*
Cravate, f. *cravat.*	Menuisier, m. *joiner.*	Volume, m. *volume.*
Demi, *half.*	Mousseline, f. *muslin.*	

1. Le cheval que vous avez est il bon? 2. Il est meilleur que celui que vous avez et que celui de notre ami. 3. Combien d'enfants avez vous? 4. Je n'en ai qu'un, mais l'Italien en a plus que moi. 5. Avons nous le dix septembre? 6. Non, Monsieur, nous avons le neuf février. 7. Avez vous ma cravate de soie ou ma cravate de mousseline? 8. J'ai l'une et l'autre. 9. Avez vous huit kilogrammes de canelle? 10. Non, Monsieur, je n'en ai qu'un demi kilogramme. 11. Combien de francs avez vous, Monsieur? 12. Je n'ai qu'un demi franc, mais mon ami a un franc et demi. 13. Votre sœur a-t-elle vingt cinq centimes? 14. Oui, Monsieur, elle a un quart de franc. 15. N'avons nous pas le premier août? 16. Non, Monsieur, nous avons le six septembre. 17. Est-ce aujourd'hui le dix? 18. Non, Monsieur, c'est le onze. 19. Votre frère a-t-il la première place? 20. Non, Monsieur, il a la dixième. 21. Votre menuisier a-t-il beaucoup d'outils? 22. Oui, Monsieur, il en a beaucoup. 23. Cet ouvrage a-t-il dix volumes? 24. Non, Monsieur, il n'en a que neuf. 25. J'ai le sixième volume des œuvres de Molière et le premier volume de l'histoire de France de Michelet.

EXERCISE 36.

1. Is that cinnamon good? 2. That cinnamon is better than yours and your brother's [R. 1]. 3. What day of the month is it to-day? 4. It is the sixth. 5. Has your father twenty francs? 6. No, Sir, he has only six francs fifty centimes. 7. How many volumes has your work? 8. It has many, it has fifteen. 9. Has the joiner read (*lu*) the second volume of Michelet's history of France? 10. Yes, Sir, he has read the second volume (of it). 11. Has your friend, Molière's works? 12. He has only two volumes of them. 13. Have you my cloth coat or my velvet coat? 14. We have both. 15. We have this and that. 16. How much cinnamon have you? 17. We have two kilogrammes. 18. How many centimes has the merchant? 19. He has twenty-six. 20. Have you the third or the fourth place? 21. I have neither the third nor the fourth, I have the tenth. 22. Are you not ashamed to-day? 23. No, Sir, I am not ashamed, but I am afraid. 24. Have you a quarter of a franc? 25. No, Sir, but I have half a franc. 26. Have we the sixth of July? 27. No, Sir, we have the fourth of March. 28. Has your uncle six children? 29. No, Sir, he has only one. 30. Have you ten kilogrammes of meat? 31. I have only five kilogrammes. 32. Is the butcher's meat good? 33. It *(elle)* is not very good. 34. How many kilogrammes have you (of it)? 35. I have only two, but my brother has four.

SECTION XIX.

1. For the time of the day, the verb être, is used unipersonally in French, in the same manner as the verb *to be* is used in English for the same object. The word heure, sing. heures, plur. represents the English expressions, *o'clock*, or *time*, and must always be expressed.

Quelle heure est il?	*What o'clock (time) is it?*
Il est une heure.	*It is one o'clock.*
Il est dix heures.	*It is ten, it is ten o'clock.*

2. Midi is used for *twelve o'clock* in the day, and minuit, for *midnight*, or *twelve at night.* Douze heures is never used except in the sense of *twelve hours.*

Est il midi?	Est il minuit?	*Is it noon?*	*Is it midnight?*

3. Et quart, et demie [§ 84 (2)], answer to the English expressions, *a quarter, half-past, after*, &c.

Il est neuf heures et quart.	*It is a quarter after nine.*
Il est midi et demi.	*It is half after twelve.*
Il est une heure et demie.	*It is half after one.*

4. Moins un quart, moins vingt minutes, answer to the English expressions, *a quarter before, twenty minutes before*, &c.

Il est dix heures moins un quart.	*It wants a quarter of ten.*
Il est neuf heures moins dix minutes.	*It is ten minutes before nine.*

5. The word demi, preceding the word heure, does not vary. Placed after it, it is variable [§ 84 (2)].

Une demi heure.	*Half an hour.*
Une heure et demie.	*An hour and a half.*

6. The verb avoir is used actively [§ 43 (2) (3)] in French in speaking of age, and the word an, *year*, is always expressed.

Quel âge avez vous?	*How old are you?* i. e. *What age have you?*
J'ai plus de vingt ans.	*I am more than twenty.*

7. Plus de, moins de, are used for *more than, less than*, before a number.

Avons nous plus de dix mètres de cette toile d'Hollande?	*Have we more than ten metres (yards) of this holland (Holland linen)?*
Vous en avez moins de six aunes.	*You have less than six ells of it.*

Resume of Examples.

Il n'est pas encore deux heures.	*It is not yet two o'clock.*
Est il une heure et demie ?	*Is it half-past one?*
Il est midi et quart ou midi et demi.	*It is a quarter or half-past twelve.*
Il est huit heures moins un quart.	*It wants a quarter of eight.*
Quel âge votre fils a-t-il ?	*How old is your son?*
Il n'a que dix-huit ans.	*He is only eighteen years old.*
Votre beau-frère n'a-t-il pas plus de dix-neuf ans ?	*Is not your brother-in-law more than nineteen years old?*
Ma belle sœur n'a pas moins de dix-huit ans et demi.	*My sister in-law is not less than eighteen years and a half.*
Est il plus de dix heures à votre montre ?	*Is it more than ten o'clock by your watch?*
Il n'est que neuf heures à mon horloge.	*It is only nine by my clock.*
Votre fils est il plus âgé que le mien ?	*Is your son older than mine?*
Il est plus jeune que le vôtre.	*He is younger than yours.*

Exercise 37.

Âgé, -e, *old.*	Cela, *that.*	Jour, m. *day.*
Aune, *f. ell.*	Cinquante, *fifty.*	Maintenant, *now.*
Beau-frère, m. *brother-in law.*	Cousin-germain, m. *first cousin.*	Mars, m. *March.*
Beau-fils, m. *son-in-law.*	Enfant, m *child.*	Mètre, m. *metre*—a *French measure about three French feet.**
Beau-père, m. *father-in-law.*	Février, m. *February.*	
	Horloge, *f. clock.*	Mois, m. *month.*
Belle-mère, f *mother-in-law.*	Indienne, *f. printed calico.*	Ruban, m. *ribbon.*
Belle-sœur, *f. sister-in-law*	Jeune, *young.*	Tard, *late.*
		Verge, *f. yard.*

1. Votre beau-frère est il plus âgé que le mien ? 2. Le vôtre est plus jeune que le mien. 3. Quel âge a votre belle-mère ? 4. Elle a près de cinquante ans. 5. Quelle heure est il maintenant ? 6. Il est six heures passées. 7. Etes vous certain de cela ? 8. Oui, Monsieur, j'en suis certain. 9. Est il plus de deux heures à votre montre ? 10. Il n'est que midi à ma montre. 11. Avez vous plus de cinq ans, mon enfant ? 12. Je n'ai pas encore quatre ans. 13. Avez vous plus de six verges d'indienne ? 14. J'en ai moins de trois mètres. 15. Combien d'aunes de ruban votre beau-père a-t-il ? 16. Il n'a guère de ruban, il n'en a qu'une demi-aune. 17. Est il midi moins un quart ? 18. Il est plus tard, Monsieur, il est midi et quart. 19. Quel jour du mois avons nous ? 20. Nous avons le six octobre. 21. N'est-ce pas le huit février que... ? 22. Non, Madame, c'est le huit mars. 23. Combien de jardins a votre cousin-germain ? 24. Il n'en a qu'un, mais il est très beau. 25. Il en a plus de dix.

Exercise 38.

1. How old is your brother-in-law ? 2. He is fifty years old. 3. Is your sister-in-law older than mine ? 4. No, Sir, my sister-in-law is younger than yours. 5. Is your son twenty-five years old ? 6. No, Madam, he is only sixteen. 7. What day of the month have we to-day ? 8. We have the eleventh. 9. Have you the twentieth volume of Chateaubriand's works ? 10. No, Madam, we have the eleventh. 11. What o'clock is it, Sir ? 12. It is only twelve o'clock. 13. Is it not later ? 14. It wants a quarter of one. 15. It is a quarter after five. 16. How many yards of this holland (*toile d'Hollande, f.*) have you ? 17. I have ten ells and a half. 18. I have six metres of it, and sixteen yards of Italian silk. 19. Is your mother-in-law younger than your father-in-law ? 20. She is younger than he. 21. Are you twenty years old ? 22. No, Sir, I am only nineteen and a half. 23. Are you sure (*sûr*) that it is ten o'clock ? 24. Yes, Madame, I am sure of it. 25. Is it twenty minutes of ten ? 26. No, Sir, it is a quarter before twelve (*midi*). 27. How many houses have you ? 28. I have only one, but my sister-in-law has two. 29. Have you mine (f.) or yours ? 30. I have neither yours nor mine, I have your son-in-law's. 31. Has your mother-in-law five yards of that printed calico ? 32. She has only two yards of it. 33. What o'clock is it by (*à*) your watch ? 34. It is half-past four by my watch. 35. It is more than seven o'clock by mine (*à la mienne*).

* The French *metre* is exactly 39.371 inches English measure; it is therefore longer than the English yard by about 3½ inches, or more accurately $3\frac{10}{29}$ inches.

LESSONS IN ARITHMETIC.—No. IX.

RULE OF SIMPLE DIVISION.

In commencing the operations required in the rule of simple division, the student will do well to bear in mind the remarks made on the multiplication table in page 38, No. 3, especially those which relate to its use in this rule. In commencing the process of dividing any large number by one of the nine digits, it will be of importance to remember the definition of division; viz., that it is the process by which we find *how many times* one number is contained in another. Suppose, for example, we wished to know how many times 9 is contained in 32768. It would be necessary first to know how often 9 is contained in the larger part of this number—viz., 32000 (768 being the smaller part); now, on consulting the multiplication table, we find on looking down the vertical column, having 9 at the top, that 27 is the nearest number to 32, the number of thousands, and as 9 is contained 3 times in 27, therefore 9 is contained 3 *thousand* times in 27 *thousand*; consequently it is contained in 32 *thousand*, 3 *thousand* times, with 5 *thousand* over. As this remainder 5000 does not contain 9, *one thousand times*, it is evident that we have found *how many thousand* times 9 is contained in 32000,—viz., 3 *thousand* times. Now, the remainder 5000, being added to the smaller part of the original number, makes it 5768. It will be necessary in the second place, to know how often 9 is contained in the larger part of this number,—viz., 5700 (68 being now the smaller part of it); on consulting the multiplication table, again, we find in the 9's vertical column, that 54 is the nearest number to 57, the number of *hundreds*, and as 9 is contained 6 times in 54, therefore 9 is contained 6 *hundred* times in 57 *hundred*; consequently it is contained in 57 *hundred*, 6 hundred times, with 3 *hundred* over. As this remainder 300 does not contain 9, *one hundred* times, it is plain that we have found *how many hundred* times 9 is contained in 5700,—viz., 6 *hundred* times. Now, the remainder of 300, being added to the smaller part of the second number, makes it 368. It will be necessary in the third place, to know how often 9 is contained in the larger part of this number,—viz., 360 (8 being now the smaller part of it); on consulting the 9's column of the multiplication table again, we find that 36 the number of tens is in that column, and that it contains 9 *four* times; therefore 9 is contained in 36 *tens*, the number of times denoted by 4 *tens*, that is *forty* times, and there is no remainder. In the fourth place, the smaller part of the last number divided,—viz., 8, does not contain 9; therefore it is said to contain it 0 time and 8 is over. Collecting all the different numbers of times that 9 is contained in the different parts of the number 32768, in succession,—viz., 3 thousand times, 6 hundred times, forty times, and 0 time, or 3640 times in all, we have thus found how many times 9 is contained in 32768, and what remainder is over,—viz., 8. Applying the names given to the different numbers in this operation, the dividend is 32768, the divisor is 9, the quotient is 3640, and the remainder is 8. As the remainder 8, ought if it could be done, to be divided by 9, the unperformed division is denoted by the expression $\frac{8}{9}$ in accordance with the definitions in page 36, No. 3. Indeed the expression for the whole operation is the following: $\frac{32768}{9}=3640\frac{8}{9}$ and this is as convenient a mode of representing the process as any that could be adopted. The general principle involved in the preceding operation is simply this: *that if a number be divided into its several parts, and if the quotient of each of these parts divided by another number be found, the quotient of the former number divided by the latter will be equal to the sum of the quotients of its different parts divided by the same.* These considerations and principle are the foundation of the following rule for the division of large numbers by any one of the nine digits.

Rule 1.—Write down the dividend or number to be divided, and draw a line under it; place the divisor on the left of the dividend with a bar or vertical line between them; and place the successive figures of the quotient under the line as they are found. Find the quotient of the divisor and the number represented by the first figure; or, if necessary, the first two figures of the dividend on the left, by consulting the multiplication table or the memory, and put it under the line in its proper place, that is immediately under the place of the rank to which it belongs; if millions, under millions; if thousands, under thousands; if hun-

dreds, under hundreds, &c. If there be a remainder, then *carry it*, (that is, *add it*) as so many *tens* to the next figure (considered for the moment, as units)* in the dividend, and find the quotient of the divisor and this number, in the same manner as before, and put it also in its proper place under the line; if there be a remainder in this case also, proceed as before directed, until all the figures of the dividend have been exhausted by this process. But, if there be no remainder over, at any figure of the dividend, then, having put down under the line, the quotient belonging to that figure, find the quotient of the divisor and the number represented by the next figure of the dividend, or if necessary the two next figures, as at first; carefully observing, that if two figures are necessary to obtain a quotient, a cipher or 0 must be placed under the line, immediately below the first of the two figures in question, to indicate that no part of the quotient is composed of figures belonging to this rank, and to keep the other figures of the quotient in their proper places. Lastly, if there be no remainder when all the figures of the dividend have been exhausted by this process, the quotient is then *complete*, and the one number is said to be *exactly* divisible by the other; that is, the dividend is a multiple of the divisor; it is also said to be a multiple of the quotient. If there be a remainder, the quotient is *incomplete*, and the one number is *not exactly* divisible by the other; that is, the dividend is neither a multiple of the divisor, nor of the incomplete quotient. To render the quotient *complete*, it is necessary to annex to it an expression denoting the quotient of the remainder by the divisor, an expression which is usually called *a fraction*; that is, a fragment or part remaining over and above the whole number expressed by the quotient. Since the quotient in division ALWAYS expresses the *number of times*, that the divisor is contained in the dividend, if there be a fraction, that is, a fragment or part remaining over in any case, it must be considered as a fraction or part of *a time*; hence, in such cases, the *quotient* is not *complete* unless the *whole number of times, and the fraction of a time, over and above that whole number of times*, be properly expressed.

EXAMPLE 1.—Divide 32768 by 9.

Divisor 9) 32768 dividend.

Quotient 3640—8 remainder.

MODE OF OPERATION.

Here, beginning with 32 the first two figures of the dividend on the left, because the figure 3 does not contain 9, we find the quotient of 32 by 9 to be 3 times, and 5 remainder; putting down 3 under the line, below the figure 2 in the dividend, which is its proper place, as explained above, carry 5 *as tens* to the next figure 7, which makes 57; then the quotient of 57 by 9 is 6 times, and 3 remainder; now putting down 6 under the line, below the figure 7 in the dividend, which is its proper place, as explained above, carry 3 *as tens* to the next figure 6, which makes 36; again the quotient of 36 by 9 is 4 times, and no remainder; now putting down 6 under the line, below the figure 6 in the dividend, which is its proper place as explained above, we have nothing to carry to the next figure 8; then the quotient of 8 by 9 is 0 time, and 8 remainder; therefore putting down 0 under the line, below 8 in the dividend, which is its proper place, as explained above, all the figures of the dividend are now exhausted, and the whole of the quotient is now 3640, and 8 remainder. This quotien is *incomplete*, and therefore it is necessary to express the remainder by the fraction $\frac{8}{9}$ which still indicates the division of 8 by 9, or the quotient arising from the same. The *complete* quotient is consequently $3640\frac{8}{9}$; that is, the number 9 is contained in the number 32768 so *many times* as this quotient denotes, that is 3640 times and $\frac{8}{9}$ (eight-ninths) of a time, or $3640\frac{8}{9}$ times. The number 32768 is therefore *not exactly* divisible by 9, neither is it a multiple of 9, or of 3640, the incomplete quotient. The term *multiple* is restricted to whole numbers as explained in page 36, No. 3.

EXAMPLE 2.—Divide 5760680049 by 8.

Divisor 8) 5760680049 dividend

Quotient 720085006—1 remainder

* Because *ten units or ones* of any rank make only *one unit or one* of the next higher rank, and *vice versâ*.

METHOD OF OPERATION.

Here, beginning with 57, the first two figures of the dividend on the left, as before, the quotient is 7 and remainder 1; putting down 7, under the line, below the second figure of 57, and carrying 1 to the next figure of the dividend,—viz., 6, you have 16; the quotient is here 2, and remainder 0; putting down 2, under the line, below 6, and having nothing to carry, you proceed to the next figure of the dividend,—viz., 0; the quotient is here 0, which being put down under the line, as before, proceed to the next figure of the dividend,—viz., 6; the quotient here is again 0, and remainder 6; putting down 0, under the line, as before, carry 6 to the next figure of the dividend,—viz., 8, and you have 68; the quotient here is 8, and remainder 4; putting down 8 under the line, as before, and carrying 4 to the next figure of the dividend,—viz., 0, you have 40; the quotient here is 5, and remainder 0; putting down 5 under the line, as before, proceed to the next figures of the dividend; the quotients obtained from them in the same manner as the preceding, will be 0, 0, 6, and last remainder 1; now these being put under the line in their proper places, you obtain the whole number of the quotient,—viz., 720085006, and remainder 1; whence the quotient, in its complete state, is $720085006\frac{1}{8}$.

In this rule, as in the former rules of arithmetic, an abridged mode of procedure may be adopted; thus, in the above example, we have omitted mentioning the divisor, as it is *quite understood*, and stands before the eye at the commencement of the operation; this in itself is a *great saving of time and thought*,—viz., the mere keeping it *before the eye*, and *working with it* without naming it; the next saving would be, merely to name the quotients in succession, without naming the figures to be divided; for all that is to be remembered is the first figure of each; that is, the figure *to be carried*, when there are two; as when there is only one, it also stands *right before the eye* in the course of operation. The student, however, will not be able to avail himself fully of these instructions till he has perfectly committed to memory the multiplication table, page 37, No. 3. When he has done so, he will proceed as follows: Divisor 8, quotient figures 7, 2, 0, 0, 8, 5, 0, 0, 6; remainder 1; answer $720085006\frac{1}{8}$ as before.

EXERCISES ON THE PRECEDING LESSON.

1. Divide each of the numbers contained in the bottom square on page 58, No. 4, successively by the nine digits.

2. Divide each of the numbers 101042169; 4285714285714; and 76897684321 successively by the nine digits.

3. For students who have learned the Extended Multiplication Table, on page 107, No. 7, as far as 12 times 12, this exercise may be added: Divide the numbers mentioned in the preceding exercises by the divisors 10, 11, and 12.

LESSONS IN ENGLISH GRAMMAR.—No. VIII.

ADJECTIVES.

THE word ADJECTIVE is taken from the Latin *adjicio*, to add to. An adjective, sometimes called an *adnoun*, is a word added to nouns to describe them particularly; to point out the nature, property, or quality of any person, place, or thing; as, for example, a *good* man; a *large* town; a *beautiful* garden; a *fine* house. An adjective, therefore, cannot stand by itself, but must be used in connexion with some noun. If you were in the street with a friend, and were to say to him, "There goes a good—" and were to add nothing more, your friend would not know whether you meant a good man, or a good horse, or a good carriage. And if you were to say, "There goes *a man*," your meaning would not be very definite. But if you add the noun *man* to the adjective *good*, and say, "There goes a *good man*," he would immediately understand that you meant to point out to him some individual eminent for the goodness of his character. Still, as *several* men might be passing at the same time, he might not know *which* man you meant; here you could employ another adjective, and say, "That *tall* man." Suppose there were *two* tall men; you might make yourself still better understood, by saying, "That one in the *blue* coat."

Adjectives, we repeat, are added to nouns to denote the *quality*; as a *great* general; a *happy* thought; a *good* journey; a *bad* habit. Or, to denote the *form*; as a *square* table; a *round* building; a *long* form; a *three-cornered* stool. Or, to denote the *number*, as *one* man; the *second* chapter; &c.

Adjectives are subject to *change* in form. The mode of spelling

them, however, does not undergo any change on account of number, gender, or case. The changes are for the purpose of *comparison*; as to the nature of the noun, the meaning continues the same. An apple is an apple, and a house is a house, whether it be large or small, old or new.

By *comparison*, is meant the altering of the quality or quantity, to denote a greater or less degree of either: and these alterations are called *degrees of comparison*. Of these degrees there are three; the positive, the comparative, and the superlative.

The *positive* is the simple form of the adjective, and expresses the actual quality, without any increase or diminution; as, *good, wise, happy, great, hard, short, wide*, &c.

The *comparative* expresses an increase or decrease of the quality, as, *better, wiser, happier, greater, harder, shorter, wider*, &c.

The *superlative* expresses the quality in the highest or lowest possible degree; as, *best, wisest, happiest, greatest, hardest, shortest, widest*, &c.

Prefix any of the above adjectives to any noun, and it will be seen that they denote the presence of the same quality or property, but in different degrees; as three blocks of stone may all be *hard*, but the second may be *harder* than the first, and the third *hardest* of all.

The *comparative degree* of the adjective is usually formed by adding *r* or *er*, or the adverb *more* to the positive; or by changing *y* preceded by a consonant into *ier*; thus:—

Positive.	*Comparative.*
Wise	Wiser, or more wise
Great	Greater, or more great
Hard	Harder, or more hard
Happy	Happier, or more happy

The *superlative* degree of the adjective is usually formed by adding *st* or *est*, or the adverb *most* to the positive; thus:—

Positive.	*Comparative.*	*Superlative*
Wise	Wiser, or more wise	Wisest, or most wise
Great	Greater, or more great	Greatest, or most great
Hard	Harder, or more hard	Hardest, or most hard
Happy	Happier, or more happy	Happiest, or most happy

Either of the above forms of the superlative may be employed, but both the forms, as, *more wiser, more harder, most happiest*, must never be used together.

When the positive degree ends in a *single* consonant, preceded by a *single* vowel, the consonant is doubled in the comparative and superlative; as, *hot, hotter, hottest*. Where there are *two* vowels, the consonant is not doubled; as *clear, clearer, clearest*.

The signification of the positive is sometimes lessened by the use of the termination *ish*; as *cold, coldish; black, blackish; mild, mildish*; but when the positive ends in *e*, that letter must be omitted; as *white, whitish*. The positive may be lessened also, by placing the words *less* or *least* before it; as, *less cold; least important*. The word *rather* has nearly the same effect; as, *rather cold; rather better*. But *ish* and *rather*, having the same meaning, ought not to be used in the same sentence; though we often hear persons say improperly, "'*Tis rather coldish*;" or, "*He's rather wildish*."

As, however, it is not always possible to express the exact degree of a quality by any one of the three degrees of comparison, certain *adverbs* are employed to denote it more precisely. Thus we say, *much* good may it do you; I am very well; this is *by far* the best; you are *too* particular, &c. The word *rather*, noticed in the preceding paragraph, is of this class. The words, *a little*, are also employed for the same purpose; as, He is a *little* better.

Some adjectives are compared irregularly, by a partial or total change of the positive; thus:—

Positive.	*Comparative.*	*Superlative.*
Good	Better	Best
Bad	Worse	Worst
Little	Less	Least
Much	More	Most
Near	Nearer	Nearest, or next
Old	Older, or elder	Oldest, or eldest
Late	Later	Latest, or last

Sometimes the comparative of *late* is written *latter*: the *latter* of *two* refers either to time or place; *later* to time only.

In some words the superlative is formed by adding the word *most* to the end of them; as:—

Utter,	*uttermost,*	or *farthest*
Under,	*undermost,*	or *lowest*
Upper,	*uppermost,*	or *highest*
Fore,	*foremost,*	or *first*

Some adjectives are derived from nouns, and are formed in various ways; as, for example:—

By adding	*y*	to the noun;	as from	*health,*	*healthy*
,,	*ly*	,, ,,	,,	*heaven,*	*heavenly*
,,	*en*	,, ,,	,,	*oak,*	*oaken*
,,	*ful*	,, ,,	,,	*mind,*	*mindful*
,,	*some*	,, ,,	,,	*trouble,*	*troublesome*
,,	*ish*	,, ,,	,,	*child,*	*childish*
,,	*less*	,, ,,	,,	*child,*	*childless*

Observe that the adjectives ending in *less* generally express want; as *penniless*, that is, *without a penny*.—The termination *ly*, being a contraction of *like*, expresses resemblance, or manner when added to nouns, it changes them into adjectives; as, from *God, godly*; or from *man, manly*; or from *heaven, heavenly*; that is, *godlike*, &c. And *ly*, added to adjectives, changes them into adverbs; as from *plentiful, plentifully; ingenious, ingeniously*.

Some adjectives are derived from proper names, either of persons or of countries. Thus from *Moses*, we get the word *Mosaic*; from *Newton, Newtonian*; from *Cicero, Ciceronian*, &c. These latter words we apply either to the systems of these celebrated men, or to some individual of like spirit; or who, in some remarkable respect, resembles them. So from the word *India*, we form the word *Indian*; from *America, American*; from *Paris, Parisian*; from *Norway, Norwegian*, &c.

Every adjective has relation to some noun, either expressed or implied. Thus in the New Testament we read of "*the Christian*" meaning the followers of Christ; or when we speak in plain terms of "the young," or "the old," we mean young or old men; or when we say "*the lame*," "*the blind*," "*the industrious*," "*the idle*," "*the righteous*," "*the wicked*," we mean persons whose characters are of such a description.

Sometimes the adjective becomes a noun, and has an adjective joined to it, as, "*the chief good*," or "*Evil be thou my good*." In other instances the noun either becomes an adjective, or supplies its place, by being joined to another noun, as, *bird-cage, sea-coast, land-crab, bar-iron*. It adds greatly to the variety and beauty of language when adjectives are introduced as nouns, as in the following sentence:—"Good may be *done* by the wicked, but no good alone can *be* good."

The adjective generally goes *before* the noun; as, *a good man, bad child, ill habits*, &c.; but there are cases in which it is placed *after* the noun; for instance, when we wish to speak emphatically, as Alexander *the Great*, or Charles *the Bald*; or when something is made to depend on the adjective, as, "food *convenient* for me;" or for the sake of greater harmony in a sentence, as, "O goodness *infinite*! O power *divine*!"

For the value of distinction many grammarians arrange the leading varieties of adjectives thus:—

1. *Common Adjectives*: these simply denote quality; as, a *good* woman; a *ripe* orange; *evil* things; *learned* sirs.

2. *Possessive Adjectives*: these denote possession; as, *my* love, *our* father; *your* sister; *his* brother.

3. *Demonstratives*, or *definitive adjectives*: these point out the precise thing to which they relate. Of this class are *this* and *that*, with their plurals *these* and *those*; *former* and *latter*; and sometimes the indefinite adjectives, *one* and *other*, and *another*; also, *yon* or *yonder*. As, for example:—

> "Body and soul must part;
> *This* wings its way to its Almighty source;
> *That* drops into the dark and noisome grave."
>
> "Warnings point out danger; gnomons* time;
> As *these* are useful when the sun is set,
> So *those*, but when more glorious reason shines."

"The coolness of the *former* was a check to the ardour of the *latter*." "The *one* daughter vanquished by a single blow; the *other* by efforts successively repeated." "In *yon* cool grot reclining." "In *yonder* grave a Druid lies."

4. *Indefinite adjectives*: these express the subject in a general or indeterminate manner. Of this kind are the words *some, other, any, one, all, such*. Of these adjectives, two only admit of being

* *Gnomon.* An index; the pin or hand, the shadow of which points out the hour on a sundial.

varied; *one* takes the possessive case; as, *one, one's*; *other* is thus declined:—

	Singular.	*Plural.*
Nominative	Other	Others
Possessive	Other's	Others'
Objective	Other	Others

The plural *others* represents both the adjective and the noun; as,

"Be you to *others* just and true
As you'd have *others* be to you."

Here *others* means *other persons*.

5. *Distributive Adjectives:* these denote several persons or things individually. In this class are the words *each, every, either, neither*. *Each* and *every* refer simply to *all* the persons of any number; as, "*Each* domestic was satisfied, for *every* guest was liberal." *Either* implies one or the other *of two only*; as, "We must take *either* this road or that, for there are but two." *Neither* means *not either*; as, "Two accounts of the affair have been given, but perhaps *neither* of them is right."

6. *Numeral Adjectives:* these denote something relating to *number* in the object or objects spoken of; as, *three* volumes, *many* persons, the *second* part, the *fourteenth* chapter. Numeral adjectives are either CARDINAL, as *one, two, ten, fifty, a hundred*; or ORDINAL, as *first, third, twentieth, hundredth*; or INDEFINITE, as *a, an, any, all, every, many, some, several, few, only, no, both, each*, &c. There are other numeral adjectives which do not belong to either of these classes, though they express numbers definitely; as, *double, triple, threefold, a hundredfold*.

7. *Pronominal* or *pronoun adjectives:* these relate to profession or property; they are, *my, thy, his, her, our, your, their*; from the pronouns, *I, thou, he, she, it, we, you, they*.

8. *Verbal* or *participial adjectives:* this is the name given to verbs ending in *ing* or *ed*, and some others; as, a *learned* youth, a *running* brook, a *broken* window; a *pleasing* picture, &c.

QUESTIONS ON THE FOREGOING LESSON.

What is an adjective?
Can an adjective stand by itself?
Are adjectives subject to change in form?
In what way are adjectives changed in form?
What is expressed by degrees of comparison? The positive? The comparative? The superlative?
If the comparative be "*wiser*," what are the positive and superlative?
What is the effect of the termination "*ish*" on the positive?
Why are adverbs sometimes employed to express degree?
Are all adjectives compared regularly?
Give an instance of *irregular* comparison.
What is the effect of adding "*most*" to words?
Are adjectives ever derived from nouns? If so, in what way are they formed?
Are there any cases in which adjectives become nouns?
Does an adjective always go *before* a noun?
Why is an adjective sometimes placed *after* a noun?
How do grammarians class the leading varieties of adjectives?
Give a specimen of the common adjective; of the possessive; of the demonstrative; of the indefinite; of the distributive; of the numeral, cardinal, and ordinal; of the pronominal; of the verbal.

HINTS TO SOME READERS.

PERSEVERANCE is a virtue, essential to the man who wishes to pass the limit of mediocrity. The victory is not always gained by the strong; the constant and persevering, though possessed of little or no talent, have often in the race of human life overtaken the more fortunate by birth and education, and like the tortoise in the fable, outstript them while asleep. Ordinary men, as an excuse for not attempting great things, declare that they have not the necessary abilities, instead of trying what they can do with the abilities they possess. This excuse is made so often, that I believe instances may be found in every town and village in Great Britain. It may be useful to relate for the benefit of such, the following anecdote:—I was acquainted when young, with a tall, awkward-looking lad of about 17 years of age, who could not read the alphabet; he was of extremely poor parentage, and having no regular employment, it seemed as if his hopes of worldly success, were very small. He formed an intimacy, however, with a person who could read and write a little, and after some time, he wished that person to teach him to read. His wish was complied with; and this tall awkward lad at last became a merchant, had a *warehouse* of his own, and did a very good trade in Manchester goods. After he had learnt to read, he taught himself writing and arithmetic, got employment, and speedily emerged from his original obscurity into his present position. He was entirely unassisted, and totally dependent on his own resources, from beginning to end. Although this is the most remarkable, yet it is not the only case which has come under my own observation; and there has no doubt been many such cases, which were never particularly noticed by any one. But although many men have a disposition to push themselves forward in the world, they will not use the means; they stand discontentedly watching the vigorous operations of some of their fellows, and refuse to give themselves the slightest inconvenience; whereas if they only followed their example, they might soon obtain all that they want, and probably reap an harvest of reward far above what they sought.

Every man may exert himself to the utmost, in his own particular trade or profession, if he chooses. I say, abandon without scruple or hesitation, every habit, association, or place of resort, which your conscience tells you is evil and degrading; do not stop to make fine distinctions to suit your taste, but abandon *all*; form good habits, study your business as far as it can be studied; employ all your leisure in reading and writing, or in profitable and invigorating exercise; rise early, and retire to rest before the approach of midnight, and you will find ere long, that you are reaping the benefits of perseverance in good resolutions. The head which you formerly laid down in pain and restlessness on your pillow, will be free from excitement and feverish aches; your body, formerly kept in a state of continual weariness or disease, will be a source of pleasure from the enjoyment of vigorous health; and your prospects, which were formerly darkened to the view, will gradually brighten up, infusing fresh life into your veins, and cheering you to still further exertions, which will undoubtedly be amply recompensed. Solomon says, "the hand of the diligent maketh rich," and "the hand of the diligent shall bear rule;" but to the listless, the dissipated and the inactive, he says, "thy poverty shall come upon thee as an armed man," and "the slothful roasteth not the meat which he took in hunting;" or in other words, the good designs which he conceives, will vanish when they are not put in execution, and others who have picked them up, will profit by them.

Perseverance is an imperative duty and an exquisite pleasure: self-denial and action alone are wanted, and when exercised, they will infallibly be rewarded. A poet says,—

"Intrepid virtue triumphs over fate,
The good can never be unfortunate;
And be this maxim graven in thy mind,
The height of virtue is, to serve mankind." F. V.

LITERARY NOTICES.

LIVES AND WORKS OF THE PAINTERS OF ALL NATIONS.—On July the 1st, JOHN CASSELL will publish the first part of a magnificent work, in imperial quarto, under the above title. Many years have been already devoted to a preparation for this work, the publication of which has been commenced most successfully in France. Drawing have been made, and exquisite engravings have been executed, by the first artists, under the superintendence of that distinguished connoisseur, M. ARMENGAUD, of Paris. Popular memoirs of the Painters, accompanied with notes of a more special and technical nature, have been prepared, in the intervals of his official labours, by M. CHARLES BLANC, late Director-in-chief of the Gallery of the Louvre at Paris. These memoirs will be translated by Mr. PETER BERLYN. The general editorship will be intrusted to Mr. M. DIGBY WYATT, architect. Each Monthly Part will consist of sixteen pages of letter-press, with numerous illustrations inserted in the type, together with several finished and separate engravings on wood, and will appear on the first of every month, at 2s. each, and will be supplied through every bookseller in town or country.

THE ILLUSTRATED EXHIBITOR AND MAGAZINE OF ART.—The First Volume of this splendidly embellished work, handsomely bound, price 6s. 6d., or extra cloth gilt edges, 7s. 6d., will be ready July 1, and will contain upwards of Two Hundred Principal Engravings, and an equal number of Minor Engravings, Diagrams, &c. The literary matter will be of the most varied and interesting description, and the volume, considering the enormous cost of its production, will certainly be one of the cheapest ever issued from the press.

The EMIGRANT'S HANDBOOK, a Guide to the Various Fields of Emigration in all Parts of the Globe, is now ready, price 6d.

COMPLETION OF JOHN CASSELL'S LIBRARY.—This invaluable Work is now complete, in 26 Volumes, 7d. each in paper covers; double Volumes, cloth, 1s. 6d., or when 3 Vols. in 1, 2s. 3d. The entire Series may be had, bound in cloth, 19s., or arranged in a Library Box, 26s.—Contents—HISTORICAL WORKS:—The History of England. By Dr. R. Ferguson. 4 vols. History of Scotland. By Dr. R. Ferguson. 3 vols. History of Ireland. 3 vols. The History and Sources of the Greatness of the British Empire. By Benjamin Parsons. 1 vol. The History of France. 3 vols. SCIENTIFIC WORKS:—The Natural History of Man. By J. Kennedy. 2 vols. The Wonders of the Heavens. By F. S. Williams. 1 vol. The History of the Steam-Engine. By Professor Wallace. 1 vol. VOYAGES AND TRAVELS:—Sailings over the Globe. 2 vols. Footprints of Travellers in Europe, Asia, Africa, and America. 2 vols.

ANSWERS TO CORRESPONDENTS.

J. P.—To him we are indebted for the correction of some misprints.

LATIN.—It is a rule in Latin prosody (say pronunciation) that one vowel immediately before another is short; thus in fīlius, the second i standing before the u is short; so in pumĭlo, fulcĭo, nutrĭo, and generally; though when in Latin i represents the Greek diphthong ei, it is long, as in Alexandrīa; when long the vowel takes the accent; thus Alexandrīa; when short it is without it, as vānio. G in Latin before e and i is pronounced like our g in good and gum; before i like our g in gin; thus in lego and similar cases the g has, in the first person singular, the sound of g in good; but in the second person the sound of g in gin. So is it with c, as in dīco, dīcis, dīcit, pronounced dīko, dīcis, dīcit. All diphthongs are long and have the accent. A vowel immediately preceding two consonants is generally long.

M. B.; S. C. Our Edinburgh friends who "are about to make a monochord" should get, through any bookseller, a shilling pamphlet entitled "The Theory and Practice of Just Intonation," by Col. Thompson. It is published by Effingham Wilson, London. At pages 33 and 58, they will find the best and clearest instructions we have seen. Dr. Crotch, in his Elements, proposes a board three feet long, and the steel wire of "music gage," No. II. The ends of the wire are attached to a peg at each end of the monochord. Both pegs are turned in tuning the string. They answer the purpose of a weight. This length and weight of string, he recommends to be tuned to C, on the second space of the bass clef. Our friends should understand that *any* length of string and *any* pitch of sound may be taken for the *key-note* or DOH, and the other notes will always be in the proportions named. By "the true sound of DOH," we suppose them to mean the true sound of C—the standard pitch-note. That is best obtained from a tuning-fork, recommended and sold by a respectable music-seller. See our fourth lesson.

A YOUNG BEGINNER would like to have questions to the music lessons, as he would then know how much he has learnt of the lesson. He shall have them in due time. But let us recommend him a practice we ourselves have often adopted with vast advantage. Let him *make* questions on the lessons and write them down. These would be incomparably more useful to him than any we can supply.

The suggestions of the following correspondents will be attended to as soon as possible:—Cash and Contra; G. J. M., Cornwall; R. W—g; M. Mills; J. C.; T. W., Doctors' Commons; T. G. Fenden; J. W.; T. H. Lavers; E. Moon; Puerl; A Friend, especially on the Ablative Case; P. Mc Gill; H. J. and C. D. B., Islington; O. Y. Smith; W F. B., Lambeth; W. S. W., Hammersmith; J. W. T., Edinburgh; T. Edwards, Stafford; Toll; G. B., Edinburgh; W. J. Baker.

A. W. (Bridgewater-square).—We strongly advise him to study the 1st book of Euclid, Simson's edition, which he may get second-hand for a few pence.—BLACKPOOL: Yes.—J. L. N., Dublin: We shall not lose sight of his arithmetical magic.—We are obliged to R. P., and request him to study the solution in No. 8.—ALICE: We fear her literary friend, though right on some points, is wrong on others. We are antiquated enough to admire Solomon's description of a virtuous woman contained in the last chapter of Proverbs, from verse 10 to the end. We recommend this strongly to her perusal. It will stand comparison with any modern production.

Solutions of query 8, No. 2:—G. B.: Ingenious but too laborious.—T. B., Great Marlow: Very ingenious, but founded on Book VI.—W. H. PEARCE: Right.—H. F. R: Right.—E. C., Dublin: Ditto.—J. L., Windsor: Ingenious, but too short.—W. C. F., Dublin: Right.—M. M. D., Greenheys: Right.

Solutions of query 7, No. 2:—C. W. H., Summertown: Right.—PHILO, Summertown: Very correct.—E. F., Holytown: Ditto.—T. B, Great Marlow: Ditto.—W. S. W—N, Fife: Ditto.—J. L., jun., Perth: Ditto.—H. F. R., Chatham: Correct, but not within the limits.—J S., Devonport: Pretty correct.—E. C., Dublin: Right.—J. L., Windsor: Ditto.—M. M. D., Greenheys: Ditto.

ETA.—We sympathise with our correspondent. We have looked into the *latest*, Craig's Technical Dictionary, but we are not quite satisfied. As to Greek, let him try *Aristophanes* first, then *Pindar*, then *Æschylus*. The German editions are *by far* the cheapest, and are generally pretty accurate, being got up by good scholars. He will get them at any foreign bookseller's in London.—J. M., Ashton-under-Lyne.—If he would take our advice, he would be very cautious in forming opinions on the subject of Electro-Biology and Mesmerism. We ourselves have no faith in them.—A—R P—T, Deddington.—Try both; the morning is the best time for study, at least for nine months in the year.

LATIN.—On inchoative verbs we shall speak in due time; also on Latin dictionaries. Verbs wanting the preterite and the supine want the parts which are formed therefrom. So in general derivatives are wanting in all cases where there are no primitives. A few scattered exceptions only prove the rule. Learn the case-endings by themselves; learn them also in conjunction with the several stems. "Practice, practice, practice," is the motto in grammar.

ABOMINABLE.—It has been established, by recent observations, that a few hours after incubation commences, a blood-vessel issues from each side of the embryo, and branches into numerous smaller ones, which unite at their termination, and become a boundary on the covering of the yolk. The check is the centre of this network of vessels, and as it increases so do they multiply, until they nearly pervade the membrane of the yolk; the vessels carry the yolk into the body of the chick and thus there is a supply for its sustenance and growth. The yolk is, therefore, the *food*, and not the *substance* of the chicken.

R. R.—His solution of query 7 is very correct. He adds, "by following the same process, the sides may be made to contain the same number of times required within the restrictions proposed in the POPULAR EDUCATOR."

B. R. C. (Leeds).—He must matriculate before he can graduate. The fee for matriculation is *two* pounds, and for the degree ten pounds. Other information necessary for him to know, and too long to be inserted here, will be found in the *London University Calendar*, which is published annually.—G. A. S., Greenock: We thank him for his suggestions, they shall be attended to; his opinions coincide with our own on most points. His letter does him credit.—MANCHESTER: He is right, but we must not innovate.—C. J., Birmingham: Study as you would at home; and if you meet with one who knows better than you, read with him.—W. M., Manchester: We recommend Riddle's Dictionary. There is a small edition, at half-price.—C. H. T.: Answers to his queries have been given in the correspondence.

A FRIEND (Carlisle).—SPHINX.—Yes, as soon as possible.—G. E.: Our own map of the world will appear immediately, and will suit you to a T.—W. S. will find a plan for the attainment of his object proposed in No. 7.—J. T. B., Taunton: Custom is the only reason.—LEWIS W. H.: The question is not so clearly stated as we could wish. We thank him for his offer, and shall be glad to see a specimen.—R. V., Stamford: The letter cannot find its owner. Richardson's Dictionary.

C. W. J. AUDERS.—We think he is studying enough at present to do it well. The pronoun *I* he ought always to write with a capital letter, thus *I*.

E. SMITH.—See note at the bottom of page 72, No. 5.

JOHN WRIGHT.—He is *wrong* as to the *obtuse* angles; we called them *oblique*. He is *right* as to the grammar, and the music; the syllables in the latter below the note would enable most readers to correct.

GEORGE GEEN.—His difficulties chiefly arise from two or three misprints; these with others we shall give in a table of errata for correction.

JOSEPH WEBSTER.—To say "It incarcerates our prisons with men" is downright absurdity. If a man pretends to see with his nose, we should eschew his company as *too knowing* for us; but this is another gross absurdity. As to *gold* and *golden*, use has made them synonymous in many cases, and therefore we must submit. We prefer *golden* however, as most in accordance with the analogy of the language. We also say *wheaten* bread.

W. K.—We strongly advise him to read and study with a friend or two.—C. G. M.: Repeat it while you eat, drink, walk, and work.

Useful suggestions to be attended to, have been received from A YOUNG TEACHER, Glasgow; J. G., Keiso; W. C. S., Leith; OUVRIER, Preston; W. Drilgur; E. J. M—N, Derby; MUNRO, Edinburgh; J. Y.; H. LANCASTER, Liverpool; E. J. R. B., Carlisle; C. H., Islington; H. C. BARTON.

GEORGE BEAKE (St Leonard's-on-Sea).—If he looks into future numbers his difficulties will be removed. The reasoning on the theorem of Pythagoras is independent of all actual measurement. Only suppose the figures to be correct, and the argument becomes conclusive, or irrefragable.

OPIFEX.—We thank him for his recommendations, and suggestions they are good. But he has overlooked what we have said in page column 1, No. 1. We therefore, beg to refer him to that place, and he will see that his suggestions on one important subject are anticipated. We have already engaged for it the services of the late Professor of Theoretical and Practical Mechanics in the College for Civil Engineers.

*** In reply to numerous correspondents, who are anxious to know what lessons they may expect after the present have drawn to a close, we say that, we have already announced that the German will follow the French; we add that all the other European languages will follow in the order of their utility. After the Latin, we propose to give Greek and Hebrew, as the most valuable and useful of the ancient languages. Then as to commercial pursuits, we intend to combine book-keeping with arithmetic, shorthand with penmanship and algebra in connexion with arithmetic is already begun. The other sciences will follow in their proper order, and according to their dependence on each other.

We find our correspondence increasing so much, that we must confine ourselves in future to questions strictly educational. It is for the reason also that we cannot notice new publications in our limited space.

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LESSONS IN GEOLOGY.—No. I.

By Thos. W. Jenkyn, D.D., Fellow of the Geological Society.

HOW TO BECOME A GEOLOGIST.

There are two methods of becoming a Geologist. The one is by observing geological facts, and the other by reading geological works. Both of these methods must be adopted and combined, if you wish to succeed in the study of geology.

§ i. By Observation.

The first method of studying geology is personal observation. There is no science that teaches you to make use of your eyes more completely and habitually than geology. The "sermons in stones" are never to be *heard*, but they are always to be *read*, and read with your own eyes. This personal observation is to be directed to the different geological materials around your own neighbourhood, and to the geological character of any district or country, across which you may be travelling.

Do you wish to become a geologist? If you do, as soon as you shall have read this article, take up the very first stone, or fragment of a stone, that you can pick up in your way. As you examine the stone, ask yourself a few questions about it. If from these questions you at first learn nothing but your own ignorance, you must not be discouraged; for that discovery is the best means for creating and whetting a keen appetite for geological knowledge.

Look at the stone again, and ask: What is it? What is the name of it? Where did it come from? How did it come here?

Perhaps it is a piece of chalk. What is chalk? How does chalk appear under the microscope? Is all chalk white? In what English counties is chalk found?—Or the fragment in your hand may be a flint. What is flint? Was it once soft? In what kind of rock is it originally found? If it is round, what rounded it as if it were waterworn? If waterworn, when and where could water have acted upon it? Do flints ever contain fossils? How came they there?—Your pebble may be a sandstone? What is sand? What is the difference between sand and clay? What has given the colour to the sandstone? Is it soft or hard? How many kinds of sandstone are there?—It may be that the piece you have picked up is a limestone. How came it to be produced? What districts in England abound with rocks of limestone? How is it that these rocks are always in layers or beds? How came shells to be imbedded in them? How is it that some limestone is crystallised?

You may catechise yourself by applying similar series of questions to any stone or pebble that you may meet, to granite, to slate, to coal, and to the different ores.

This class of questions you may ask, any day, within twenty yards of your own dwelling. You do not, however, always stay at home. You often take a walk or a ride. You sometimes take a long journey; or you may make a short summer excursion for business, recreation, or pleasure. On these occasions you must, if you wish to become a geologist, always take with you the same habit of personal observation, and the same system of asking questions.

On your journey from one part of the country to another you find that the colour of the soil, as exhibited in the ploughed fields, &c., differ very much from that of your own neighbourhood. How and why is this? If you ride on horseback, or travel by coach, you pass by gravel-pits, or rocks by the road-side, all of which are totally unlike those of the place whence you started. Try to account for this. What is gravel? were the pebbles that you see in the gravel ever larger than they are now? How came they to be so small? and so round? If you travel along a valley, how is it that the pebbles in the upper part of it are large—and that those in the lower part of it become gradually less and less as you approach the sea, till at last they are mere sand or mud? Remember that for all these things there are reasons, and that the science of geology furnishes them.

It is possible that sometimes, in the summer, you make a long excursion by one of the railways. On such a journey, you not only pass over a great variety of superficial soil, but you travel through deep cuttings in different rocks; such cuttings as geologists would call fine "sections for studying geology." If, on these excursions, you make proper use of your eyes, you will learn much of the alphabet of geology; which, in the course of a short time, you will, by attention and perseverance, be able to put together, in such a manner, into syllables, and words, and sentences, as will utter to you the great and delightful truths of science.

Let me suppose that you live in London, and that, upon some holiday in the week, you make an excursion by railway to Brighton. I mention this, as it is the most common excursion made by artisans and others. As you travel along, you can mark the different rocks through which you pass, without, for a moment, losing the enjoyment of the charming landscapes that smile on each side of you.

From the London-bridge station to New Cross, you ride over the dark-looking mould which the gardeners find so well adapted to the growth of vegetables. As soon as you pass under the bridge at New Cross, you enter a very deep cutting in a high bank of clay. How is this? What is clay? What clay is this called? How is it that, if you took a walk to Hampstead by Haverstock-hill, or made a short start by the Great Northern Railway, you would come to the same clay? Was the clay at New Cross, and that at Haverstock-hill, ever one continuous bed? If so, what has become of all the clays that once lay between the two places? Has the Thames, or any other water, scooped it out and carried it away?

Near Croydon, you come to beds of gravel. How did that gravel come there? What gives the tint of olive green to all that gravel? What has made those deep beds of clay, through which you have passed, now cease altogether? When you pass the Stoat's Nest you come again into deep cuttings, not in clay, as before, but in chalk. In the upper part of the cutting you see a black line continuing on both sides for miles. What is that line? It is a layer of flint looking as regular as a line of dark-coloured brick placed in a white brick wall by a mason. How came flint to be formed in layers? Is this layer of flint found in every cliff of chalk? Is the flint whole, or broken? If broken, what shattered it? Below this layer of flint you find two other lines of a dark brown colour. These lines run parallel to each other, and keep about seven feet apart from each other for many miles. They do not look like flint: what are they? They are seams of marl. What is marl? What is a seam? How came seams of marl into the chalk. As you whirl onward, you find that both the layer of flint and the seams of marl break off suddenly, and as suddenly begin again lower down in the cutting or section. How is this? Has any portion of this rock ever sunk? or has some other portion of it been thrown up, so as to disturb the continuance of these layers? If so, what force could have occasioned the disturbance?

As soon as you find yourself through the Merstham Tunnel the daylight shows that you are in a completely new rock. What is that stone? Why is it called Firestone? Has it any other name? Is it always found under the chalk? On leaving Reigate station you come to Redhill. The hill on each hand consists of different coloured sands, layer upon layer. What are these sands? Why are they called Shanklin sands? How is it that these sands are found here, at *Shanklin*,

in the Isle of Wight, *Leighton-Buzzard*, and near *Biggleswade*, in Bedfordshire? Before you reach HORLEY you ride through flats abounding in clays and sands, which, as the cuttings show, furnish fuller's earth, and even iron ore. What is fuller's earth? What is an ore? How came iron to be formed in these sands? Is iron found in all sands? Why not?

At HORLEY you come to a perfectly new series of rocks consisting of layers of clay and sand, and sandstones and shales. This group of rocks is called the Wealden. Why? What is shale? How came the sandstones at BALCOMBE to be, some in thin layers called laminæ, and others in thick masses called beds? What caused these beds to dip towards the north-east? But as soon as you pass the viaduct, you find that the very same beds dip towards the south-west. How is this? Did a force from below push up these beds till they snapped and then fell in different directions? By the Tunnel at HAYWARD HEATH, you see all these beds of clay, sand, shale, &c., exhibited in a deep cutting. In this neighbourhood you find Tilgate stone, called calciferous grit. What is grit? Why is this called calciferous? Is this like the rocks at TONBRIDGE WELLS and HASTINGS? How is it that the shales here look like those of coal? Is it likely that coal would be found here? Why not?

At St. JOHN'S COMMON, you pass a rock that is crammed with shells. This rock is called Sussex marble. Did these shells ever live? What kind of shells are they? Are they like those in the sea, or like those found in rivers? If like those of rivers, is it likely that an immense river ever flowed in this district? While you are pondering these questions you come to STONEPOUND Gate, near HURSTPERPOINT, and you again enter the very sands which you left at REIGATE station. How is this? Did these sands ever form one continuous bed? If so, how came they to be separated? How came the rocks of TILGATE Forest to rise between them? And now OBSERVE that, as soon as you pass through these sands, you again enter the white chalk, as if you were going back from REDHILL to LONDON, instead of being on your way to BRIGHTON.

You have now reached BRIGHTON. Look about you. Take a walk on the sea-shore near KEMP TOWN. Look towards ROTTINGDEAN. Close to the water side you find a low cliff or bank of chalk. Resting on this wall of chalk you find a large and somewhat thick mass of loose soil, abounding with shingle, and large round stones, called boulders. What are these stones? Are they flints? No. Are they granite, like the stones that pave the streets of London? If so, how came they to BRIGHTON? Where did they come from? The granite rocks nearest to Brighton are either in CORNWALL or at ABERDEEN in SCOTLAND. Did the sea bring these granite stones from CORNWALL? Will their colour help us to ascertain whether they come from CORNWALL, or from SCOTLAND? Did the present sea bring them? If so how is it that they are much higher than the high water-mark? Was there once a sea higher than the present? Was this the beach of that ancient sea? How did the sea change its level? Did the sea retire and sink? or did the land rise? How could this be?—But, look higher up. Resting upon this ancient sea-beach, you find a high cliff, consisting altogether of clay. What clay is this? Is it the same clay that you passed at New Cross? Why is it called the Elephant Bed? Did elephants ever live in this neighbourhood? If so, what was the climate of this region at that time?

On your return to LONDON, put all these questions together, and try to obtain some intelligible truths out of them. Bethink yourself of the journey that you have made. You have begun and ended your excursion in a deep bed of clay, at NEW CROSS and at KEMP TOWN. You have passed through two rocks of chalk, one between CROYDON and MERSTHAM, and the other at CLAYTON-HILL, near BRIGHTON. You have crossed two beds of Shanklin sands, one at REDHILL, and the other near HURSTPERPOINT. You have travelled through two beds of what are called Wealden rocks, one near Hayward Heath, dipping to the north-east; and the other, near Balcombe, dipping to the south-west.

Now, sum up all these hints of information, and compare the facts that you have marked. From New Cross to Hayward Heath, you have had, 1 Clay, 2 Chalk, 3 Shanklin sands, 4 Wealden rocks. From the viaduct near Balcombe, you have had again, 4 Wealden rocks, 3 Shanklin sands, 2 Chalk, 1 Clay. Here is perfect regularity: 1, 2, 3, 4 :: 4, 3, 2, 1. The space in the middle is called by geologists, anticlinal. What is that? what are the facts developed by an anticlinal? On what theory is an anticlinal founded?

This process of observing, recording, compassing, and questioning, is the surest way by which you can become a geologist. The proper and full answer to these various questions cannot be obtained without some, and perhaps large, acquaintance with the geological writings of men who have laboured hard and long, both mechanically and scientifically, among the various rocks of which our globe is composed.

EXPLANATION OF SOME HARD WORDS IN THE PRECEDING LESSON.

Geology, is derived from two Greek words, *ge* and *logos*, which signify *the earth*, and an *account* or *description*; it therefore means *an account of the earth* as regards its structure, and the different changes which it has undergone in the course of its formation.

Fossil, is derived from a Latin word *fossilis*, which signifies *that can be dug out of the ground*, it is now restricted to organic remains; that is, the petrified remains of beings that were once possessed of life.

Crystallised, is derived from a Greek word *crystallos*, which signifies *ice*; it is applied to the regular forms which bodies assume when they are cooled after having been in a liquid state from the action of heat.

Granite, is derived from a Latin word *granatus*, which signifies *having many grains*; it is applied to the hardest known stone, which is composed of *quartz*, *felspar*, and *mica* or *hornblende*.

Calciferous, is derived from two Latin words, *calx* and *fero*, which signify *chalk* or *lime*, and *to carry*; it therefore means *chalk-bearing*, or *lime-bearing*.

Grit, from the Saxon *gritta*, meaning *rough hard particles*; it is applied to stones adapted for grinding, paving, and building purposes.

Boulders, detached stones rounded by travelling in water, and deposited in hollows formed by water.

Quartz, is a crystalline substance composed of oxygen and silicum.

Felspar, is a crystalline substance composed of sand, clay, lime, and potash.

Mica, is a substance which glitters like silver, and is divisible into very thin plates or leaves; it is composed of flint, clay, magnesia, and oxide of iron.

Hornblende, a dark crystalline substance, composed of alumina, flint, magnesia, and oxide of iron.

Geognosy, though it does not occur in the lesson, is a name formerly applied to the science of Geology; it comes from two Greek words, *ge* and *gnosis*, which signify *the earth* and *knowledge*, it therefore means a *knowledge of the earth* as regards its structure, and the changes which have taken place in its formation, until it arrived at its present state. Of the two it is better to be a *Geognostic* than a *Geologist*.

LESSONS IN FRENCH.—No. IX.

By Professor LOUIS FASQUELLE, LL.D.

SECTION XX.

THE FOUR CONJUGATIONS OF VERBS.

1. THE four classes or conjugations, into which the French verbs are divided, are distinguished by the endings of the present of the infinitive [§ 44]. The first conjugation ends in ER; as chanter, *to sing*; donner, *to give*; parler, *to speak*; chercher, *to seek*.

The second conjugation ends in IR; as, chérir, *to cherish*; punir, *to punish*; munir, *to provide*; finir, *to finish*.

The termination of the infinitive of the regular verbs of the third conjugation, is EVOIR; as, devoir, *to owe*; recevoir, *to receive*; that of the irregular verbs is OIR, as valoir, *to be worth*.

The fourth conjugation ends in RE; as, rendre, *to render*, fendre, *to split*; tendre, *to stretch*; vendre, *to sell*.

2. A verb preceded by another verb (other than the auxiliaries avoir and être), or by a preposition (other than en), is put in the present of the infinitive.

Il va travailler ou lire. *He is going to work or to read.*

3. In French, verbs are often connected with others by prepositions not answering literally to those which accompany the same verbs in English. They also often come together without prepositions. The student will find in § 129, and the following sections of the Second Part, lists of verbs, with the prepositions which they require after them.

4. The following idioms are followed by the preposition de when they come before a verb: (§ 132) avoir besoin, *to want*; avoir coutume, *to be accustomed*; avoir dessein, *to intend, to design*; avoir envie, *to have a wish, a desire*; avoir honte, *to be ashamed*; avoir intention, or, l'intention, *to intend*; avoir le temps, *to have time* or *leisure*; avoir le courage, *to have courage*; avoir peur, *to be afraid*; avoir raison, *to be right*; avoir regret, *to regret*; avoir tort, *to be wrong*; avoir sujet, *to have reason*; avoir soin, *to take care*.

Cet enfant a besoin de dormir.	*That child wants to sleep.*
Vous avez honte de courir.	*You are ashamed of running.*

Résumé of Examples.

Avez vous quelque chose à dire?	*Have you anything to say?*
Je n'ai rien à dire.	*I have nothing to say.*
Votre sœur n'a-t-elle rien à écrire?	*Has your sister nothing to write?*
Elle a deux lettres à écrire.	*She has two letters to write.*
A-t-elle le temps de les écrire?	*Has she time to write them?*
Elle n'a pas dessein de les écrire.	*She does not design to write them.*
Elle n'a pas l'intention de les écrire.	*She does not intend to write them.*
Elle n'a pas envie de les écrire.	*She has no desire to write them.*
Avez vous peur de danser?	*Are you afraid to dance?*
Je n'ai pas honte de danser.	*I am not ashamed to dance.*
Votre cousin a raison de sortir.	*Your cousin is right to go out.*
N'avez vous pas soin d'écrire?	*Do you not take care to write?*
Avez vous le courage d'aller à la guerre.	*Have you the courage to go to the war?*

Exercise 39.

Acheter, *to buy.*	Faire, *to make.*	Marcher, *to walk.*
Champ, m. *field.*	Fatigué, –e, *tired, weary*	Mars, m. *March.*
Danser, *to dance.*	Gazette, *f. newspaper.*	Ne—rien, *nothing.*
De bonne heure, *early.*	Juillet, m. *July.*	Page, *f. page.*
Dormir, *to sleep.*	Juin, m. *June.*	Seize, *sixteen.*
Ecrire, *to write.*	Lire, *to read.*	Travailler, *to work, labor.*

1. Votre belle-mère a-t-elle quelque chose à faire? 2. Elle n'a rien à faire. 3. A-t-elle deux pages à écrire? 4. Non, Monsieur, elle n'en a qu'une. 5. Avez vous l'intention de lire cette gazette? 6. Oui, Madame, j'ai l'intention de la lire. 7. Avez vous raison d'acheter un habit de velours? 8. J'ai raison d'en acheter un. 9. Votre petite fille a-t-elle besoin de dormir? 10. Oui, Monsieur, elle a besoin de dormir, elle est fatiguée. 11. Avez vous peur de tomber? 12. Je n'ai pas peur de tomber. 13. Le jardinier a-t-il le temps de travailler dans les champs? 14. Il n'a pas envie de travailler dans les champs. 15. Vos champs sont ils aussi grands que les miens? 16. Ils sont plus grands que les vôtres. 17. Avez vous honte de marcher? 18. Je n'ai pas honte de marcher, mais j'ai honte de danser. 19. Quel âge a votre fils? 20. Il a seize ans. 21. Avons nous le deux mars ou le cinq juin? 22. Nous avons le vingt-huit juillet. 23. Est il midi? 24. Non, Monsieur, il n'est pas encore midi, il n'est que onze heures et demie. 25. Il est encore de bonne heure.

Exercise 40.

1. What has your brother-in-law to do? 2. He has letters to write. 3. Does he want to work? 4. Yes, Sir, he wants to work. 5. Does he intend to read my book? 6. He does not intend to read your book, he has no time. 7. Is your sister ashamed to walk? 8. My sister is not ashamed to walk, but my brother is ashamed to dance. 9. Has your cousin anything to say? 10. My cousin has nothing to say, she is afraid to speak (*parler*). 11. Is it late? 12. No, Madam, it is not late, it is early. 13. Have you a wish to read my sister's letter (f.)? 14. Have you the courage to go to the war? 15. I have not the courage to go to the war. 16. Is your sister right to buy a silk dress (f.)? 17. Yes, Sir, she is right to buy one. 18. Does that child want to sleep? 19. No, Sir, that child does not want to sleep, he is not tired. 20. Has your brother's gardener a wish to work in my garden? 21. He has a wish to work in (*dans*) mine. 22. How old is that child? 23. That child is ten years old. 24. What is the day of the month? 25. It is the ninth of March. 26. Are you afraid to walk? 27. I am not afraid to walk, but I am tired. 28. Have you time to read my brother's book? 29. I have time to read his book. 30. Has the joiner a wish to speak? 31. He has a wish to work and to read. 32. Is your son afraid of falling? 33. He is not afraid of falling, but he is afraid of working? 34. What o'clock is it? 35. It is twelve.

Section XXI.

1. The expressions avoir besoin, *to want*; avoir soin, *to take care*; avoir honte, *to be ashamed*; avoir peur, *to be afraid*, require also the preposition de before a noun. Those idioms mean literally, *to have need, to have care*, &c.

Avez vous besoin de votre frère?	*Do you want your brother?*
J'ai soin de mes effets.	*I take care of my things.*
Il a honte de sa conduite.	*He is ashamed of his conduct.*
Elle a peur du chien.	*She is afraid of the dog.*

2. As these expressions require the preposition de before their object, they will, of course, require the same preposition before the pronoun representing that object.

J'ai besoin de vous.	*I want you.*
J'ai soin de lui.	*I take care of him.*
De qui avez vous besoin?	*Whom do you want?*
De quoi a-t-elle besoin?	*What does she want?*

3. When the object is not a person, and has been mentioned before, the pronoun en takes the place of the preposition de, and that of the pronoun representing the object.

Avez vous besoin de votre cheval?	*Do you want your horse?*
J'en ai besoin.	*I want it.*

4. The expressions être fâché, *to be sorry*; être étonné, *to be astonished*; être content, *to be satisfied*, require the preposition de before a noun or pronoun [§ 88].

Je suis fâché de son malheur.	*I am sorry for his misfortune.*
Je suis étonné de sa conduite.	*I am astonished at his conduct.*
Je suis content de lui.	*I am pleased with him.*

5. Etre fâché, in the sense of *to be angry*, requires the preposition contre.

Vous êtes fâché contre moi.	*You are angry with me.*

6. For rules on the government of adjectives, see § 87, and following Sections.

Résumé of Examples.

Avez vous besoin d'argent?	*Do you want money?*
J'ai besoin d'argent.	*I want money.*
Je n'en ai pas besoin [R. 3].	*I do not want any.*
En avez vous besoin?	*Do you want any?*
J'en ai besoin, et mon frère en a besoin aussi.	*I want some, and my brother wants some too.*
Avez vous besoin de votre frère?	*Do you want your brother?*
J'ai besoin de lui.*	*I want him.*
De quoi avez vous besoin?	*What do you want?*
J'ai besoin d'un dictionnaire.	*I want a dictionary.*
Avez vous soin de votre livre?	*Do you take care of your book?*
J'en ai soin.	*I take care of it.*
Avez vous soin de votre père?	*Do you take care of your father?*
J'ai soin de lui.*	*I take care of him.*
Votre frère est il fâché contre moi?	*Is your brother angry with me?*
Il est fâché contre votre sœur.	*He is angry with your sister.*
Avez vous peur de ce chien?	*Are you afraid of this dog?*
J'en ai peur.	*I am afraid of him.*
De qui avez vous honte?	*Of whom are you ashamed?*
Je n'ai honte de personne.	*I am ashamed of nobody.*
Avez vous besoin de quelque chose?	*Do you want anything?*
Je n'ai besoin de rien.	*I want nothing.*

Exercise 41.

Besoin, m. *want, need.*	Fatigué, –e, *weary, tired.*	Parler, *to speak.*
Conduite, *f. conduct.*	Garçon, m. *boy.*	Reposer, *to rest.*
Domestique, m. *servant.*	Jeune homme, m. *young man.*	Soin, m. *care.*
Effets, m. *things, clothes.*		Travailler, *to work.*
Etonné, –e, *astonished.*	Lire, *to read.*	Vieux, *old.*
Fâché, –e, *sorry, angry.*		

1. Qui a besoin de pain? 2. Personne n'en a besoin. 3. N'avez vous pas besoin de votre domestique? 4. Oui, Monsieur, j'ai besoin de lui.* 5. Votre jardinier a-t-il soin de votre jardin? 6. Oui, Madame, il en a soin. 7. A-t-il bien soin de son vieux père? 8. Oui, Monsieur, il a bien soin de lui. 9. Votre garçon a-t-il honte de sa conduite? 10. Oui, Monsieur, il en a honte. 11. Avez vous peur de ce cheval-ci ou de celui-là? 12. Je n'ai peur ni de celui-ci ni de celui-là. 13. Notre domestique a-t-il soin de vos effets? 14. Il en a bien soin. 15. Avez vous peur de parler ou de lire? 16. Je n'ai peur ni de parler ni de lire. 17. Etes vous étonné de cette affaire? 18. Je n'en suis pas étonné. 19. En êtes vous fâché? 20. Oui, Monsieur, j'en suis bien fâché. 21. Avez

* The word *en* should be avoided as much as possible in relation to persons.

vous besoin de ce garçon? 22. Oui, Madame, j'ai besoin de lui. 23. N'avez vous pas besoin de son livre? 24. Je n'en ai pas besoin. 25. Avez vous envie de travailler ou de lire? 26. Je n'ai envie ni de travailler ni de lire, j'ai envie de me reposer car je suis fatigué.

Exercise 42.

1. Do you want your servant? 2. Yes, Sir, I want him. 3. Does your brother-in-law want you? 4. He wants me and my brother.* 5. Does he not want money? 6. He does not want money, he has enough. 7. Is your brother sorry for his conduct? 8. He is very sorry for his conduct and very angry against you. 9. Does he take good (*bien*) care of his books? 10. He takes good care of them. 11. How many volumes has he? 12. He has more than you, he has more than twenty. 13. What does the young man want? 14. He wants his clothes. 15. Do you want to rest (*vous reposer*)? 16. Is not your brother astonished at this? 17. He is astonished at it. 18. Have you a wish to read your brother's books? 19. I have a wish to read them, but I have no time. 20. Have you time to work? 21. I have time to work, but I have no time to read. 22. Does the young brother take care of his things? 23. He takes good care of them. 24. Is that little boy afraid of the dog? 25. He is not afraid of the dog, he is afraid of the horse. 26. Do you want bread? 27. I do not want any. 28. Are you pleased with your brother's conduct? 29. I am pleased with it. 30. Has your brother a wish to read my book? 31. He has no desire to read your book, he is weary. 32. Is that young man angry with you or with his friends? 33. He is neither angry with me nor with his friends? 34. Do you want my dictionary? 35. I want your dictionary and your brother's.

LESSONS IN ARITHMETIC.—No. X.

RULE OF SIMPLE DIVISION—(*Continued*).

If the divisor to any proposed dividend happens to consist of any one of the nine digits, followed by one cipher, or any number of ciphers; then divide according to the following rule:—

Rule 2.—Place the divisor and dividend as directed in Rule 1, and mark off with a turned comma the cipher or ciphers contained in the divisor, and similarly an equal number of figures, to the right, from the figures contained in the dividend; then divide the figures of the dividend which remain to the left by the significant figure of the divisor, according to Rule 1. If there be any remainder when this division is performed, annex to it, on the right, the figures which were cut off from the dividend, and you will have the complete remainder which belongs to the complete divisor. If there be no remainder in dividing by the significant figure of the divisor, then the figures which were cut off from the dividend constitute the complete remainder belonging to the complete divisor.

The reason of cutting off the ciphers from the right of the divisor, and the same number of figures from the right of the dividend in this rule, is founded on the following principles:—1. *If the divisor and dividend be both divided by the same number, their quotient will be unaltered*; that is, it will be the same after this division as before. For example, if we divide 1728 by 8, we shall have the same quotient as if we divided each by 4, and then found the quotient of the results; because $1728 \div 4 = 432$, and $8 \div 4 = 2$, whence $432 \div 2 = 216$; but $1728 \div 8 = 216$ also, the same quotient as before. In like manner, $78{,}000 \div 6{,}000 = 13$; for 78 thousands divided by 6 thousands give 13 for the quotient. 2. *If any number of ciphers or figures be cut off from a given number to the right, the figures which remain to the left form the quotient, which arises from dividing that given number, by a number composed of unity (or one) and as many ciphers are there in the number of ciphers or figures cut off.* First, cutting one figure off a number to the right, is dividing it by 10; for example, to divide 3478 by 10 is to cut off one figure, thus: 347,8, in which 347 is the quotient, and 8 is the remainder. Again, cutting two figures off a number to the right is dividing it by 100; for example, to divide 3478 by 100 is to cut off two figures, thus: 34,78, in which 34 is the quotient, and 78 is the remainder. Next, cutting three figures off a number to the right is dividing it by 1000; for example, to divide 3478 by 1000 is to cut off three figures, thus: 3,478, in which 3 is the quotient, and 478 the remainder, and so on, whatever be the number of ciphers in the divisor. This principle is obviously the result of the decimal scale of notation; for if to place ciphers on the right of any given number is to increase its value in a tenfold proportion, then to cut them off will be to diminish its value in the same proportion.

Examples: Divide 987654321 by 90; and, 142857100 by 7000.

(1)

Divisor 9,0) 98765432,1 dividend

Quotient 10973936—81 remainder.

(2)

Divisor 7,000) 142857,100 dividend

Quotient 20408—1100 remainder.

In the first of these examples, you mark off with a turned comma, the cipher or 0 in the divisor, and the first figure 1, to the right, in the dividend; this is equivalent to dividing both divisor and dividend by 10. You now divide the remaining figures 98765432 to the left, in the dividend, by the divisor 9, according to Rule 1; thus, you obtain the quotient 10973936, and remainder 8; to this remainder, you annex the figure 1, which was cut off, and you have the complete remainder 81. The division may now be correctly represented, thus:—

$$\frac{987654321}{90} = 10973936\frac{81}{90}$$

In the second example, you follow the same rule; that is you cut off three ciphers in the divisor, and three figures in the dividend and obtain the quotient as before, which is 20408, and remainder 1; to this 1, annex the three figures cut off from the dividend, and you have the complete remainder 1100. The division may now be properly represented thus:—

$$\frac{142857100}{7000} = 20408\frac{1100}{7000} \text{ or } 20408\frac{11}{70}$$

In this second expression, the quotient of 1100 by 7000, which is the fractional expression of the remainder, is not altered in value by dividing both of its parts by 100, that is, by cutting off two ciphers from each.

Exercises.

1. Divide 123456 by 80; 876543 by 900; and 202037600 by 60000.

2. Find the following quotients: $692986000 \div 7000$; $55438880000 \div 80000$; and $428571428571 \div 900000$.

When the divisor to any given dividend consists of several significant figures then proceed according to the following rule:—

Rule 3.—Make a table of the multiples or products of the divisor by each of the nine digits, 1, 2, 3, 4, 5, 6, 7, 8, 9. This may be done either by multiplying the divisor by each of the digits separately, and tabulating the results; or it may be done by adding the divisor to itself, then to this sum, and again to this and each successive sum, till its product of *nine* times has been obtained by this addition. You will know whether the table obtained by this means is correct by the fact that when you add the divisor to the product by 9, the sum, if correct, will be the divisor itself, with a cipher annexed. You now mark the places for the divisor, dividend, and quotient, by placing on each side of the dividend a straight or curved bar, like an inverted parenthesis—the divisor being generally placed on the left, and the quotient on the right of the dividend; all this arrangement being merely matter of convenience and not essential to the operation of division.

The first step in this operation is to take as many figures to the left of the dividend as are in the divisor; or, if the number composed of them be less than it, take one more, and ascertain by comparison with the table of its multiples which of them is nearest to the number composed of these figures, which for the sake of brevity we shall call the *dividuum*; then, as this *first dividuum* contains the divisor as often as its multiple just found, put the digit which answers to the multiple in the quotient, and the multiple itself under the first dividuum; subtract the former from the latter, and to the remainder annex the next figure of the dividend, this will be the *second dividuum*; ascertain again by comparison with the table of multiples which of them is nearest to this dividuum: then, as this *second dividuum* contains the divisor as often as its multiple now found, put the digit which answers to this multiple in the quotient (that is, annex it to the former figure put in the quotient), and the multiple itself under the second dividuum subtract the former from the latter, and to the remainder annex

* Repeat the preposition *de*.

the next figure of the dividend; this will be the *third dividuum*; and with this proceed as before, continuing the process until the last figure in the dividend has been annexed; the remainder obtained at the last step will be the complete remainder, and the first figure in the quotient with those successively annexed will be the complete quotient.

If, in the course of the operation, it be found, in any case, that when the next figure of the quotient has been annexed, the dividuum thus obtained is less than the divisor, the next figure of the quotient must be annexed, and the next to that again in succession, until a number be obtained, equal to, or greater than, the divisor, for a dividuum. Let it be most carefully observed, however, that for every figure of the dividend thus annexed, a figure or cipher must be put in the quotient; that is, a figure when the dividuum contains the divisor, and a cipher when it does not; the reason of which is plainly as follows:—that unless this were done the quotient figures would not be in their proper places relatively to each other according to the decimal system of notation. It is evident, indeed, that in the case of the first quotient figure, the place which it holds will depend entirely on the number of figures in the dividend which follow the first dividuum; for these figures decide the value of the first quotient figure as exemplified in Rule 1; and the rest of the figures of the quotient must take their successive values in a tenfold decreasing proportion accordingly. This, however, will be best illustrated by an example.

EXAMPLE.—Divide 347658903 by 26.

Divisor. Dividend. Quotient.
26) 347658903 (13371496
26

Table of Multiples of the Divisor.

26	1
52	2
78	3
104	4
130	5
156	6
182	7
208	8
234	9

87
78
96
78
185
182
38
26
129
104
250
234
163
156
7 Remainder.

MODE OF OPERATION.

Here you first make a table of the multiples of the divisor, by each of the nine digits, as exhibited on the margin. Having then marked out the places for divisor, dividend, and quotient, as directed, the first two figures 34 of the dividend on the left are found sufficient to contain the divisor, and are therefore called the *first dividuum*; on consulting the table of multiples, you find the nearest multiple to 34, to be 26; you therefore put the digit 1, which answers to this multiple in the quotient, and the multiple itself 26, under 34, the first dividuum; subtracting, you find the remainder 8; to this remainder, annex 7, the next figure of the dividend, and you have 87, for the *second dividuum*; consulting the table of multiples again, you find the nearest multiple to 87, to be 78; you therefore put the digit 3, which answers to this multiple in the quotient; that is, annex it to the figure 1 already put in the quotient, and put the multiple itself 78, under 87, the second dividuum; subtracting, you find the remainder 9; to this remainder annex 6, the next figure of the dividend, and you have 96 for the *third dividuum*; with this proceed as before, until you have reached the last dividuum 163, which produces the last figure in the quotient 6, and gives the remainder 7. Hence, the complete quotient is 13371496 and the remainder 7; that is, the number 347658903 contains the number 26, so many as 13371496 times, with a remainder of 7. The division may now be correctly represented as follows:—

$$\frac{347658903}{26} = 13371496\frac{7}{26}$$

In the preceding operation it is useful to observe that as there are *seven* figures in the dividend after the *first dividuum* 34, which contains the divisor 1 time; therefore by annexing *seven* ciphers to this figure you have the number 10,000,000, which shows that the divisor 26 is contained in 340,000,000 *ten million* times. Again, as there are *six* figures in the dividend, after the next figure 7 in it has been annexed to the remainder 8, arising from the *first dividuum*, and as the second dividuum contains the divisor 3 times, therefore, by annexing *six* ciphers to this figure, you have the number 3,000,000, which shows that the divisor 26 is contained in 87,000,000 *three million* times. Consequently the divisor 26 is contained in 347,000,000, the first part of the dividend, 13 *million* times. In this way it is evident that we might proceed with the explanation, obtaining each figure step by step, and fixing its place in the quotient until the whole was explained in the same manner, and the proper quotient obtained, as shown in the preceding operation.

EXAMPLE 2.—Divide 62355847984 by 20306.

Table of Multiples of the Divisor.

20306	1
40612	2
60918	3
81224	4
101530	5
121836	6
142142	7
162448	8
182754	9

Divisor. Dividend. Quotient.
20306) 62355847984 (3070809
60918
143784
142142
164279
162448
183184
182754
430 Remainder.

MODE OF OPERATION.

Here, as in the former example, you make a table of the multiples of the divisor, as exhibited on the margin. Having then marked out the places of the divisor, dividend, and quotient, you take the *first five* figures of the dividend, as the *first dividuum*; comparing it with the table of the multiples of the divisor, you find the nearest multiple to be 60918; now, putting the corresponding digit 3 in the quotient, and this multiple under the *first dividuum* 62355, you subtract and find the remainder 1437; to this remainder, annexing 8, the next figure in the dividend, you find that the *second dividuum* 14378 is less than the divisor; that is, it does not contain the divisor *even one time*; you accordingly put 0 in the quotient; that is, annex 0 to the first figure 3 in the quotient, and proceed to find the *third dividuum*; by annexing the next figure 4 of the dividend, to the *second dividuum* 14378, which must now be treated as a remainder, you have 143784 as the *third dividuum*; comparing this with the table of the multiples of the divisor as before, you find the nearest multiple to be 142142; now, putting the corresponding digit 7 in the quotient, and this multiple under the *third dividuum* 143784, you subtract and find the remainder 1642; with this remainder, and the rest of the figures of the dividend, proceed as above, until you have exhausted all the figures of the dividend. You will thus obtain the quotient 3070809 and the remainder 430. Representing this division in the usual manner, we have

$$\frac{62355847984}{20306} = 3070809\frac{430}{20306}$$

The meaning of this expression is, therefore, that the number 20306 is contained in the number 62355847984, so many as 3070809 times, and a fraction of a time denoted by $\frac{430}{20306}$

EXERCISES.

1. Divide all the numbers contained in the first square on page 58, col. 1, No. 4, by 36; and the quotients will be all the numbers from 1 to 121.

2. Divide all the numbers contained in the second square on page 58, col. 1, No. 4, by 98998, and the quotients will be all the numbers from 1 to 49.

3. Divide 10101010101 by 128; 437685 by 10, 100, and 1000; and 142857142857 by 999.

4. Divide the sum of all the numbers in the second square mentioned in Ex. 2, by the sum of all the numbers in the second square mentioned in Ex. 1.

LESSONS IN ENGLISH.—No. I.

[In compliance with the wishes and suggestions of a numerous class of readers, who are anxious to make themselves perfect in the English tongue, by combining the study of English Grammar with that of English Composition and English Literature, we have made an important change in our plan. These different branches will now be united under one head, so that they may be more easily and speedily learned together than they could be apart. The care of this combined department has been committed to Dr. Beard, as will appear by his first lesson, which follows this announcement. We have no doubt that our students will derive from these Lessons as much benefit with regard to the English language as they have hitherto done with regard to the Latin. In future, therefore, the Lessons on English Grammar, in a separate form, will be discontinued.]

A MANUAL OF THE ENGLISH LANGUAGE AND LITERATURE,

COMPRISING AN INTRODUCTION TO ENGLISH COMPOSITION.

By JOHN R. BEARD, D.D.

ABOUT to write a series of lessons in English, I think it desirable to let the readers of the POPULAR EDUCATOR know what they may expect. In general, then, I intend to exhibit the facts of the language and the productions of the language. The facts of the language, if systematically presented, will involve the laws of the language; and the productions of the language, historically treated, will comprise the literature of the language. The facts of the language and the productions of the language thus regarded, will obviously lead the careful student to a knowledge of the language. Nor without both the facts and the productions can any one possess an acquaintance with the language. A knowledge of any language implies a familiarity with its literature, and a familiarity with the facts or laws of its construction. You cannot have the one without the other, any more than you can know the principles of Grecian art, unless you have studied its masterpieces. Apart from the literature of a language, you cannot know its grammar; apart from the grammar of a language you cannot know its literature. The literature of a language is the organic life, whose laws grammar has to learn and expound. The grammar of a language is merely a systematic exposition of the laws observed in the composition of its literature. Hence you see that an acquaintance with the literature of a language should precede the study of its grammar. Indeed the productions of a language are earlier than its grammar. Men pronounced sentences, delivered speeches, composed and sang poems, long before they had any idea of the rules of which grammar is made up. First was the thought; then came the utterance, and out of many utterances at last grew the science of grammar. Grammar has no other function than to learn and set forth the laws of a language, which have been already observed by some great writer or great writers. Long posterior to Homer was the criticism which in Greece gave birth to grammar.

The knowledge of the grammar of a language, then, does not involve a knowledge of the language itself. Still less are the two identical. Grammar is only one branch of the tree. Important as grammar is, it is scarcely the most important of the branches which combine to form the knowledge of a language. Grammar is only a means to an end. It is a pathway to the temple. The temple itself is the treasure of great thoughts which constitutes the literature, and which we have termed the productions of a language. It is for this treasure that a language is worth the labour of study; and in regard to literary treasures, no language will repay attention more fully than the English.

From what has been said, it is also clear that the grammar of a language is to be learnt in its literature. Grammar is no arbitrary thing. Its rules are not inventions. Its forms are not optional. They are both merely general statements of facts—facts ascertained by the careful perusal of what we term classical authors; that is, authors of high and universal repute. The office of grammar is to make a systematic report of the usages observed in writing by the great minds of a nation. Hence grammar is a science of imitation. The grammarian, like the sculptor, takes a model, and having studied its parts and qualities, endeavours to reproduce the whole. Authority, in consequence, is the great principle recognised in grammar. The authority of such men as Macaulay, Mackintosh, Addison, Dryden, Shakspeare, is, in grammar, paramount and supreme. What they do we must follow, and we must follow it because it is their practice. Their words, their forms of speech, their constructions must be ours. They are our masters, we their scholars. They give laws, we obey the laws they give. Scarcely less than implicit and unqualified ought the obedience to be; for grammar merely declares what is customary, and what is customary in a language is known by what is customary among its best writers.

Yet some degree of latitude may be permitted. Grammar, as the science of language depends upon the laws of thought. Now the laws of thought, which find their systematic expression in what is termed logic, are a compact and consistent whole. In every such whole, principles are found and a certain harmony prevails. Consequently in grammar, which in some sense is the mirror of a language, there exist principles and harmony. It is conceivable that the discovery and the observance of those principles may be gradual. If so, well as Shakspeare wrote, Macaulay may write better in regard to grammar. But if improvement is possible, the use of reasoning, by which all improvements are made, is not banished from the science of grammar. Even in this science of imitation, then, obedience must not be blind and passive. Regard to amelioration may be combined with allegiance. We may attempt to improve what we imitate. We may aim at an ideal perfection. Imbibing the spirit of the great masters of our language, we may yield to the impulse which urged them forward in pursuit of unlimited excellence. Nevertheless, we must keep close by their side. In our loftiest aspirations we must keep our feet firmly set on the solid earth. We cannot wisely attempt to improve usage unless under the teachings of analogy. First, we must ask, "What is *customary?*" Having clearly ascertained what is customary, we may entertain the question, "What *ought* the usage to be?" And, in attempting to answer that question, the specific laws and capabilities of the language, as well as the general laws of thought and utterance, must be consulted. The neglect of usage occasions all manner of imaginary laws and fanciful constructions. The neglect of logic perpetuates the mistakes and short-comings of past ages. It is only in the union of the two that the perfect grammarian is found; and in such a union as secures for both usage and logic their proper share of observance. Usage, however, is the sovereign power in language; logic has only a small and subordinate province.

Disregard to these fundamental principles has occasioned numerous failings and errors.

Lindley Murray, Blair, Cobbett, possessing each many excellences, have more or less failed to expound, as they really exist, the facts of the English language, and given rules as well as sanctioned forms of speech which have no other source, than the undue predominance of the logical faculty in their own minds.

To another class of writers on English grammar we owe a yet greater departure from its usages and laws. English grammar was first expounded by classical scholars. Familiar with the forms and usages of the Greek and Latin tongues, and holding them to be perfect in character, if not of universal obligation, they introduced those forms and usages into their manuals of English Grammar, and so made complex and difficult one of the simplest and easiest grammars in the world. Hence came into our grammatical books, cases, tenses, and constructions, which have no corresponding realities in our literature. With such things the student of English grammar has nothing to do, and the sooner our manuals are disencumbered of them the better. Studying, as we shall do, the grammar of the language in its productions, we shall be under the guidance and the control of fact, and take special care to report as a usage and establish as a rule nothing but what has its sanction in unquestionable authority.

Let it then be observed that it is the English language that we are about to study. Consequently it is the qualities and

the laws of *that* language that it will be our business to ascertain. If we were studying Sanscrit or Hebrew, then the qualities and the laws of the Sanscrit and the Hebrew should we be in search of. Disregarding them, we are equally to disregard the qualities and the laws of the Latin. The best of Latin grammars would be a very bad English grammar, and a usage in Latin is no authority for the introduction into English of a similar usage. The same remark may be made in relation to the Anglo-Saxon; in an undue regard to which Latham with all his merits, and they are very numerous and very great, has not wholly avoided error.

The principles now set forth determine the mode of my proceeding. I shall not copy forms and rules from the writings of former grammarians. I shall not out of my own head devise forms and rules. I shall rather take the language as it is, and inquire into its qualities and laws. Beginning with the simplest enunciations of thought, I shall aid the student to analyse them, and from such analysis to deduce for himself the fundamental facts and principles of the English tongue. This process must be gone through three times: first, in regard to the forms of the language or its grammar; secondly, in regard to the productions of the language or its literature; and thirdly, as an appendage to the last, in regard to the origin and progress of the language or its history. If the reader attentively accompany me over this extended field, he will possess a full as well as accurate acquaintance with the English language.

I must add that it is for Englishmen I write. I write also for the uneducated and for the young. Having these facts before my mind, I shall study plainness and simplicity. Yet do I hope to be able to write in such a manner that scholars may not disdain to cast an eye on these pages. However that may be, I shall make it my first object and my last so to express my thoughts as to be fully understood, if not also readily followed by the now large and meritorious class, who are endeavouring to educate themselves. To labour for such is to me a very great pleasure. I ask for their confidence, and will endeavour to reward their attention.

LESSONS IN NATURAL HISTORY.—No. III.

THE WILD CAT,—THE DOMESTIC CAT,—AND THE LYNX.

The wild cat is found throughout Europe, wherever it can secure an asylum in extensive woods. It is common in the forests of Germany, Hungary, Russia, and the western parts of Asia; and though scarce in the British islands, it is not yet absolutely extirpated. The mountains of Scotland, of the northern counties of England, and of Wales and Ireland, are its chief strongholds, the larger woods being its place of resort and of concealment during the day.

It is generally admitted that the wild cat of the British islands is specifically distinct from our domestic race. It often happens, however, that individuals of the domestic breed betake themselves to the woods, or to extensive preserves of game, where, finding an abundant supply of food, they continue there, leading an independent life. But these must not be confounded with the genuine wild cat, which is clearly distinguished from the other species. The wild cat stands higher on its limbs than the tame; its body is more robust; the tail is shorter, and instead of tapering, terminates somewhat abruptly; and it is almost invariably tipped with black. The soles of the feet are also black. The fur of the wild cat is full and deep; in the face it is of a yellowish-grey colour, passing into greyish-brown on the head; the general colour of the body is dark grey, a dusky black stripe running down the spine, while beautiful transverse wavings of an obscure blackish-brown, adorn the sides; the tail is ringed with the same tint.

In its chosen retreats, the wild cat lurks on the branches of large trees, in the hollows of decayed trunks, and in the clefts and holes of rocks. As night comes on, it issues forth to seek its prey; it commits sad havoc on hares, rabbits, grouse, partridges, and all kinds of game; young lambs and fawns are by no means safe from its attacks, and of all our native beasts of prey, it is the most fierce and destructive. It was called by Pennant, the "British tiger," and it has all the ferocity, if not the size and strength of that animal. Bewick says that he recollects one killed in the county of Cumberland, which measured, from the nose to the end of the tail, upwards of five feet.

At Barnsboro', a village between Doncaster and Barnsley, in Yorkshire, there is a tradition of a serious conflict that occurred between a man and a wild cat. It is said that the fight commenced in an adjacent wood, that from thence it was removed and waged in the porch of the church, and that each of the combatants died from wounds received during the struggle. The event is commemorated by a rude painting in the church. The story is sustained by the danger that is involved in attempts to destroy the wild cat. For when hard pressed, or enraged by a wound too slight to disable it, it darts fiercely on its antagonist, aiming chiefly at his face and eyes, and using furiously its claws and teeth.

THE DOMESTIC CAT.

It appears from an ancient law of one of the Welsh princes, that in his time a domestic cat was a rare and valuable animal. A penny for a kitling before it could see, which was doubled from that time till it caught a mouse, and quadrupled for a mouser, were very high prices, considering the relative value of money at that time. A person who had stolen the cat that guarded the prince's granary, was to forfeit a milch ewe, its fleece and lamb, or as much wheat as, when poured on the cat while suspended from the tail, with the head touching the floor, would form a heap high enough to cover the tip of the former.

The Domestic Cat is too familiar to require description; but it has certain peculiarities which must be noticed. Its whiskers consist not only of long hairs on the upper lips, but also of four or five others standing up from each eyebrow, and also two or three on each cheek: all of which, when erected, form, at their extremities, so many points of a circle, equal, at least, in extent, to the circumference of the animal's body. It is supposed that with a little experience cats can tell by means of this gauge, whether any aperture, as among hedges or shrubs, is sufficiently large to allow them to pass.

That cats are able to see in the dark, though generally supposed, is not absolutely true. It is certain, however, that they can see with much less light than most other animals. For this their eyes are peculiarly adapted; as the pupils are capable of being contracted or dilated, according to the degree of light falling upon them. Thus in the daytime, the pupil of the cat's eye is always contracted, sometimes into a mere line, because it is with difficulty that this animal can see by a strong light; but in the twilight the pupil resumes its natural roundness, and the eye possesses its fullest power of vision.

The cleanliness of these animals has frequently been the topic of remark. They wash their faces, and generally behind their ears, every time they eat. And here there is a remarkable exercise of instinct; for as they cannot lick their faces with their tongues, they first apply saliva to the inside of the leg, and then repeatedly rub them over with it. The cat is equally concerned to keep her progeny clean, as any one may notice where there are kittens.

One tendency of these animals is illustrated by the following amusing anecdote. The celebrated Charles James Fox was one day walking up Bond-street with George IV., when Prince of Wales, when he laid his royal highness a wager that he would see the greater number of cats as they went onwards, though the prince might take which side of the street he liked. On reaching the top of the street, Mr. Fox had seen thirteen cats, but the prince not one, which led him to inquire the cause of so singular a fact. Mr. Fox replied, "Your royal highness took, of course, the *shady* side of the street as the more agreeable; I knew that the *sunny* side would be left to me, and that is the one that cats always prefer."

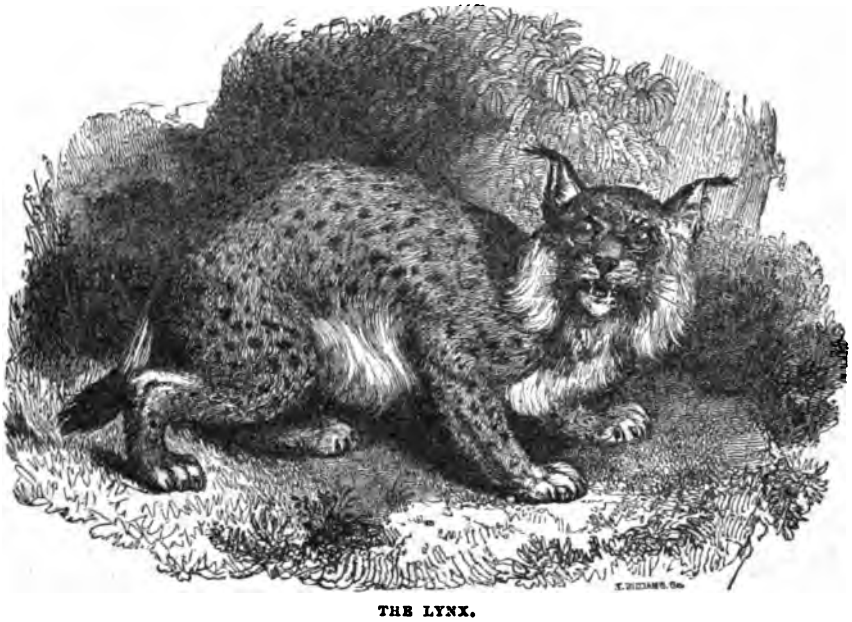
The fondness of the cat for warmth is indulged whenever it can enjoy its favourite place in cold or chilly weather before the fire. There it not only sleeps cozily, but often stretches out its limbs when awake in manifest enjoyment. The same feeling which is there gratified has obtained it many enemies from its nestling, when it can, about infants in beds and

cradles. To suppose that it does so to "suck the breath" of the little one is a vulgar error, which sound knowledge will effectually dispel.

"Playful as a kitten" has become a proverb. The first toy it finds is the tail of its mother, who seems to move it about as she sits or reclines before the fire to amuse her offspring; and as she walks away, the little romp will bound after it, and continue perhaps its gambols in high glee. If set before a looking-glass, a kitten appears surprised and pleased; it makes several attempts to touch its new acquaintance, and, failing to do so, it looks behind the glass, and finding nothing there, seems not a little perplexed. Again it turns to the image of itself, tries to touch it with its foot, looks perhaps again and again suddenly behind the glass, stretches out its paw in various directions as if making experiments; and as the motions are repeated by the figure in the glass, the kitten seems at length to conclude it is a playmate.

THE WILD CAT.

How careful the cat is of her young is matter of common observation; but the following fact cannot fail to interest the reader: — "A lady residing in Glasgow, had a handsome cat sent to her from Edinburgh, in a close basket, which was placed in a carriage. She was carefully watched for two months, but having had two young ones at the end of that time, she was left to herself. It was not long, however, before she disappeared with both her kittens. The lady prizing the cat highly, wrote to her friend in Edinburgh, lamenting the loss of the animal; and, about a fortnight after the cat was missed in Glasgow, her well-known mew was heard at the street-door of her old mistress. There she was with both her kittens,—they looked plump and well, but their mother was extremely thin; and no wonder, when the task she had accomplished is considered. The distance from Glasgow to Edinburgh is forty miles; and as the cat could only carry one kitten at a time, if she brought one of them part of the way, then went back for the other, and thus conveyed them by turns, she must have travelled, at least, one hundred and twenty miles; while her sagacity must have suggested the necessity of journeying in the night, with many other precautions for the safety of her young. Her strong attachment to her former circumstances, is equally remarkable."



THE LYNX.

Of the sagacity of the cat, the following is one among many examples: — At a time when insects, in consequence of the cold, flew low, and swallows were forced to hawk for their prey by skimming the surface of the ground, a wily cat stretched herself on a sunny grass-plot, with her legs extended as if she were dead. The flies in consequence, collected about her, and the swallows not dreaming of any harm, pounced down on the flies, when grimalkin seeing her prey within reach, made a rapid spring, and just when she pleased, struck down with her paws, a poor unsuspecting bird. A good marksman knows how difficult it is to shoot a swallow on the wing; yet the cat, in this curious instance, found her patience, cunning, and activity rewarded.

"To live like cat and dog" is a proverb for a life of ceaseless conflict; but often do these animals live together in peace. The following is a very remarkable case. M. Wenzel says,— "I had a cat and dog, which became so attached to each other, that they would never willingly be asunder. Whenever the dog got any choice morsel of food, he was sure to divide it with his whiskered friend. They always ate socially out of one plate, slept in the same bed, and daily walked out together.

"Wishing to put this apparently sincere friendship to the proof, I one day took the cat by herself into my room, while I

had the dog guarded in another apartment. I entertained the cat in a most sumptuous manner, being desirous to see what sort of a meal she would make without her friend, who had hitherto been her constant table companion. The cat enjoyed the meal with great glee, and seemed to have entirely forgotten the dog. I had had a partridge for dinner, half of which I intended to keep for supper. My wife covered it with a plate, and put it into a cupboard, the door of which she did not lock. The cat left the room, and I walked out on business. My wife, meanwhile, sat at work in an adjoining apartment.

"When I returned home, she related to me the following circumstances:—The cat having hastily left the dining-room, went to the dog, and mewed uncommonly loud, and in different tones of voice; which he from time to time answered with a short bark. They then went both to the door of the room where the cat had dined, and waited till it was opened. One of my children opened the door, and the two friends entered the apartment. The mewing of the cat excited my wife's attention. She rose from her seat, and stepped softly to the door which stood ajar, to observe what was going on. The cat led the dog to the cupboard which contained the partridge, pushed off the plate which covered it, and, taking out my intended supper, laid it before her canine friend, who devoured it greedily. Probably the cat, by her mewing, had given the dog to understand what an excellent meal she had made, and how sorry she was that he had not participated in it; but, at the same time, had given him to understand that something was left for him in the cupboard, and persuaded him to follow her thither. Since that time I have paid particular attention to these animals, and am perfectly convinced that they communicate to each other whatever seems interesting to either."

THE LYNX.

Another animal of the feline race is the lynx, of which we give an engraving. Its ears are terminated with a tuft of hairs invariably black. The names given by the Turks and the Persians to the lynx are founded on this peculiarity. This animal was formerly spread over the Old World, was common in France, and has but recently disappeared from Germany. It is found in Spain, and in the north of the European continent. America certainly produces two species, of which one, the Canadian lynx, is a fine creature.

The aspect of the lynx is rather gentle than savage, and indeed appears to be less ferocious than most of the species of the same genus. It walks and leaps, or bounds like a cat, and hunts martens, ermines, squirrels, and other creatures. Its skin is changed by climate and season, and in high latitudes, particularly in winter, the fur is much finer and thicker, and more esteemed. When of a pale colour, with tolerably distinct spots, the fur is extremely valuable. The Russians sell the skins of lynxes to the Chinese at a rate varying from about sixteen shillings to five or six pounds each, exclusive of the fore-feet, which are also valuable, and sold separately. Many thousand skins of the Canadian lynx have been imported in one year by the Hudson's-bay Company. Among the hunters of America the lynx is called the wild cat.

LESSONS IN LATIN.—No. IX.

By JOHN R. BEARD, D.D.

DEGREES OF COMPARISON.

WHEN two objects are compared together, the ideas involved in the words *more* and *most* come into prominence. Thus we say, "the father is *more* learned than the son;" "Cicero is the *most* learned of the Romans." The question which we have to answer is, how are such forms of thought expressed in the Latin? Observe that at the bottom of *more learned* and *most learned* is the quality *learned*; for no one can be *more learned* or *most learned* without being *learned*. This ground quality is something positive, a real definite quality. Hence in grammar it is called *the positive degree*. It is the first step. A higher step is indicated by our word *more*; and the highest by *most*. You thus see that besides the positive there are two other degrees, of which the one is the higher, and the other the highest of the three. The higher is called *the comparative degree*, and the highest is called *the superlative degree*. Accordingly, there are *three* degrees of comparison, the *positive*, the *comparative*, the *superlative*. It has been denied that the positive is a degree of comparison. The term may not be rigidly correct, but it is in use, and no better substitute has been offered. Our business is not so much to criticise as to explain; and consequently only then must we enter into criticism when it smooths the way to explanation.

Now these three forms of speech which I have just given, stand in Latin, thus:—

Positive	Pater est doctus *Father is learned*
Comparative	Pater est doctior *Father is more learned*
Superlative	Pater est doctissimus *Father is most learned*

Look at the terminations of the adjective. In the first case it is *us*, that is the *positive*, or ordinary form of the adjective. In the second case, it is *ior*, that is the *comparative*. In the third case, it is *issimus*, that is the *superlative*. You thus see that what in the English is expressed by *more* is in Latin expressed by *ior*; and what in the English is expressed by *most* is in Latin expressed by *issimus*. Remember, then, *ior* is the form of comparison, *issimus* is the superlative form. You might thus obtain for yourself the rule, and say that to the stem of the positive add *ior*, and you have the *comparative*; and to the stem of the *positive* add *issimus*, and you have the *superlative*. Such in reality is the rule. These two endings *ior*, m. and f. *ius*, n.; and *issimus*, *a*, *um*, are to be added to the stem of adjectives and participles, in order to convert the *positive* degree into the *comparative* and the *superlative*. I subjoin some instances:—

Positive.	*Comparative.*	*Superlative.*
Laet-*us*, *joyful*	laet-*ior*, *more joyful*	laet-*issimus*, *most joyful*
Pudic-*us*, *modest*	pudic-*ior*, *more modest*	pudic-*issimus*, *most modest*
Imbecill-*us*, *weak*	imbecill-*ior*, *weaker*	imbecill-*issimus*, *weakest*
Lev-*is*, *light*	lev-*ior*, *lighter*	lev-*issimus*, *lightest*
Fertil-*is*, *fruitful*	fertil-*ior*, *more fruitful*	fertil-*issimus*, *most fruitful*
Dives Divit-*is* *rich*	divit-*ior*, *richer*	divit-*issimus*, *richest*
Prudens Prudent-*is* *prudent*	prudent-*ior*, *more prudent*	prudent-*issimus*, *most prudent*
Amans Amant-*is* *loving*	amant-*ior*, *more loving*	amant-*issimus*, *most loving*
Felix Felic-*is* *happy*	felic-*ior*, *happier*	felic-*issimus*, *happiest*

If, however, the adjective ends in *er*, *rimus* is used instead of *issimus*, for the sake of sound; as, miser, *unhappy*, *miserable*; miser-*ior*, *more unhappy*; miser-*rimus*, *most unhappy*; pulcher (pulchr-*i*), *beautiful*; pulchr-*ior*, *more beautiful*; pulcher *rimus*, *most beautiful*. In like manner, vetus (*g.* veter-*is*), *old*; veter-*rimus*, *oldest*; the comparative veter-*ior* is rarely used; also nuper-*us*, *late*; (no comparative;) nuper-*rimus*, *latest*.

The six adjectives which follow, take *limus* in the superlative;—namely, facil-*is*, *easy*; difficil-*is*, *not easy*, *difficult*; simil-*is*, *like*; dissimil-*is*, *unlike*; gracil-*is*, *thin*; humil-*is*, *humble* thus, facil-*limus*, *most easy*; simil-*limus*, *most like*; gracil-*limus*, *most thin*; humil-*limus*, *most humble*. In full, thus:—

Facil-*is*, *easy*; facil-*ior*, *easier*; facil-*limus*, *easiest*; &c.

There are some compound adjectives which form their comparatives and superlatives, by endings different from these. Such adjectives are those which in the positive end in *dicus*, *ficus*, and *volus*; for instance, male*dicus*, magni*ficus*, bene*volus*. I have called these compound adjectives because they are composed each of two words. Maledĭcus is formed from male, *badly (in an evil manner)*, and dico, *I speak*; and consequently denotes an *evil-speaker*; magnĭficus is formed from magnus, *great*, and facio, *I do*; and consequently denotes a *great doer*; benevŏlus is formed from bene, *well*, and volo, *I wish*; and consequently denotes a *well-wisher*. To form the comparative of these, add to the stem *entior*, and to form the superlative, add *entissimus*; thus:—

Positive.	*Comparative.*	*Superlative.*
Maledĭc-*us*, *abusive*	maledĭc-*entior*, *more abusive*	maledĭc-*entissimus*, *most abusive*
Magnĭfic-*us*, *magnificent*	magnifĭc-*entior*, *more magnificent*	magnifĭc-*entissimus*, *most magnificent*
Benevŏl-*us*, *benevolent*	benevol-*entior*, *more benevolent*	benevol-*entissimus*, *most benevolent**

In Latin as well as in English, some adjectives depart from the usual modes of comparison. As we say, positive, *good*; comparative, *better*; superlative, *best*; so the Romans said, *bonus*, good; *melior*, better; *optimus*, best. Carefully learn by heart the following:—

IRREGULAR FORMS OF COMPARISON.

Positive.	*Comparative.*	*Superlative.*
Bonus, *good*	melior, *better*	optimus, *best*
Malus, *bad*	pejor, *worse*	pessimus, *worst*
Magnus, *great*	major, *greater*	maximus, *greatest*
Parvus, *little*	minor, *less*	minimus, *least*
Multus, *much*	plus (n.), *more*; plures (m. and f.); plura (n.)	plurimus, *most*; plurimi, *very many*

Many Latin adjectives do not take any of these forms of comparison. Such are adjectives which have *e* before the termination *us*; as idone-us, *fit*. These are formed by prefixing magis, *more*; and maxime, *most*; as, magis idoneus, *more fit*; maxime idoneus, *most fit*; so, pius, *pious*; magis pius, *more pious*; maxime pius, *most pious*. In the same way, form nearly all adjectives and participles ending in Icus, Imus, inus, Ivus, ĕrus, undus, andus, and bundus.

In the English meanings added to facilis above, I have given the forms *easy*, *easier*, *easiest*. Here you see changes made at the end of the positive, similar to those you have just been instructed to make in the Latin. First, the positive *easy* is changed into *eas*, and then to this, as the stem, we add *er* for the comparative, like the Latin *ior*, and *est* for the superlative, like the Latin *issimus*. This similarity of forms indicates in the two languages a sameness of origin. As too, in English, we use *more* and *most*, so do the Latins use, magis, and maxime, to denote the comparative and the superlative. Magis and maxime must be used for this purpose, in the case of adjectives which do not admit the termination forms.

Besides expressing the formal degree of comparison, the Latin superlative signifies *a very high degree* of the quality involved in the positive, as doctissimus, *very learned*; pater tuus est doctissimus, *thy father is very learned*. So in English, Milton uses wisest—

> "*the wisest heart*
> Of Solomon he led by fraud, to build
> His temple right against the temple of God."

Latin comparatives are declined like adjectives of two terminations, and according to the third declension. Thus, positive altus, *high*, makes comparative altior, *higher*; altior is masculine and feminine, the neuter is altius.

EXAMPLE OF A COMPARATIVE.—DECLENSION III.

	Singular.		*Plural.*		
Cases.	M. F.	N.	*Cases.*	M. F.	N.
Nom.	altior	altius	Nom.	altiŏres	altiŏra
Gen.	altiŏris		Gen.	altiorum	
Dat.	altiŏri		Dat.	altiŏribus	
Acc.	altiŏrem	altius	Acc.	altiŏres	altiŏra
Voc.	altior	altius	Voc.	altiŏres	altiŏra
Abl.	altiŏre (i)		Abl.	altiŏribus	

VOCABULARY.

Beneficentia, ae, f. *well doing, kind action* (E. R. *beneficence*); luna, ae, f. *the moon* (E. R. *lunar*); pauper, paupĕris, *a poor man* (E. R. *pauper*); natura, ae, f. *nature*; sapientia, ae, f. *wisdom* (E. R. *sapient*); odium i, n *hatred* (E. R. *odious*); amor, ōris, m. *love* (E. R. *amorous*); hirundo, hirundĭnis, f *a swallow*; Lacedemonius, i, m. *a Lacedemonian*; simplex, simplĭcis, *simple*; mos, moris, m. *custom*; in the plural, *character* (E. R. *morals*); velox, velŏcis, *swift* (E. R. *velocity*); corvus, i, m. *a raven*; niger, nigra, nigrum, *black* (E. R. *negro*); simia, ae, f. *an ape*; Syracusae, arum, f. *Syracuse*; murus, i, m. *a wall* (E. R. *mural*); Homērus, i, m. *Homer*; labor, ōris, m. *labour*; adulatio, ōnis, f. *flattery* (E. R. *adulation*); similitudo, inis, *likeness* (E. R. *similitude*); crus, cruris, n. *the leg* (from the knee to the ankle); beatus, a, um, *happy*; benefĭcus, *well doing, beneficent*; celeber, bris, bre, *sought after, visited* (E. R. *celebrity*); brevis, e, *short* (E. R. *brevity*); valeo 2, *I am strong, I am worth* (E. R. *valid*); contemno 3, *despise, contemn*; affinitas, ātis, f. *relationship* (E. R. *affinity*); liberalitas, atis, f. *liberality*; lux, lucis, f. *light*; ratio, ōnis, f. *reason* (E. R. *ratio*); simulatio, ōnis, f. *simulation, pretence, hypocrisy*; sol, solis, m. *the sun* (E. R. *solar*); sonitus, ūs, m. *a sound*; accommodātus, a, um, *suited* (E. R. *accommodate, commodious*); garrulus, a, um, *talkative* (E. R. *garrulity*); munificus, a, um, *free in giving, liberal* (E. R. *munificent*); secundus, a, um, *favourable* (E. R. *to second*); res secundae, *favourable things*, that is, *good fortune*; amabilis, e, *worthy to be loved* (E. R. *amiable*); nihil (not declined), *nothing*; quam, conj. *than*; non nunquam, adv. *sometimes*.

EXERCISES.—LATIN-ENGLISH.

Nihil est naturae hominis accommodatius quam beneficentia; nihil est amabilius quam virtus; lux est velocior quam sonitus; nihil est melius quam sapientia; multi homines magis garruli sunt quam hirundines; pauperes saepe sunt munificentiores quam divites; in adversis rebus saepe sunt homines prudentiores quam in secundis; divitissimorum vita saepe est miserrima; simulatio amoris pejor est quam odium; nihil est melius quam ratio; sol major est quam terra; luna minor est quam terra; omnium beatissimus est sapiens; Homērus omnium Graecarum poetarum et veterrimus; adulatio est pessimum malum (*evil*); urbs Syracusae maxima et pulcherrima est omnium Graecarum urbium; pessimi homines sunt maledici; omnium hominum maledicentissimi sunt fratres tui; in amicitia plus valet similitudo morum quam affinitas soror tua amabilior est quam mea.

ENGLISH-LATIN.

Nothing is worse than the pretence of love; the sun is very great; the sun is greater than the moon; the life of man is very short; the richest are often the unhappiest; the poorest are sometimes the happiest; the labour is very easy; my labour is easier than yours; the customs (character) of men are very unlike; the king is very free in giving; the worst men are not often happy, good men are happy; very good men are happiest; God is the happiest of all; the best men are sometimes despised by the worst; the health of my friend is very weak; thy father's garden is very beautiful; thy son's garden is more beautiful; the labour is very difficult; the walls of the city are very low (humilis); most (plurimi) men love their native country; nothing is better than virtue; the port is very much visited; God is the greatest, best, and wisest of all; the customs (or character) of the Lacedemonians were very simple; the horse is very swift; ravens are very black; thy father is very benevolent and very liberal; thy brother builds a very beautiful house; a very beautiful house is built by my brother; virgins must (debeo) be very modest; thy sister is more modest than thy brother; the ape is like men; is the ape very much like men? of all animals the ape is most like men; nothing is sweeter than friendship; the Lacedemonians were very brave; light is very quick; light is quicker than sound.

LESSONS IN BOTANY.—No. V.

"I SHOULD like to botanise," is the expression of a wish which we are concerned to gratify. We shall glance, therefore, at systematic botany, by which alone the discrimination or recognition of a plant can be secured. Without such ability, even a knowledge of the properties of the vegetable tribes would be of little or no use. For want of this acquaintance with them, persons have lost their lives by mistaking noxious and poisonous plants for wholesome herbs; and others have administered what they deemed to be salutary and restoring medicines, but which have proved to be deadly poison. It will consequently be evident that the study of systematic botany is one of great utility, associated with objects of peculiar interest.

Some persons may anticipate difficulty from observing the hard and outlandish names employed in botany; but it should be remembered that this science is not the study of names but of an admirable and most important branch of the economy of nature; and even the use of a hard name does not necessarily imply that the thing itself is difficult to be understood. *Aloysia citriodora* is a hard name, yet multitudes who would consider it to be so are well acquainted with the shrub to which it is applied—the sweet-scented verbena; and

* These comparatives and superlatives are evidently formed in the regular way, from such nouns as *maledicens*, *magnificens*, and *benevolens*, two of which, at least, are in use in the language, and have the same meaning as the other *positives* above given.

the *Jasminum officinale* is nothing more than that sweetly fragrant flower the common white jessamine, under another appellation.

When the use of spring-guns became illegal, a gentleman who wished to protect his trees and flowers had a board placed in his garden, with the inscription "Terroflokaibloudomenoi set on these premises;" and by the awful length and mysterious appearance of this word, kept off many an intruder. And yet, after all, it meant nothing. Not so is it with the terms adopted by men of true science; they mean something, and generally the meaning is well worth having. Dicotyledon or Monocotyledon is a term of somewhat formidable aspect; but the reader who has observed the explanation given of it in Lesson No. I., has an idea as well as a name, and the means of understanding and of making an important distinction in the structure of plants.

Among the reasons for the use of such names in Botany, one may be stated. The words of some language or other must become current, and hence the question has arisen, which shall it be? Suppose it to be French, or German, or Spanish, or Portuguese, it is evident that to the many it would remain an unknown tongue. But the Latin and Greek languages are employed in this and some other sciences, that the same appellations of plants may be recognised by students of different nations, and that they may be able to read the works written on these subjects without the trouble and expense of translating and printing in a variety of languages. We shall not make any further demand in this respect on our readers than is absolutely necessary; but we wish them all to remember that the power of acquiring words apparently hard, is generally increased in proportion as it is tasked, and that an effort which, at first sight, looks as it were impracticable, becomes, after due repetition, perfectly easy. Many a working gardener, if asked, could give them such a string of apparently difficult names of plants and flowers, which it is absolutely necessary for him to know, as would leave this fact beyond all possible dispute.

Two names are especially prominent in connexion with systematic botany; they are those of Linnæus and Jussieu. Linnæus, a native of Sweden, who flourished about a century ago, was the first person who facilitated the study of plants by anything deserving the name of a system. He founded his arrangement on the *structure of the flowers*. Jussieu took another basis for the system of which he is the father, involving a more minute and difficult investigation. Each system takes the name of its founder, and is called the *Linnæan* or *Jussieuan*; but frequently the former is described as the *artificial* and the latter as the *natural* system. We do not enter on a criticism of the respective merits of the two, but simply state that we shall adopt the classification of Linnæus in preference to that of Jussieu, as the better adapted to our present purpose, as likely to be more acceptable and attainable, and also as equally useful to those for whom the present series of botanical lessons is designed.

We have already described those two important parts of a flower, the *stamen* and the *pistil* (see Lesson No. II.), and with these it becomes the student to have a thorough acquaintance, as upon some circumstances connected with them Linnæus founded *twenty-four* classes or divisions, in one of which every individual of the thousands of plants in the vegetable kingdom may be placed. That the system is complete it were absurd to contend. "For a long time," says the great Swedish botanist, "I have laboured to establish it; I have made many discoveries, but I have not been able to perfect it; yet while I live I shall continue to labour for its completion. In the mean time I have published what I have been able to discover; and whosoever shall resolve the few plants which still remain shall be my Magnus Apollo. Those are the greatest botanists who are able to correct, augment, and perfect this method, which those who are unqualified should not attempt." Linnæus did well, but that much remained for others to do is evident when we know that the number of species with which he was acquainted was probably not an eighth of those with which botanists are now familiar.

The reader will observe that we now enter on a course in which the letters *andria* will form a principal part of several words, and no difficulty whatever will be felt if it be remembered that literally meaning *male*, it stands in this instance for a *stamen*, or stamens; and that the other letters connected with it are nothing more than indicative of successive numbers; as *monandria*, *one* stamen, *triandria*, *three* stamens, &c. A knowledge of this will carry us through eleven classes of the Linnæan system.

The classes, it must also be remarked, are subdivided into *orders*, in denoting which the termination *gynia* is of frequent occurrence. Literally, it means *female*, but it stands, in this instance, for a *pistil*; while the preceding part of the word, as *monogynia*, *digynia*, or *trigynia* is formed exactly in the way just noticed, by adding, in each case, the name of a number.

There are some persons,

"Who *allium* call their onions and their leeks;"

but we are not of that number. We prefer the simple English names of plants, and shall generally use them. Many of these are connected with old times and customs; and often do they convey some idea of the uses of the plants to which they are given.

CLASS I.—MONANDRIA.

Plants bearing flowers with *One* Stamen only.

Order I. Monogynia. *One Pistil.*

Of this kind our ditches and muddy ponds produce one example that may be easily procured. It is called mare's-tail, and has neither calyx nor blossom. Its single stamen is terminated by an *anther* slightly cloven, behind which is the pistil, with its awl-shaped *stigma*, tapering to a point. The stem is straight and jointed, and the leaves grow in *whorls*, or circles round the joints; at the base of each leaf is a flower, so that the number of flowers and leaves is equal. Its season of flowering is the month of May.

Order II. Digynia. *Two Pistils.*

Three British annual plants, known by the name of the water starwort. They have two petals, curved inwards, but no calyx. They are scientifically called *callitriche*, from two Greek words meaning beautiful hair.

CLASS II.—DIANDRIA.

Plants bearing flowers with *Two* Stamens.

Order I. Monogynia. *One Pistil.*

The privet is a shrub well known in the hedges in many parts of England, and when mixed with others it makes a pleasing variety in our gardens. It bears a white blossom,

Germander Speedwell.

and generally flowers in June. A single petal forms its corolla or blossom, which is funnel-shaped. The leaves grow in

pairs, and are sometimes variegated with stripes of yellow or white. The berries have been used by dyers to give a durable green colour to silk or wool by the addition of alum.

Foremost of the flowers which grace the hedge-bank in April is the germander speedwell, sometimes called cat's-eye, and eye-bright. Thus Ebenezer Elliott says,—

"Blue eyebright! loveliest flower of all that grow
In flower-loved England! Flower whose hedge-side gaze
Is like an infant's! What heart does not know
Thee, clustered smiler of the bank, where plays
The sunbeam on the emerald snake, and strays
The dazzling rill, companion of the road."

The notched leaves of this plant, in shape not unlike the leaves of a rose, but growing opposite to each other on the stem, sufficiently mark this species. We have in our fields, woods, and hedges, thirteen species of the speedwell, but only the germander with three other kinds bloom in April. The rest bloom from spring to autumn. The ash, the duck-weeds, and the sages belong to the same order.

ORDER II. DIGYNIA. *Two Pistils.*

The sweet-scented spring-grass. It has a spiked panicle, and flowers on short stalks. It flowers in May; grows in pastures and meadows, and is about a foot high. This plant is a true grass, but is separated on account of its having only two stamens. The pleasant smell of new-made hay is chiefly owing to this plant.

CLASS III.—TRIANDRIA.

Plants bearing flowers with *Three* Stamens.

ORDER I. MONOGYNIA. *One Pistil.*

The crocus, having six equal segments, resembling petals, which blossoms in spring. Another plant is known as the autumnal crocus.

The valerian, a numerous species of shrubs or under-shrubs, with very variable leaves, and mostly reddish-white flowers. Twelve species are European, and four are British. The officinal, or great wild valerian, grows abundantly by the sides of rivers, and in ditches, and moist woods, in Great Britain. The root has a very strong smell, which arises from a volatile oil. It is used by rat-catchers to destroy rats. It is also employed in medicine, in the form of infusion, decoction, and tincture.

The yellow iris is a beautiful flower in June. It is often called flag-sedge, and corn-flag, and in Scotland is named water-skeggs. Many people in rural districts value its long acrid root as a cure for the toothache. It is also used for dyeing a black colour, and for making ink. This flower is sometimes found in moist woods. The common purple iris is the *fleur de luce*, and it derives its name from Louis VII., king of France, who, when setting forth on his crusade to the Holy Land, chose it as his heraldic emblem.

ORDER II. DIGYNIA. *Two Pistils.*

The grasses and the corn-plants, which were described in Lesson IV.

ORDER III. TRIGYNIA. *Three Pistils.*

The water chickweed; the jagged chickweed; the allseed.

LESSONS IN GEOGRAPHY.—No. II.

NOTIONS OF THE PORTS.

HOMER who wrote his poems in the tenth century before the Christian era, appears to have been acquainted with Greece, the Archipelago, the island of Crete, and the coast of Asia on the shores of the Mediterranean. Within these limits, he appears to have travelled; and he was, no doubt, personally acquainted with some of the scenes which he describes. His works, however, show that the geographical knowledge of the Greeks was at that time more limited than that of the Egyptians in the time of Moses, who lived seven centuries before him. On the south, the Greeks only knew the valley of the Nile, and that part of Africa which extends from Egypt to the west as far as Cape Bon, and the commencement of the Atlas chain of mountains; and, on the east, the Syrian desert, Asia Minor, Mesopotamia, and Persia. They possessed only very confused notions of the Adriatic Sea, of Sicily, and of the south of Italy; and with the greater part of the Italian peninsula, they were wholly unacquainted.

Previous to the Homeric epoch, the Greeks believed in the existence of nations who inhabited the countries situated behind the regions where the sun appeared to them to rise and to set. They imagined that these nations lived in perpetual darkness, and they called them *Cimmerians*, a word evidently derived from the Hebrew *Cimeririm* (pronounced *Kimerim*, and signifying *darkness*. In proportion as they became acquainted with more regions that were enlightened by the sun (that is, as the limits of the known world were extended by voyage and discovery,) they transported the Cimmerians and their dark abodes to a greater distance. In those early times the Cimmerians were supposed to inhabit the borders of the Black Sea, near the Thracian Bosphorus, in Italy, and on the east and west, where the world was supposed to terminate. The people who were supposed to live the farthest north, were called *Hyperboreans*, because they were placed *beyond Boreas*, or *in the extreme north*; and those who lived the farthest south were called *Ethiopians*,—literally, *sunburnt*,—because they were situated more directly under the sun's rays; their country lay south of Egypt, and was afterwards called *Æthiopia sub Ægypto*, or *Ethiopia under Egypt*; under, evidently signifying farther to the south than the latter country. The ancients generally believed that Africa and Asia, or rather Ethiopia and India, were united by land still farther to the south; and they consequently considered the Ethiopians and Indians as near neighbours. This is the ground on which both Virgil and Lucan have supposed the Nile to take its rise in the frontiers of India.

At the Homeric epoch the Greeks generally considered that the earth existed in the form of a disk. This disk was supposed to be centrally divided by the Euxine, or Black Sea, the Ægean, and the Mediterranean into two parts, the one north and the other south; these parts were at a later period designated by Anaximander under the names of *Europe* and *Asia*, names which had been previously understood in a more restricted sense. The river Phasis in Colchis, or Pontus, on the east, and the straits of Hercules, or Gibraltar, on the west, were supposed to mark the limits of the world. The country of the *Cimmerians*, who were afterwards confounded with the Cimbri; and of the *Macrobians*, so called because they were supposed to be longer-lived than other mortals; *Elysium*, a happy country which had no existence but in the fantasies of the mind; the *Fortunate Isles*, which at a later period, under the names of *Atlantis* and *Meropis*, were the object of the philosophic fictions of Plato and Theopompus; the country of the *Arimaspi*, who saw so clearly because they had only one eye, and of the *Gryphons*, who guarded the precious metals of the *Riphean* mountains; *Colchis*, the country of magic, peopled with monsters and prodigies; all these and many other ingenious fables, the offspring of the imaginations of the poets Homer and Hesiod, or rather of the people among whom they lived, were mixed up with notions purely geographical, and constituted the world at that period a scene of marvels, a receptacle of agreeable delusions and formidable mysteries.

During the historic ages of Greece, cosmological systems were multiplied to an endless extent. Thales said that the earth was a sphere; his disciple Anaximander taught that it was a cylinder. Leucippus said that it was a drum, and Heraclides that it was a boat. Many and curious were the notions the ancient philosophers held concerning the globe until voyages of discovery were begun. Herodotus made a great step in the descriptive geography of certain regions, especially in the east of Europe. Yet, notwithstanding his voyages into the three parts of the old world, he fills his narrative with childish tales and dreamy details. He only knew the names of Arabia, Iberia (or Spain), Celtica (or Gaul), the islands of Albion (Great Britain), and the Cassiterides (or Scilly Isles). He had correct notions on Africa, and particularly on Egypt, but the western part of this continent was unknown to him beyond Tripoli. His details on India, besides their uncertainty, are intermingled with fables taken from the legends or popular creeds of the extreme East. Among the tales more or less ingenious, we must not forget the ants that were as large as foxes, and that collected heaps of gold mixed with sand!

Herodotus appears to have been unacquainted with western Europe. He does not speak of Massilia (Marseilles), a city

founded by the Phocians a century before he was born. Rome, which had been increasing in grandeur for about three hundred years before his time, is not even mentioned by name. Of Italy he only knew the south of that part anciently called Magna Græcia. The extreme west of Africa was equally unknown to the Greeks. Yet the Phenicians had made discoveries in the Atlantic Ocean, and the *periplus* (*sailing round*) or coasting voyage of Hanno was executed considerably before Herodotus. The African voyage of the Carthaginian admiral, with the thirty-thousand persons which he had on board his vessels, is acknowledged to be authentic; opinions only differ as to the point where his maritime course terminated. Some will have it that, after having cleared the pillars of Hercules (the Straits of Gibraltar), he went as far as the Gulf of Guinea; while others limit his exploratory voyage to the mouth of the Senegal river. Gossellin fixes the limit at Cape Nun.

Pytheas, a citizen of Marseilles, performed a voyage to the North, before the time of Alexander the Great. He discovered Albion, or Great Britain, and always sailing in a northern direction, he reached the mysterious place called *Ultima Thule*, which he saw covered with ice, enveloped in mist, and as it were immersed in a horrible chaos. But what was *Thule*? This is a question which has puzzled all historians and geographers. Some have considered with good reason that this country was *Jutland* or the coasts of Norway called *Thulemark*; or perhaps Iceland, as Pytheas sailed through the Scandinavian seas, and his remarks relating to the coasts of the Baltic have been acknowledged exact. Others have claimed this appellation for the Shetland Isles on the north of Scotland.

Aristotle, the great Greek philosopher and naturalist, maintained that the earth was of a spherical form, and he even stated the measure of its circumference at four hundred thousand *stadia* (a Greek itinerary measure, equal to about 600 feet). Indications of the existence of *Madagascar* have been noticed in his writings. As to *Ceylon*, he mentions it under the name of *Taprobane*, and that a long time before the age of Ptolemy. The limits of the world according to Aristotle were, on the east, the Indus; on the west, the Tartessus, or the Guadalquivir; on the north, the Riphæan mountains, Albion and Ierne (Ireland); on the south, Libya, in which he places the river Chremetes, which rises out of the same mountains as the Nile, in order to disembogue itself in the Atlantic ocean; an idea which leads to the supposition that he confounded the Nile with the Niger. He admitted that the Caspian sea was a great inland lake, having no communication with any other sea.

The conquests of Alexander the Great, led to the most distinct and extended motions of the ancient world. The most remarkable geographical fact of his reign, was the exploration of the Indus. A fleet of 800 vessels, under the command of Nearchus, descended this river, and went along the coast of Asia to the bottom of the Persian Gulf. The expedition of Alexander opened the eyes of the Greeks, but produced at that time, no results of any consequence to the science of geography. What was gained by his exploratory voyage, was lost by the dismemberment of his empire; and the historians of the period relapsed into their former ignorance.

By degrees, however, geography assumed the dignity of a science. Eratosthenes, who flourished in the second century before the Christian era, composed a treatise on the subject. He was a native of Cyrene in Africa, and the keeper of the Alexandrian library. By means of instruments erected in the museum of the city of Alexandria, he found the obliquity of the ecliptic, to within half a degree of the truth. He was the first who attempted to determine the circumference of the earth by the actual measurement of an arc of one of its great circles. By means of sun-dials, he found that Syene, near a cataract of the Nile, which was situated, as he thought, on the same meridian as Alexandria, was immediately under the tropic of Cancer, so that at the time of the summer solstice, the sun was vertical to the inhabitants of Syene, and the gnomon had no shadow at noon. Thus, having measured the angle of the shadow of the gnomon at Alexandria, also at the time of the summer solstice, he found the distance of the sun from the zenith at noon, to be 7° 12′, or one-fiftieth part of the circumference of a great circle, viz. 360°. He then computed the distance between the two places, Alexandria and Syene, and found it 5,000 stadia. Accordingly, he multiplied this number by 50, and found the measure of the earth's circumference to be 250,000 stadia. Making allowance for the errors which he committed, for want of the delicate instruments of observation, which we possess in modern times, this was a tolerable approximation to the truth. Syene, indeed, was not on the same meridian as Alexandria, but on one nearly 3° east of the meridian of that city; and instead of being exactly on the tropic, it was about half a degree north of that line. Eratosthenes affirmed the spherical figure of the earth, and asserted that the immensity of the ocean would not prevent vessels from going to India by continually shaping their course westward.

Hipparchus, who flourished about sixty years later than Eratosthenes, laid the foundation of astronomical geography, by endeavouring to determine the latitudes and longitudes of places by observations on the heavenly bodies. He constructed a catalogue of the fixed stars, and taught the projection of the sphere on a plane surface. Agatharchides, president of the Alexandrian library, who flourished rather before Hipparchus, wrote a treatise on the navigation and commerce of the Red Sea, and an account of Egypt and Ethiopia. He was the first who gave a correct description of the Abyssinians; he mentions the gold-mines wrought by the ancient kings of Egypt on the coast of the Red Sea, the process of working them, and the sufferings of the miners. He speaks, also, of the tools of copper found in these mines, supposed to have been used by the native Egyptians before the conquest of that country by the Persians. The voyages of Eudoxus of Cyzicus added new information to what was already gained respecting the East. He visited Egypt in the reign of Ptolemy Evergetes, about 130 B.C. He made two voyages to India, and afterwards accomplished the circumnavigation of the African continent. Strabo, who gives an account of his voyages and discoveries, attempts repeatedly to throw discredit on the truth of his statements; but they have been confirmed by those of later times.

Questions on the preceding and former Lesson.

What is Geography? How many kinds of information respecting the earth does it include? What is the form of the earth? What proportion does the highest mountain on its surface bear to its diameter? Had the ancients any proper knowledge of its form? What appearance does the surface of the earth present to the human view taken on the most extended scale? What appearance do the heavens present? State some of the natural notions which mankind form respecting the heavens and the earth.

What were the early notions of the Hebrews regarding the structure of the earth and the heavens? Where are we to look for the origin of geographical knowledge? To what source are we indebted for the earliest account of the known divisions of the world? What were the geographical boundaries alluded to by Ezekiel, as referring to the farthest limits of that knowledge in his day?

What country is considered to be referred to in Scripture under the name of Tarshish? What country did the Romans understand under the name *Africa Propria*? What were the two different voyages to Tarshish, and how are they comprehended under the same name? What country is understood by the name Ophir? How was gold transported from Ophir to Jerusalem?

What countries are understood by the names, the Isles, the Isles of the Gentiles, the Isles of the Sea, &c.? What country was known by the name of Sheba? What by Dedan? To what river were the names of *the river* and *the great river* applied? What famous cities and empires flourished on the banks of this river? With what countries did they trade? What is meant by *the north* in Scripture? What were its products mentioned by Ezekiel?

With what parts of the world were the Greeks acquainted in the time of Homer, as appears by his writings? What notions had they of the world previous to his epoch? Who were the Cimmerians? the Hyperboreans? the Ethiopians? and the Marobians? What country was Elysium? the Fortunate Isles? and Colchis? Who were the Arimaspi? and the Gryphons?

What notions regarding the form of the earth had the later Greeks? With what countries was Herodotus acquainted? What cities were in existence unknown to him? Who first made discoveries in the Atlantic Ocean? What is meant by the *Periplus* of Hanno? What were the discoveries of Pytheas of Marseilles? In what did the geographical knowledge of Aristotle consist? What addition did the conquests of Alexander make to the science of

geography? When did it assume the dignity of a science, and who wrote a treatise on the subject? How did Eratosthenes ascertain the approximate circumference of the earth? Who laid the foundation of astronomical geography? Who gave the best account in early times of Egypt, Ethiopia, and Abyssinia? Who made the first voyages to India from Egypt, and circumnavigated Africa?

IMAGINARY QUANTITIES.

A VERY ingenious and useful work on Algebra has just been put into our hands, written by J. R. Young, Esq., late Professor of Mathematics in the Royal Academical Institution, Belfast. In order to enable our more advanced readers to form some opinion of its merit, as an Elementary work, we give the following extract:—

"Imaginary or impossible quantities, are those expressions which indicate an *even* root of a *negative* quantity; the arithmetical extraction of such a root being almost an impossibility, because no even power of any number, whether positive or negative, can ever be negative. Imaginary quantities thus differ essentially from other surd expressions; the root indicated in each of these latter cannot be accurately exhibited, solely because the quantity under the radical sign differs from a complete power; yet a complete power may always be assigned which shall differ from the incomplete one by a quantity less than any that can be proposed, so that the defect mentioned is never of any practical consequence. But an imaginary quantity admits of no arithmetical representation either accurately or approximately: the bare idea of arithmetical value is altogether excluded from it; the symbol $\sqrt{-4}$ implies an operation upon the -4 of impossible performance; so that if such a symbol were to occur in the answer to any question, we should at once conclude that the solution to that question, in real numbers, is an impossibility; and, consequently, that the conditions to be satisfied are incompatible or contradictory. Imaginary quantities thus subserve a very important purpose: whenever they present themselves as here supposed, they effectually apprise us of concealed absurdities among the conditions upon which our reasoning has been based, or which we are aiming to satisfy, and which might otherwise involve us in bewilderment or error. They are thus necessary to give completeness and certainty to our algebraic results, and on these grounds alone are valuable items in our system of symbols. But independently of this office of imaginary quantities, by which they inform us of the fact when the solution of a question is impossible, algebraists turn them to important account as direct instruments of investigation; frequently introducing them with great advantage into inquiries having reference only to real quantities, and terminating only in real results.

"In his first steps in the study of algebra, the learner naturally looks upon the new symbols of quantity to which he is introduced as nothing more than the familiar figures of arithmetic in disguise. It is not easy, nor would it be prudent to correct this too limited notion at the outset; the more comprehensive scope of the symbolic language of algebra gradually unfolds itself to him as he proceeds, till he at length comes to combine his characters and contract his expressions without any thought towards the numerical processes bearing the same names as those which enter into his symbolical combination. In fact, the important truth discovers itself by degrees, that the thing called algebra is a science in which symbols of any interpretation whatever are subjected to certain prescribed laws of combination, in obedience to which various operations may be performed and various results obtained without any reference to the particular characters of arithmetic. This latter science is no doubt suggestive of the symbolical science of algebra; and the learner sufficiently sees that its laws of combination actually become those of arithmetic, when the particular symbols of the latter replace the more general symbols of the former. In fact, he further sees that, till these general symbols are so replaced by those of arithmetic, many of the so-called operations of algebra are but operations *indicated*, not operations *executed*. If we have to multiply a by b, we write ab or $a \times b$, and say that the thing is done; although, in truth, nothing is *done*, although something, by the sign of operation, is *enacted*; we have no idea of the actual performance except each symbol, or the multiplier at least, be interpreted by a number; yet if the so-called product ab is to be divided by b, there is no doubt that the result is a, *whatever* the multiplier b may have been: whether a number or something having no arithmetical meaning. It is true that in the latter case the term 'multiplier' might be objected to as not sufficiently significant, but a similar objection might be made to nearly every term introduced from arithmetic into algebra: the terms have a more comprehensive meaning as well as the symbols

"In the instance just adduced, namely $\frac{ab}{b} = a$, an operation is apparently performed on pure symbols irrespective of all interpretation; yet if we really look at what has actually been done, we shall see that it amounts to nothing: when b is written by the side of a a certain operation, called multiplication by b, is directed to be performed on a; except b be a number, we cannot obey this direction; but by writing b underneath, the direction is recalled, so that a, which would be the result of the operations of multiplication and division in arithmetic, is here written down free of those operations, because they neutralise one another: their common effect being to leave a untouched. It is not necessary that we should be able to assign the effect of the combination ab and that the effect upon this of the combination $\frac{ab}{b}$; it is enough that we know, from the general laws of these combinations, that the second destroys the first and sets a free.

"It is more especially this recognition of the neutralising influence of certain algebraic combinations on one another, apart from all mere arithmetical considerations, that renders what are here called impossible or imaginary quantities so available in algebra as instruments of investigation, though not admissible into arithmetic. $\frac{ab}{b} = a$, whether b be real or imaginary."

GLOSSARY.

MOST of our writers have aimed at plainness and clearness of expression. A few words may need explanation. Let it be remembered, however, that we do not wish to save our readers the trouble of thinking; and also that many technical terms can be better explained by their connexion with the subject than by any brief definition. Several words which occur in this part are explained in the Glossary in No. 5, page 78.

s., substantive; *s.pl.*, substantive plural; *v.a.*, verb active; *v.n.*, verb neuter; *a.*, adjective.

ABSOR'PTION, *s.* the act of swallowing up, or imbibing.
APPELLATION, *s.* a name, title, term.
APPRE'CIATE, *v.a.* to estimate, to value.
ARBITRA'TION, *s.* the settlement of any dispute by persons mutually chosen by the parties.
APPA'LLING, *a.* frightful, terrifying.
AUTOM'ATON, *s.* a machine which has apparently the power of moving itself.
BRACK'ISH, *a.* saltish, like sea-water.
CAR'DINAL, *a.* principal, chief, eminent.
CATAS'TROPHE, *s.* a final event, generally of an unhappy character.
CONCUS'SION, *s.* the act of shaking; a shock.
COR'OLLARY, *s.* an inference, a deduction, surplus.
DISCRIMIN'ATION, *s.* a distinction; act of distinguishing one thing from another; a mark.
DOCI'LITY, *s.* aptness to be taught; teachableness.
ELUCIDA'TION, *s.* an explanation, or exposition.
EMER'GE, *v.n.* to rise out of, to issue from.
EQUA'TOR, *s.* a great circle, equally distant from the poles of the world, dividing the globe into equal parts, north and south.
EXPIRA'TION, *s.* the act of breathing out; an end; death.
FERO'CIOUS, *a.* savage, fierce, cruel, rapacious.
FRIVO'LITY, *s.* unimportance. FRI'VOLOUS, *a.*, slight, trifling of no moment.
GERMINA'TION, *s.* the act of sprouting; growth.
IMPREG'NATE, *v.a.* to make prolific, or fruitful.
IN'DICATE, *v.a.* to point out, to show.
INSPIRA'TION, *s.* a drawing in of the breath; an infusing of supernatural ideas.
INUNDA'TION, *s.* an overflow of water; a deluge.
JUN'GLE, *s.* land overgrown with trees, brushwood, and rank vegetation.
MAGNAN'IMOUS, *a.* great minded, brave.
MAM'ALUKE, or MAM'ELUC, *s.* an Egyptian horse-soldier.
MER'CENARY, *s.* a hireling:—*a.* selfish, base.
PHENOM'ENON, *s.* a natural appearance; also any extraordinary appearance in the works of nature.
PH is sounded as *F* in such words as *Ph*enicia, *Ph*rygian, Sp*h*inx, &c.; thus, *F*enicia, *F*rygian, Sp*h*inx, &c.
PRECA'RIOUS, *a.* uncertain, dependant.
PRECI'SION, *s.* exact limitation, great nicety.
PRECUR'SOR, *s.* a forerunner, a harbinger.
PROB'LEM, *s.* a question proposed for solution or explanation.
PROTU'BERANCE, *s.* a swelling above the rest.
PROTRU'SION, *s.* the act of thrusting forward.

PSAMMA'TICUS, PTOL'EMY:—in all words beginning with *Ps* or *Pt*, the *P* is silent; pronounced *Sam*meticus, *T*olemy.

RECEP'TACLE, *s.* a place to receive things in.

RECOGNI'TION, *s.* an acknowledgment.

RESPIRA'TION, *s.* the act of breathing; relief by breathing.

SAL'UTARY, *a.* wholesome, healthful, safe.

STA'DIUM, *s.* a race-course; a space for combatants; also, the eighth part of a Roman mile.

TAL'ENT, *s.* a certain weight or sum; the Jewish talent was 125 pounds in *weight*; a talent of *gold* was worth £5,475; a talent of silver, £375 6s.

TEMR'ITY, *s.* rashness, unreasonable contempt of danger.

THE'OREM, *s.* a position laid down as an established truth; a given principle.

TRANSMIGRA'TION, *s.* a passage from one state, place, or body, into another. The philosopher Pythagoras, and his followers, believed that when a man died his soul passed into other bodies, including those of brute beasts. He pretended that *his* soul had lived in the bodies of several persons of preceding ages, whom he specified by name.

TROU'BADOUR, *s.* a poet, or travelling minstrel.

UNDULA'TION, *s.* a rising and falling motion, like that of the waves.

VOCAB'ULARY, *s.* a small dictionary, or list of words with explanations of their meaning.

ZOOLO'GICAL, *a.* describing living creatures; pertaining to animals.

CORRESPONDENCE.

LEEDS CO-INSTRUCTION SOCIETY.

MR. S. VESLEY, of Kirkgate, Leeds, on behalf of *Call-lane Mutual Improvement and Phonetic Society*, most of whose members are subscribers to this work, writes to inform us, that as soon as our periodical was announced, they all determined to profit by its lessons, and to study them as we should see fit to give them out. He states that they have not been disappointed, but on the contrary highly gratified with our attempt to place at so reasonable a price, such valuable information within the reach of all. They have now a room adjoining Call-lane Chapel, Leeds, capable of accommodating about 100 persons, and by paying one penny per week, they are able to meet all expenses, and purchase the periodicals which are published at this office, and about a dozen others. They meet every Monday, Tuesday, Wednesday, and Friday evenings, at eight o'clock, and close at half-past nine; on each evening they have writing, arithmetic, &c.; they have also a grammar class, taught by Mr. Elisha Waite, on the plan and from the pages of the EDUCATOR; and a phonographic class on Wednesday evenings, under the care of our correspondent; while the other branches are under the care of Mr. Daniel Rider, cloth merchant, of the same town; and the Rev. Jabez Tunnicliffe is their president. We are requested to give these statements in the POPULAR EDUCATOR, as it is believed that there are a number of our subscribers in the town who would be glad to join the society if they knew of its existence; and thus to increase its efficiency, by enabling it to employ able teachers for the different departments, which may appear in this work. The increase in the number of its members, would also enable the society to form themselves into classes for the study of those branches which would be most useful to them in their different employments, as they are fully aware of the advantages to be derived from union and co-operation. The society has not mustered a library of books yet, but this is in progress.

To the Editor.

DEAR SIR,—I am much pleased to observe the success which is attending your labours in connexion with the POPULAR EDUCATOR, and am further gratified to observe that you propose to make arrangements for the delivery of Penny Lectures to the working classes, on the various subjects which are treated upon in the EDUCATOR. I think this suggestion a very valuable one, and likely to be greatly conducive to the elevation of the working classes. I am much accustomed to lecture to working men on various topics, such, for example, as phonography, temperance, electricity, astronomy, physiology, &c., and will be very glad to do as much as I possibly can to forward your scheme in this locality.

By the way, will you oblige by giving in your answers to correspondents some explanation of the phenomena frequently observable in meadow-fields,—viz., well defined rings of various sizes, from 1 foot to 6 feet in diameter, formed sometimes of beautifully-coloured long grass, and at other times of discoloured or short yellow grass; these rings are sometimes called fairy rings, which appellation is, perhaps, not very philosophical, and yet it is, nevertheless, about as much as is generally known respecting these remarkable circles.—I am, yours respectfully,

26, Granger-street, Newcastle-on-Tyne, T. P. BARKAS
May 16, 1852.

[FAIRY RINGS have been ascribed to various causes, the most satisfactory one appears to be that of Dr. Wollaston, who traces them to the plants called *fungi*. "During their growth," he says, "they so entirely absorb all nutriment from the soil beneath, that the herbage is for a while destroyed, and a ring appears, bare of grass, surrounding the dark ring. In the course of a few weeks, after the fungi have ceased to appear, the soil where they stood grows darker, and the grass soon vegetates again with peculiar vigour, so that I have seen the surface covered with dark grass, although the darkened soil has not exceeded half an inch in thickness, while that beneath has continued white with spawn, for about two inches in depth. The extent occupied by the spawn varies considerably, according to the season of the year, being greatest after the fungi have come to perfection, and is reduced to its smallest dimensions, and, in some instances, may not be discernible before the next year's crop begins to make its appearance."]

DEAN-STREET CO-INSTRUCTION SOCIETY.

SIR,—I have the pleasure of informing you that there is a co-instruction society of young men, called the Soho Mutual Instruction Society, held at Little Dean-street, Soho. It is managed by a president vice-president, secretary, librarian, and eight committee-men. The members meet every quarter to appoint fresh officers and examine the books. Your valuable work, the POPULAR EDUCATOR, is much admired; a great number the members take it weekly.—I am, Sir, yours, &c.,

May 16, 1852. D. V. J.

[We observe, from a bill enclosed, that the subscription to this society is 4d. per month; and that the classes are for reading, writing, grammar, spelling, arithmetic, mathematics, and French, with the use of a library.]

EDUCATIONAL NOTICES.

A correspondent at Chatham states his willingness to devote one or two evenings a week to explain the English and the French languages, and arithmetic. He has been for twenty-seven years a national schoolmaster, and has had about 2,500 children under his charge He finds that fully *five* out of every *six* of that number have left school under fourteen years of age to go to work, and that their arithmetic and other mental acquirements are entirely forgotten, so that at the age of twenty years they can barely read and write. He offers his services to the new scheme with no other desire or expectation than the pleasure of succeeding in his undertaking.

Mr. Strachan, of Aberdeen, the author of an Introduction to Arithmetic; that is, to the four simple and compound rules, has sent us a copy, in which we find the proof of the simple rules by casting out the nines. The proof of subtraction is in principle the same as Mair's.

Mr. E. P. Hill, of Islington, states that from the appearance of our first number he has had an evening class for teaching French on the plan laid down in this work, and he hopes to be useful in promoting our scheme of education. He intends to teach the Latin and the German (as soon as it appears) on the same principle.

Mr. Simpson, of Low Torrie, proposes the simplest method of proving subtraction by casting out the nines; namely, cast them first out of the minuend, and note the result; then cast them out of the subtrahend and remainder, as if they were two numbers in addition, and note the result; the two results should be the same, if the operation of subtraction be right.

LITERARY NOTICES.

FINE EDITION OF THE POPULAR EDUCATOR.—EDUCATION OF FAMILIES.—No publication has ever been welcomed with such tokens of approval from heads of families as this last of JOHN CASSELL'S works. AN EXTRA EDITION, at 1½d. per number, or in Monthly Parts, in a neat wrapper, at 7d., or when Five Numbers, 8½d., is now published, which is issued without the weekly headings. Persons wishing for this edition must be careful to order the "*Extra* Edition." The whole of the Numbers may now be obtained, or the first Two Parts.—Part I., 7d.; Part II., 8½.

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*** PORTFOLIOS for enclosing 26 numbers of THE POPULAR EDUCATOR, price 1s. 6d., may be procured at our office. These Portfolios are so constructed as to form, upon the completion of each volume, a neat Case for binding the same, which will be done at a trifling expense by any bookbinder.

ANSWERS TO CORRESPONDENTS.

MR. GALT (Glasgow) is right; thanks for his communication.—P. C.: It can; for *the wisdom of Solomon* or *Solomon's wisdom*, means the same thing.—MUNGO: Order required; French, Italian, German.

J. B.—We are of opinion, that Y-grec is so called not for its sound but its form, which is that of *upsilon* in Greek.

Suggestions, among which are some of great value, have been received from the following readers and subscribers:—William Tucker, Hoxton; A Subscriber, Birmingham; A. A. Fryer, Inner Temple; Schwarz, Liverpool; Charles Currie, Glasgow; Amicus; F. G., Sunderland; W. R., Edinburgh; Benjamin Williams, Norwich.

CRUX (Snainton) will find his query answered at page 59, col. 1, No. 4.—JAMES JAMIESON, Aberdeen, will find his difficulties removed in the answers to C. L., p. 112, and J. S. R., p. 128.—M. J., Perthshire: Quite right.—T. E. VIBERT, St. John's-wood: Correct, but the 3rd prop. of Book I. is used.—J. ORD: Right.—Mr. ARCHER (Brighton) must address his inquiries to us.—S. WOOD, Macclesfield: Right, but rather short.—M. J. H.: The plan on the first page of No. 7 will probably meet his views.—J. ASHWORTH, Crawshawbooth: Correct.—A LEARNER; C.: Yes.—J. S. K. is right on all points but the last, for which let him consult Latham.—A. B. C.: Riddle's.—W. E. H.: The *e* is silent at the end of words except when accented acutely, thus *é*.—JOSEPH WEBSTER: Under consideration.

J. K. S. B. (Belfast).—His solutions are all right, and do him credit. One of the subjects he mentions is begun; the other will follow in due time.—A SUBSCRIBER wants lessons in drawing; they will be given.—JOSEPH CORK, Belfast, shall be gratified soon by the history of Persia.—ALFRED B. is anticipated; the Lessons on Geography are begun.—B. W. M.: Conchology must take its turn; but it shall have it.—A YOUNG STUDENT is informed that they are always sounded in the middle of words; but not at the end, except they be marked with the acute accent, thus *dû (aytay)* summer.—DUNCE: We very much regret that some misprints have annoyed many readers; and among others a painstaking subscriber who assumes this signature. It is not his fault, but the printer's and ours. Sæpe means *often*.—D. N., Ayrshire, is very correct in his solution.—PALLIO: Yes.

GEORGE DARNELL (Birmingham) has forwarded the first subscription to the POPULAR EDUCATION FUND, and suggests that the first lectures should be on *English Grammar*.

LATIN.—Non omnia nimirum omnibus dii dedere, in English is, *the gods have certainly not given all things to all men*; that is, to these they have given some things; to those, others.—R. M. B. will in time be instructed how to "put the day of the month;" all things cannot be taught at once. Domine is the equivalent of *Sir*.—Let J. H. E. learn to believe, if he wishes to become a scholar.—C. A. S. will learn by-and-by that the verb *est* has the same case after it that it has before it; consequently praedam is wrong; he translates the sentence correctly.—Let S. M. study carefully what we have said respecting the inversion and collocation of words, and his difficulties will be removed.—J. L. DEMMER's inference is unwarranted; if he will have a little patience he will be taught the exact force of the interrogatory particle.—P. P. is wrong in saying that "ornemini is given," &c. Orno has 1 after it, signifying that it follows the form of the first conjugation. Conjugation has to do not with meaning, but certain variations of form. Should we go on to treat of synonyms, P. P. will be instructed in the difference between amo and diligo. It is not well to anticipate. By so doing we should teach nothing well, and our students would learn nothing well.—Let G. C. pronounce Latin words as he would pronounce corresponding English words, with such limitations as are mentioned in the Lessons. To follow his suggestion would be to fill our pages with grotesque combinations of letters.—A MECHANIC'S exercise is correct. The "art" as in "art taught," is included in the one Latin word docceris. Unus ex tuis discipulis (which should be unus e discipulis tuis), is partly wrong, partly right. Funestum, i, n. is correct, being the neuter gender of the adjective funestus. The e of the stem in the fifth declension is e long. Merces as a collective noun or a noun of multitude, may have a verb in the plural number.

ERRATA IN SOME COPIES.

Line 36 from top,	col. 1, p. 5,	*for* ta cernus *read* tacemus.
„ 28 „	2, p. 35,	*or* I conquer *read* I bind.
„ 37 „	2, p. 35,	*for* stay *read* slay.
„ 2 „	1, p. 36,	*for* nor *read* non.
„ 44 „	1, p. 70,	*for* after *read* often.
„ 15 from bottom,	col. 2, p. 71,	*for* magnus *read* amplus.
„ 34 „	1, p. 72,	*for* fecundis *read* fecundus.
„ 10 „	1, p. 72,	*for* celeritur *read* celeriter.
„ 35 from top,	col. 2, p. 92,	*for* cardinis *read* cardinis.
„ 31 „	2, p 92,	*for* decŏris *read* decōris.
„ 23 „	1, p. 103,	*for* acres (under N.) *read* acria
„ 62 „	1, p. 103,	*for* acris *read* acer.
„ 54 „	2, p. 103,	*for* feminibus *read* feminis.
„ 57 „	2, p. 103,	*for* feminibus *read* feminis.

D. R. (Glasgow): Yes.—GRATULATOR is right; the correction either have been or will be made.—A SUBSCRIBER earnestly request Chemistry; but what can we do? let him only look at what we have to do to please, interest, and instruct so many.—P. R. B. the man for us; we shall do what we can for him; we shall keep Lessons on Carpentry, Joinery, &c., in our eye, until we get an opportunity of giving him some hints on the subject.

THOMAS PATTISON (Newcastle-on-Tyne). His solution is very excellent.—J. H. O. The only correct expression is, "thou wentest," or "thou didst go."—R. E. Try both the Latin and the Mathematics: they are very good companions, especially as you have a *liking for them*. this is the *first and great point* in all studies; it will carry you on in spite of yourself; and if you feel inclined to flag at any time, remember the adage, *fortuna favet fortibus*, "fortune favours the brave;" or, likening the studies to two ladies to be won (a species of bigamy perfectly lawful), keep in mind the poet's words, "None but the brave deserve the fair."

With T. R. (a subscriber) we certainly agree in the general; yet we fear that there are some persons who take a delight in science and learning, who would still think it no harm to tease their fellow-creatures, and have a little fun with them if they could; it is but human nature. Now, we wish if possible to raise them above even this part of their nature. But our correspondent need not be alarmed, as the lady's friend said to her in a country church, "we are not going to sing," that is, we are not going to reprint Chesterfield, as new.

P. P. HAYES (Chorley).—If the flags have no dimensions in common, they MUST be calculated separately: there is no help for it. Such is the LAW of nature. If they have all the *same* length, but different breadths; add the breadths together; multiply the sum by the common length, and you have the superficial area of all the flags. If they have all the *same* breadth, but different lengths, add the lengths together, multiply the sum by the *common* breadth; and you have the superficial area of all the flags. On this subject, we speak *positively* and *definitely*. The lessons in geometry will be carried as far as he wishes and further too. As to former questions, he must have overlooked the answer.

P. T. S.—The statement about which he inquires is a misprint; it should have been Loch Greenock.

Solutions of all the geometrical problems recently proposed have been received from MATTHEW SPEARS, Glasgow; we shall take an early opportunity of noticing them more particularly. The solution of J. J. N—N, Bridgewater, is barely within the prescribed limits.—The solution of STUDENS, Dalry, is very good.—G. W., Dundee, is right.—John Mahoney, Dublin, right.—R. A., Dublin, will find answers to the rest of his questions among the notices to correspondents in preceding numbers.—We advise G. R. H—L to confine himself to one language at present; say French, for the reason he has stated.—J. F—D, Poland-street, has proposed a plan for squaring the circle, which is far inferior to the methods now known to mathematicians. It can be demonstrated that the diameter of a circle is incommensurable with the side of a square equal to it in area; but the ratio of these two straight lines can be given, by approximation, to any degree of accuracy required.—A LEARNER, Warrington, should now study geology, the first lesson being given in this number.—L'FRANÇAIS: Yes.—A Subscriber, Guernsey: Yes.—W. G—T, Yeovil: His plan is not practicable; but the index of the volume will answer all the purpose required.—J. H E—D, Middleton: Right.—R. W. and W. S., Audenshaw: The e is not sounded in the last three words, and very slightly heard in the first two.—W. L—N, Newark; GREEK: Yes.—J. R., Glasgow: The old names show the continental mode of pronunciation; the new names, the English mode.

*** We have received a great number of solutions of the problems and queries proposed in the preceding numbers of this work. Most of these solutions are excellent and do great credit to their authors, and a few are defective. We have endeavoured to notice a great many in our answers to correspondents; but we find that these notices are not always consulted as they ought to be; we would therefore recommend all our readers to peruse them, as they will often find in them a solution of difficulties which may occur, as well as the correction of important errata. Some will also be saved the trouble of writing for an explanation of things already explained to others, and sometimes even to themselves. We have not yet noticed the numerous methods of proving arithmetical rules by *casting out the nines*, which we have received; and for this reason, that we have not quite finished the explanation of the four common rules; when this has been done, we shall then take up this subject in good earnest.

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LESSONS IN GERMAN.—No. I.

The object of the author of the following German Lessons, is to unite theory and practice; to introduce, one by one, the easier forms and usages of the language; and to direct the student's attention to the more obvious differences between the German and the English. He will be supplied, throughout the various exercises, with the materials necessary for their due performance. Every section is headed with the statement and illustration of all new principles involved, with an explanation of words and phrases, and a vocabulary alphabetically arranged. To render these Lessons complete, there will be given at the end a series of reading lessons, and a full vocabulary. The whole is specially intended for those who aim at the acquisition of the German language without a teacher.

Section I.

GERMAN ALPHABET.

German.		*English.*	*Pronunciation.*	*Examples.*
A	a	a	ah	Alt.
B	b	b	bay	Beten.
C	c	c	tsay	Ceder.
D	d	d	day	Dehnen.
E	e	e	e (as in prey)	Eben.
F	f	f	eff	Fett.
G	g	g	gay	Geben.
H	h	h	hah	Hahn.
I	i	i	i (as in pique)	Ihnen.
J	j	j	yote	Jota.
K	k	k	kah	Kahl.
L	l	l	ell	Elle.
M	m	m	emm	Empor.
N	n	n	enn	Ende.
O	o	o	oh	Ohr.
P	p	p	pay	Peter.
Q	q	q	koo	Qual.
R	r	r	err (as in error)	Erretten.
S	ſ ß (Ll. S.)	s	ess	Eſſen.
T	t	t	tay	Thee. (See 18. h.)
U	u	u	o (as in do)	Ufer.
V	v	v	fow (ow as in now)	Volk.
W	w	w	vay	Weſen.
X	x	x	ix	Fix.
Y	y	y	ipsilon	Syſtem.
Z	z	z	tset	Zettel.

In German, every letter, with the exception sometimes of e and h, is pronounced. (See 3. i., 9 ie and 18. h.)

The printed capitals of i and j, in German, are in form alike.

DIPHTHONGS. ai, au, ei, eu, äu.

UMLAUTS (12. Ae, &c.). ä, ö, ü.

COMPOUND CONSONANTS.

ch, ſch, ff, ft, ſi, th.
ck. sh. ss. st. ss. ts.

Section II.

SOUNDS OF THE GERMAN LETTERS.

Sounds of the Vowels.

1. A, a = a, as in far, father. Ex. Markt, market; Aal, eel; Bahn, road; Blatt, leaf; Abend, evening.
2. E, e = e, as in met, ferry. Ex. leben, to live; Meer, sea; Ehre, honour; beſſer, better; Meſſer, knife.

3. 3, i = i, as in pique, pin. Ex. mir, to me; mit, with; ihn him; wider, against; bitter, bitter.
4. O, o = o, as in no, door. Ex. Ofen, stove; Moos, moss; Kohle, coal; Port, port; Poſt, post-office.
5. U, u = oo or o, as in poor, do. Ex. Blut, blood; Du, thou; Uhr, watch; Hut, hat; gut, good.
6. Y, y = i, (mostly in words from the Greek). Ex. Yſop, hyssop; Styx, Styx; Ypern, Ypres.

The sound of a vowel when doubled is thereby lengthened; as, Aal, Meer, Moos; followed by a double consonant, the vowels are usually shortened; as, Blatt, Brett, Sinn, Gott, &c. See, however, 18. h.

Dissyllables (See Vocabulary), unless otherwise noted, are accented on the first; as, leben, Ehre, &c.

Sounds of the Diphthongs.

7. Ai, ai (sometimes aj or ay) = ay nearly, as in aye. Ex. Kaiſer, emperor; Baiern, Bavaria; Mai, May.
8. Au, au = ou, as in our. Ex. Haus, house; Maus, mouse; laut, loud; Fauſt, fist; Braut, bride.
9. Ei, ey = i or ei, as in fine, eider. Ex. Stein, stone; dein, thy (ie = ie, as in pier; never as in pie. Ex. viel, &c..
10. Eu, eu = nearly to oi or oy, as in boil, boy. Ex. Beute, booty; Leute, people; heuen, to hay.
11. Aeu, äu = nearly to eu. Ex. Aeußerſt, extreme; häufen, to hoard Käufer, buyer; Häusler, cottager.

Sounds of the Umlauts (Umlaute).

Umlaut signifies changed or modified sound. The Umlauts are produced by a union of e with a, o, u (also ae respectively. Except when they are capitals, the e is expressed by two dots; thus, ä, ö, ü (and äu).

12. Ae, ä = somewhat (though shorter) like e. Ex. Aergerz, vexation; Fähre, ferry.
13. Oe, ö, as in Oel, oil; Pöbel, populace; tödten, to kill; Röhre, pipe; Köhler, collier.
14. Ue, ü, as in Uebung, practice; müde, weary; führen, to guide; Müller, miller.

Oe and Ue have no corresponding sound in English. Oel and müde, for example, might, perhaps, be generally understood, if pronounced, ale, meede, but this is by no means the correct pronunciation. Oe is pretty accurately given by the French eu in *peur*, and ü, by the French u in *vu*.

Sounds of the Consonants.

15. B, b; D, d; F, f; K, k; L, l; M, m; N, n; P, p; Q, q; X, x; = b, d, f, k, l, m, n, p, q, x.
16. C, c, before a consonant, at the end of a syllable, or before a, o, u in the same syllable, sounds like our corresponding letter in like position. Otherwise it sounds like ts. Ex. Ceder, cedar; Cigarre, cigar; Cymbal, cymbal; ſpecial, special.
17. G, g, sounds like our g in gild, foggy, &c., but never as in gem, ginger, &c. When preceded by n in the same syllable, it sounds like our g hard in like position; as in Angſt, anxiety; ſingen, to sing; bringen, to bring; Ringel, ringlet, &c. When g, in the midst or at the end of a syllable, is preceded by any letter except n, its sound approaches that of the Greek χ, or the still more guttural ch. (See 26. ch.) Ex. Tag, regnen, Magd, Jagd, möglich, &c. The learner should avoid confounding the pronunciation of Magd, Jagd, &c., with that of Macht, Jacht, &c.
18. H, h, in the midst and at the end of a syllable is silent, but serves to lengthen the preceding vowel. Ex. lehren, to teach; ohne, without; Thee, tea.

19. 3, j, sounds like y consonant. Ex. Jahr, year; Januar, January; jung, young.
20. R, r, is uttered with a trill or vibration of the tongue, and with greater stress than our r. Ex. Rohr, reed; Rath, council; reif, ripe.
21. S ſ, at the beginning of a syllable followed by a vowel, has a sound between that of z and s. Ex. Sohn, son; sieben, seven; otherwise it sounds like s; as in Gas, gas; Strom, stream. Note, that at the end of a syllable s is substituted for ſ: as above, Gas, &c.
22. T, t, sounds like t in tent. Ex. Text, text. In the position, where in English, t sounds like sh, t has the sound of tz. Ex. Station, station; Nation, nation, &c.
23. V, v, sounds like f, as in fife. Ex. Vater, father; vergeben, to forgive. It is only in words from the Latin and French that v sounds like w: as, in Venus, Venus; Verſailles, Versailles, &c.
24. W, w, has a sound between that of our w and v. Ex. Welt, world; Waſſer, water, &c.
25. Z, z, sounds like ts. Ex. Salz, salt; Zahn, tooth; Zunge, tongue; zehn, ten.

Sounds of the Compound Consonants.

26. Ch, ch, in primitive words when followed by ſ, s, has the sound of k. Ex. Dachs, badger; Ochs or Ochſe, ox. But if ſ, s, be added by derivation, combination, or inflection, ch has its guttural sound; as, in hoch, nach, Nacht, Buch, &c. Ex. *Nachſchrift* (from nach, after, and Schrift, writing); nachſinnen (from nach and ſinnen, to think), &c. In words from the Greek and French, ch retains its original sound; as, in Charakter, character; Charlatan, charlatan.
27. Sch, ſch, sounds like sh. Ex. Schuh, shoe; Schiff, ship; ſchon, already; Schule, school.
28 ß (though compounded of ſ and z) sounds like ſſ, and is used only at the end of a syllable. Ex. Maß, measure; Fluß, river, &c.
29. tz (though compounded of t and z) sounds like z, but like ß is only employed at the end of a syllable. Ex. Stutz, Platz, &c. Note, that this letter being a double consonant, the preceding vowel is thereby shortened.

To aid in producing the sound of ch, take for experiment the above word hoch: pronounce h o precisely like our word *ho*; observing to give as full and distinct a *breathing* of the h at the *close*, as at the beginning; thus, h-o-h = hoch. Except when preceded by a, o, or u, as will be perceived by experiment, a slight hissing sound of s, or ſch naturally attaches to the ch; as, in recht, reich, ich, Griechе, &c.

Exercise 1.

(a) Altar, altar; Paar, pair; Ahle, awl; Balſam, balsam; baden, to bathe; Pſalm, psalm.
(e) Heer, host; mehr, more; edel, noble; Ende, end; Letter, letter; Herbſt, autumn.
(i) Trinken, to drink; finden, to find; Biber, beaver; hier, here; Kind, child.
(o) Boot, boat; hohl, hollow; oft, often; Hobel, plane; Koller, collar; Koffer, trunk.
(u) Fuß, foot; gut, good; unten, below; Pudel, poodle; Kuckuk, cuckoo; Muth, courage.
(y) Nymphe, nymph; Rhythmus, rhythm; Sylbe, syllable; ſynonym, synonym; Syrup, syrup.
(ai, ei) Main, Maine; mein, my; Laib, loaf; Leib, body; Kain, Cain; kein, no.
(au) Bauen, to build; Mauer, wall; grau, gray; Raum, room; rauh, rough.
(äu, eu) Räumig, roomy; reuen, to rue; Häute, skins; heute, to-day; Häuptling, chieftain.
(ä, e) Aehre, ear (of corn); Männer, men; leben, to live; Krähe, crow; nämlich, namely; nehmen, to take.
(ö) Löffel, spoon; Oeffnung, opening; öfters, oftener; röthlich, reddish.
(ü) Uebel, evil; fünf, five; Rüſſel, proboscis; Krüppel, cripple; Jünger, disciple.

Exercise 2.

Klaſſe, class; Creatur, creature; Criminal, criminal; Section, lesson; Calcutta, Calcutta; Contract, contract; Cur, cure Cement, cement; Cider, cider; Cylinder, cylinder.
G. Gabe, gift; gehen, to go; Giraffe, giraffe; geben, to give; Gold, gold; groß, large; Ring, ring; bringen, to bring; grün, green; grau, gray; ruhig, quiet; ewig, eternal; Berg, mountain.
H. Haſe, hare; hart, hard; Hunger, hunger; Horizont, horizon; Mehl, flour; mehr, more.
J Jüngling, youth; Jude, Jew; ja, yes; Joſeph, Joseph; Juli, July; Jurist, jurist.
R. Reif, ripe; reich, rich; Reſt, rest; rar, rare; Rückſicht, regard; Form, form; Räthſel, enigma.
S. Sattel, saddle; Segel, sail; Speer, spear; Sproß, sprout; ſtark, strong; Strumpf, stocking; Süd, south; Reis, rice; Straße, street; wiſſen, to know.
T. Tiſch, table; Tarif, tariff; Tempel, temple; Truppe, troop; Titel, title; Devaſtation, devastation.
V. Vampyr, vampire; Vaſe, vase; Vers, verse; Violine, violin; Viſite, visit; Valuation, valuation.
W. Wort, word; Wurm, worm; Wunder, wonder; Will, will; Wagen, wagon; Wanderer, wanderer.
Z. Zink, zinc; Zahl, number; zahm, tame; Zeit, time; Zentner, hundred-weight; Holz, wood.
Ch. Flachs, flax; ſprechen, to speak; wachſam, watchful; Chor, choir Chauſſee, turnpike.
Sch. Schaft, shaft; Schatten, shadow; Schnee, snow; friſch, fresh; Schild, shield, sign.
ß, ſſ. Fleiß, diligence; Fließ, fleece; laſſen, to let; haſſen, to hate; Haß, hatred; häßlich, ugly.
tz (z). Hitze, heat; Klotz, log; kitzeln, to tickle; ſchwatzen, to prattle; ſchwitzen, to perspire; kurz, short; ſchwarz, black.

Räthſel.

Vier Jahre bleibt er aus,
Dann kommt er nach Haus,
Und zeigt ſich wieder,
Im Kreis ſeiner Brüder.

Erſt weiß wie Schnee,
Dann grün wie Klee,
Dann roth wie Blut,
Dann ſchmeckt es gut.

LESSONS IN MUSIC.—No. V.

By John Curwen.

The proper management of the voice in singing is of great importance, and will require a few suggestions from us. First, notice that a sound of the voice in singing is distinctly heard and continues the same from the beginning to the end. It is thus distinguished from the speaking voice, each sound of which has a change in it called an "inflection." A sound of the singing voice is commonly called a "note"—though the word note is more properly limited to the mark upon paper—the *sign* of a sound. With a violin you can produce either a "note" or an "inflection." Press your finger *steadily* on the upper part of a string, while you draw the bow, and that will give you a clear and beautiful *note*. But if, instead of that, you move your finger up or down the string, while you draw the bow, that will give you an *inflection*. You perceive, therefore, that a note ought to have nothing of the inflection about it,—no "scraping" up or down as some sing,—but it should be *clear*, *steady*, and *distinct*.

To produce a good note, the singer should be in an easy posture, with his head upright and his shoulders back, so as to allow the muscles of the chest and the larynx (that little box in the throat which we can feel with our fingers) to have free movement. His mouth should be moderately open. His tongue should lie down, just touching the roots of the lower teeth; and his lips should have the position most easily explained by referring, to that of a gentle smile, but really expressing no smile and giving no emotional expression. Some teachers require a small cork of the thickness of a little finger, or the little finger itself to be placed between the back teeth during the earlier exercises. We have a friend who to improve his voice for *speaking*, used to read aloud for half an hour before breakfast every morning with a *large* cork between his *front* teeth. Of course this did not cultivate his enunciation—his words were curiously pronounced—but its strengthened the larynx and lungs, and prevented his over-exertion of the throat, so that he could speak in public with the greatest ease and without the slightest fatigue of voice, as we have had ample proof, nearly a whole day long.

The pupil who would learn to sing without fatigue, should practise, for a few minutes every day, the taking a full inspiration into the lungs, and then giving out the air very slowly and steadily. This will give him command of the muscles of the chest. He will be surprised, at first, to discover the difficulty of a slow and steady expiration. But let him persevere, making this the *first* of his exercises for the improvement of his voice, every morning. The next of his morning exercises should be in singing the chord and scale, *holding the notes as long and steadily as possible*, and ascending as high as his voice will allow (with the cork, if necessary, to keep his mouth open), and with the most careful observance of the following directions. Expand the ribs, so that they press against the dress *at the sides*, and, by drawing in the muscles of the lower belly, *keep the ribs thus expanded*. This will allow free and easy play to the lungs. Then, touching the larynx gently with your fingers, seek to make it *fall* for the production of the *higher* notes, and make it *rise* for the production of the *lower* notes. You will not need to touch the larynx much, for you will quickly learn to tell by the quality of the sound, whether the note is rightly produced. Some will better understand what we mean when we ask them to put the mouth into the position of a gape. This will make the larynx *fall*. In the midst of the gape produce a *high* note. Next put your throat in the position of swallowing. This will *raise* the larynx. In the act try to sing a *low* note. This is not the ordinary way of singing, or that into which you would most naturally fall; but it is that of some of the most eminent singers, and especially of those whose voices do not soon wear out and who sing with comparatively little fatigue. We have known a thin painful weasandish voice entirely changed in its quality—gaining fullness, power, and delicacy—by a few month's steady practice of these rules. Another good daily exercise is that of repeating verses of poetry slowly and very distinctly, trying how much you can repeat in a single breath. But remember, that no advantages of this kind can be gained without steady, faithful perseverance.

The sounds of the voice, in singing, should be delivered *promptly* and *easily*. If the voice is given out carelessly, it comes roughly through the throat, and is called *guttural*; and if produced in a forced manner, it is driven through the nose and so becomes *nasal*. Correctness in singing depends upon *mental* effort, for it is the *mind* which commands the delicate muscles of the larynx and throat. *Lazy* singing is always *flat* and miserable. Hence we always sing musically better when our hearts are most engaged in the song.

A note may be *loud* or *soft*. The loudness or softness of the voice is called its *force*. It is very important to cultivate the *habit* of using a *medium* force of voice, so that it may be always easy to sing a note or strain more loudly or more softly than the rest. This habit is important to comfort and pleasure in singing, and absolutely necessary for expression and refinement. The medium voice of one person is, of course, different from that of another, according to the size of the larynx, and the strength of the lungs.

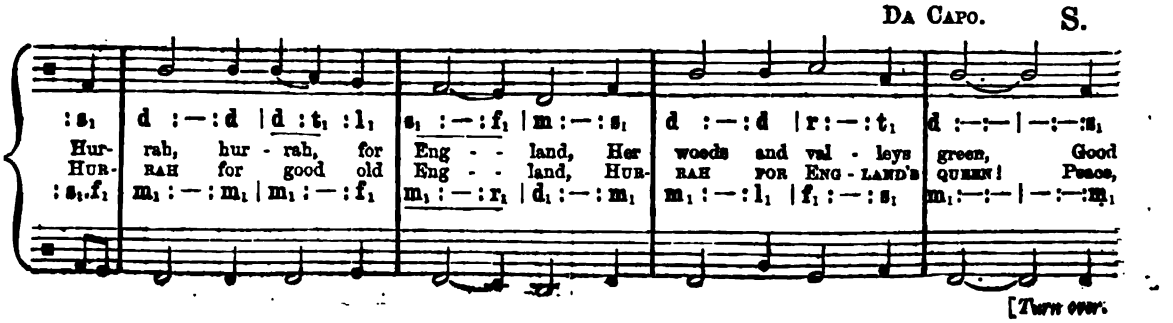
The suggestions given above must be kept constantly in mind in every daily practice. If you enjoyed the advantage of a private teacher, such points as these would be constantly in *his* mind, and he would see to it that you observed them. Indeed one of the chief uses of a private teacher is to keep us to our work. The self-educator, however, must summon to his aid sturdy determination and steady perseverance. A lady went to a distinguished teacher of singing, to receive a course of costly lessons in the art. For a large proportion of these lessons, in the early part of the course, he did not permit her to sing a single note, but made her simply pace the room, expanding her lungs, and taking breath in every way which was required to give her command of the material of which voice is made. We have heard that even the great public singers do not think of omitting the daily practice of the scale and chord in long "holding" notes as we have recommended.

All these lessons are addressed to the self-educator and to the adult. They suppose, in the pupil, an inquiring mind and robust understanding. Lessons which set the same points before the mind in a way more easy to the apprehension—such as would be used in an oral lesson to children or to a dull audience of adults—would be too lengthy and tedious for our purpose. Such lessons, however, may be of great use to one who wishes to teach, without having yet studied "the art of putting thoughts in the right light for young or dull people to see them," and such lessons may be found fully drawn out in Mr. Curwen's "Grammar of Vocal Music" (Ward & Co.). These lessons may, however, and probably will be, extensively used in classes. It is important that the learner should know the peculiar advantages and disadvantages of class teaching, and should see the absolute necessity in either case of personal effort and personal examination.

Every ART *is best taught individually.* It is true that there are some advantages to the singer in collective teaching. The "sympathy of numbers" both aids and encourages him. But his *progress* will depend entirely on individual attention and endeavour. In most classes, the *few* make progress and *lead*, while the *many*—some from timidity, and others from idleness and inattention—*hang upon the leaders*, and soon begin to clog their movements. As, however, singing for schools and congregations must be generally taught in classes, the object of the teacher must be to combine the spirit and sympathy of numbers with as careful an attention to individual progress as possible. He should also occasionally separate the laggers from the more forward, and (without blaming or discouraging them) cause them to retrace their steps and go by themselves, while the others are advancing freely and rapidly in a new class. For these purposes, the pupil should be led to expect a *rigid personal examination* at the close of each stage of progress, and a division of the class as the result. Several lesson hours should be devoted to this examination. It might be conducted in a separate room while the rest of the class are practising. In adult classes, most of the questions might be announced to the class, and the answer given in writing at the time, and they would only require *separate* examination in connexion with the exercises. The examiner would then decide by the result of the two examinations. A register of each examination should be kept by the teacher, and a memorial of it given to the pupil. To aid both the self-teacher and the class teacher, the following *questions* and *tests of progress* are given:—Let no one consider himself worthy to pursue the course further, until he has thoroughly fulfilled these requirements. *Things to be done* are marked by an asterisk. These especially must not be omitted.

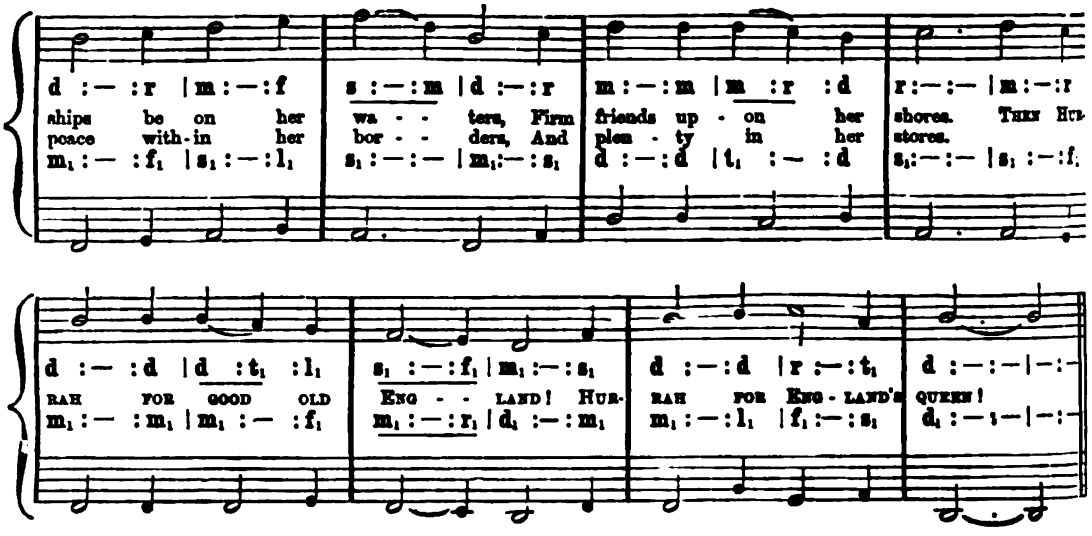
EXERCISE 16. LEYBURN. KEY B. M. *Crotchet*=66, beating only twice in a measure.

(An old English Ballad Tune. Words by M. A. STODART, from "Poetry" by the Home and Colonial School Society.)


DA CAPO. S.
:s1 | d :—:d | d :t1 :l1 | s1 :—:f1 | m :—:s1 | d :—:d | r :—:t1 | d :—:—|—:—:s1
Hur- rah, hur - rah, for Eng - - land, Her woods and val - leys green, Good
HUR- RAH for good old Eng - - land, HUR- RAH FOR ENG - LAND'S QUEEN! Peace,
:s1.f1 | m1 :—:m1 | m1 :—:f1 | m1 :—:r1 | d1 :—:m1 | m1 :—:l1 | f1 :—:s1 | m1 :—:—|—:—:m1

[Turn over.

LEYBURN (*continued*).

DAL SEGNO.

d :— :r | m :— :f | s :— :m | d :— :r | m :— :m | m :r :d | r :— :— | m :— :r
ships be on her | wa - - ters, Firm | friends up - on her | shores. THEN HUR-
peace with-in her | bor - - ders, And | plen - ty in her | stores.
m1 :— :f1 | s1 :— :l1 | s1 :— :— | m1 :— :s1 | d :— :d | t1 :— :d | s1 :— :— | s1 :— :f1
d :— :d | d :t1 :l1 | s1 :— :f1 | m1 :— :s1 | d :— :d | r :— :t1 | d :— :— | :—
RAH FOR GOOD OLD | ENG - - LAND! HUR- | RAH FOR ENG - LAND'S | QUEEN!
m1 :— :m1 | m1 :— :f1 | m1 :— :r1 | d1 :— :m1 | m1 :— :l1 | f1 :— :s1 | d1 :— :— | :—

2 Right joyously we're singing,
We're glad to make it known,
That we love the land we live in,
And the Queen upon our throne.

Then hurrah for merry England,
And may we all be seen
True to our well-loved country,
And faithful to our Queen.

Then hurrah, &c.

NOTE.—If your friend gives you "pattern" with an instrument, tell him to play in the key of B flat (with two flats), or in that of B (with five sharps), whichever he prefers; one is as easy as the other to you. Take care to *point* on the modulator without book, and to "figure" the tune (one, two, three, fo-ur, five, si-x, seven; one, two, three, fo-ur, five, six, &c.) before you sing it to words. Indeed no song is rightly learned till both tune and words are learned "by heart." You will observe the various "signs of repetition" which are explained in the preceding lesson. A second line of words is given, in each case, for the repetition of the music. The tune is harmonised with a bass in "School Music."

QUESTIONS AND TESTS OF PROGRESS ON THE "FIRST STAGE."

[The questions are to be answered from book over and over again *until* they can be also answered from memory.]

Lesson 1.

1. What were the reasons that encouraged "our friend" to think that he had a voice? What kind of road to music do we offer? What are the conditions of admission to it?
2. What is the difference between "high" and "low" in music?
3. What must be chosen and fixed before the notes which may be introduced into a tune are distinctly ascertained? What is this arrangement of notes called, and by what primary laws is it regulated? On what grounds do we call it the scale of all nations and of all times?
4. What is a musical interval? Is it a distance in time? in space? in what?
* 5. Draw *from memory* a diagram of the scale, with the solfa syllable to represent the notes, marking carefully the two shorter distances.
6. What is the general character of the 1st, 3rd, and 5th of the scale? How is the voice *tuned*?
* 7. Solfa and point on the diagram, *from memory*, EXERCISES 1, 2, 3.

Lesson 2.

1. Give an account of the first experiments on the sounds of a single string. What note does half a string give?—two thirds?—three fourths?—four fifths?—&c.
2. Describe the "syren." What is the relation of a note's *length of string* to its *vibrations*?
3. What is the smallest perfect measurement of the scale in plain figures, and according to that how many degrees belong to to the great tone?—small tone?—tonule?
4. What is an "octave" note or "replicate?"
* 5. Solfa and point on the diagram of the scale, *from memory*, EXERCISES 5, 6, 7, 8.

Lesson 3.

* 1. Explain the two sets of tetrachords. Arrange them by memory, taking coins to represent your notes.
2. By what intervals are the tonules of the scale always separated from one another? Show this by drawing a circular diagram.
* 3. Draw a modulator *from memory*. (Notice that the right-hand column takes its DOH from the level of SOH, the left from FAH.)
4. Explain fully the three great advantages of the modulator, its *picture* of interval; its mnemonic (or memory-helping) power, and its aid to the pattern.
5. What is the effect of a "mental modulator" on the horizontal line of notes?
6. Give three reasons for learning an "interpreting notation" of music in connexion with the other.
7. What is accent? How many sorts of accent are there?
8. What is a measure?—an aliquot?
9. What is the structure of the BINARY MEASURE, and what is its character? TRINARY? QUATERNARY? SENARY?
10. Give Dr. Bryce's views of the origin of our sense of Rhythm, and its connexion with the heart and lungs?
* 11. Solfa and point on the modulator, *from memory*, EXERCISES 9, 10, 11, 12, 13, 14.

Lesson 4.

1. What are the three different senses in which the word TIME is used in ordinary musical language? Give examples of each.
2. What is the peculiarity in the swings of the pendulum? What regulates the speed of a pendulum?
3. Describe the "metronome." With what is it proposed that each swing of the metronome should correspond in the binary, trinary, and quaternary measure?—in quick senary measure?
4. How would you use the string pendulum?
5. In learning to "keep time" what is the double object to be gained? Will *beating* time help *you*?
6. Describe the views of Rousseau, Dr. Burney, and Dr. Bryce on "beating" time.
7. What is the standard by which the length of notes is measured in the solfa notation? What proportion of time belongs to a note

placed alone immediately after an accent mark? What is the meaning of the horizontal stroke?—the dot after a note?—the comma?—the dot and comma?—the inverted comma? What means an empty aliquot?

8. How do you indicate a slur?

9. Explain the meaning of the following signs:—D.C. D.S. S. *P. f. p. ff. pp.* <. >. and ' or · over a note.

10. How would you indicate "expression" in writing or printing words?—loud?—soft?—abrupt?

11. Take a book of hymns or songs, and mark ten pieces for expression. [This is a really important and useful exercise of judgment and taste.]

12. What are the vibrations of the TENOR C—the standard note of pitch? Draw a diagram of the standard scale. What is meant by G sharp? B flat?

* 13. Pitch the key-note A—G—F—E—D and take the chord in each case.

* 14. Point on the modulator *by memory*, and afterwards sing to words the tune GRIFFIN.

Lesson 5.

1. What is the difference between the sound of the voice in speaking and in singing? What is a sound of the singing voice called?—of the speaking voice?

2. What is the best posture for the singer, in reference to his head?—shoulders?—chest?—mouth?—tongue?—lips?

3. What is the first daily practice for opening and strengthening the lungs? How should the chord and scale be sung, and with what two peculiar observances, in this daily practice?

4. What three faults should be especially avoided by the singer?

5. What habit, in reference to loudness and softness of voice, should be carefully formed?

6. In what respects would you alter your phraseology and mode of illustration if you had to set the facts and principles of this first "stage" of our course before the minds of the young, or persons dull of comprehension? [It will be a good exercise of mind for you to answer this question. It will be better still for you to do so practically. *Teach* what you know. There is no better way of perfecting your knowledge.]

7. What are the advantages and disadvantages of class teaching? Show the importance of personal effort and examination.

* 8. Sing a high note with the low larynx,—a low note with the high larynx.

* 9. Sing (taking a very low note for DOH) DOH, ME, SOH, DOH^1, ME^1, and if you can *without straining the voice*, SOH^1,—holding each note with a long and steady breath. [You should be more anxious about the *chord* than the scale in the present stage of your course,—for you may not yet have got all the notes of the *scale* quite perfectly in tune.]

* 10. Repeat slowly and very distinctly (with good use of tongue, lips, and teeth)—*and in one breath*. "How doth the little busy bee improve each shining hour." Take two more lines in another breath and so on.

* 11. Point and sing the tune LEYBURN *from memory* on the modulator.

LESSONS IN LATIN.—No. X.

By JOHN R. BEARD, D.D.

ADVERBS.

IN English, adverbs are formed from adjectives by the addition of *ly*, thus swift, swift-*ly*. Similar is the manner in which the Romans formed their adverbs. The ordinary terminations of the Latin adverbs, are *e* and *ter*; *ter* sometimes stands as *iter*. To form an adverb, find the stem and add the terminations. Adverbs formed from adjectives or participles of the second declension end in *e*. Adverbs formed from adjectives or participles of the third declension in *ens* and *ans* end in *ter*. Adverbs formed from the other adjectives of the third declension, end in *iter*.

You ought now to have no difficulty to know which are adjectives of the second, and which adjectives of the third declension. But for your assistance, I interpose a few remarks. Adjectives follow the first, the second, and the third declension of nouns. Adjectives which have the nominative singular in *a*, and genitive singular in *ae*, follow the first declension. Adjectives which have the nominative singular in *us* or *um*, and genitive singular in *i*, follow the second declension. Adjectives which have the nominative singular in *is*, &c., and genitive singular in *is*, follow the third declension. There are no adjectives of the fourth or fifth declension. I add instances of

ADVERBS FORMED FROM ADJECTIVES.

Clarè, *clearly, brightly*	from	clarus 2, *clear*
Libèrè, *freely*		liber 2, *free*
Pulchrè, *beautifully*		pulcher (pulchri) 2, *beautiful*
Prudenter, *prudently*		prudens (prudent) 3, *prudent*
Amanter, *lovingly*		amans (amant) 3, *loving*
Fortiter, *bravely*		fortis (fort) 3, *brave*
Audaciter, *daringly*		audax (audac) 3, *daring*

Adverbs, like adjectives, undergo comparison. Thus, clare, *clearly*, positive; clarius, *more clearly*, comparative; clarissime, *most clearly*, superlative. Properly the comparative is the neuter gender singular number of the adjective, thus clarus, clarior, *clarius*. The superlative is formed by the conversion of *us* of the adjective into *e*; thus, optimus, *best*; optime, *in the best manner*. Instances follow of

ADVERBS IN THE THREE DEGREES OF COMPARISON.

Positive.	*Comparative.*	*Superlative.*
Lætè, *joyfully*	lætius, *more joyfully*	lætissime, *most joyfully*
Docte, *learnedly*	doctius, *more learnedly*	doctissime, *most learnedly*
Leviter, *lightly*	levius, *more lightly*	leviss*i*me, *most lightly*
Feliciter, *happily*	felicius, *more happily*	felicissime, *most happily*
Magnificè, *splendidly*	magnificentius, *more splendidly*	magnificentissime, *most splendidly*
Similiter, *similarly*	similius, *more similarly*	similli*m*e, *most similarly*

These Adverbs are irregular.

Positive.	*Comparative.*	*Superlative.*
Bene, *well*	melius, *better*	optime, *best*
Male, *ill*	pejus, *worse*	pessime, *worst*
Multum, *much*	plus, *more*	plurimum, *most*
		maxime, *very greatly*

VOCABULARY.

Pugno 1, *I fight* (E. R. *pugilist*); labóro 1, *I labour*; vito 1, *I avoid*; supero 1, *I overcome* (E. R. *superior*); cogito 1, *I think*; dimico 1, *I contend*; sedo 1, *I set down, compose*; nego 1, *I deny* (E. R. *negation*); administro 1, *I administer* (E. R. *minister*); habito 1, *I dwell, remain* (E. R. *habitation*); sono 1, *I sound*; quotidie, *daily*; civitas, átis, f. *a city* or *state* (E. R. *civic, civil*); atque, *and*; que (stands after the word thus, pluseque), *and*; periculum, i, n. *a danger* (E. R *peril*); de, *concerning*; Græcia, æ, f. *Greece*; rus, ruris, n. *the country*; in dies, *every day*; ædifico 1, *I build* (E. R. *edifice*); scriptus, a, um, *written*; patiens, *patient*; occultus, a, um, *hidden* (E. R. *occult*).

EXERCISES—LATIN-ENGLISH.

Milites fortiter pugnant; pugnantne fortiter milites? nonne fortiter pugnant milites? Romani fortius quam hostes pugnant; de Græciâ magis atque magis cogito; nonne de patre tuo multum cogitas? litteras magis atque magis quotidie expectamus; cupidissime adventum matris expectas; rus patrem plus plus que in dies delectat; bene domum ædificas; ædificatne domum optime? litterae sunt pessime scriptae; verba tua male sonant; servi de domino pessime cogitant; puellae patientius quam pueri labórant; occultissima pericula difficillime vitantur; difficile est Græcos superare; fortissime dimicant Graeci; seditio facilius quam bellum sedatur; civitas optime administratur; audaciter negat; urbem feliciter habitant cives.

ENGLISH-LATIN.

Is the war easily composed? the war is composed with very great difficulty (superlative from *difficilis*); he fights bravely; they fight more bravely; the Greeks fight very bravely; greatly do you hope for (*expecto*) the coming of spring; the coming of spring is most eagerly hoped for by all boys and girls; they hope for your letter daily more and more; bad words sound badly; the soldiers contend more and more; hidden things are not easily avoided; mothers labour more patiently than daughters; the sedition is happily composed (that is, being put down); he writes a letter beautifully; the Romans fight more bravely than the Greeks; the country delights my mind very much; is thy mind delighted much by the country? very much do I think of my home (*domus*) my brothers and my sisters; the state is administered very ill by the Romans.

PRONOUNS.

The personal pronouns ego, *I*, and tu, *thou*, are declined according to the ensuing table. Strictly, the Latins have no personal pronoun of the third person, *he*; that is, no pronoun which exactly corresponds to our *he*. Ille, which is often given as such, signifies *that person*, and sui (no nominative) is a reflective pronoun; that is, it has a reference to a subject pre-

ceding. As, however, parts of sui agree with parts of the personal pronouns it is inserted in this table of

THE PERSONA OR SUBSTANTIVE PRONOUNS.

Singular.

Cases.	1st.	2nd.	3rd
Nom.	ego, *I*	tu, *thou*	——
Gen.	mei, *of me*	tui, *of thee*	sui, *of him, himself*
Dat.	mihi, *to me*	tibi, *to thee*	sibi, *to himself*
Acc.	me, *me*	te, *thee*	se, *himself*
Abl.	me (a me), *by me*	te (a te), *by thee*	se (a se), *by himself*

Plural.

Cases.	1st.	2nd.	3rd.
N.	nos, *we*	vos, *you*	——
G.	nostri, nostrum, *of us*	vestri, vestrum, *of you*	sui, *of them, themselves*
D.	nobis, *to us*	vobis, *to you*	sibi, *to themselves*
A.	nos, *us*	vos, *you*	se, *themselves*
A.	nobis (a nobis) *by us*	vobis (a vobis), *by you*	se (a se) *by them, themselves*

Sui, sibi, &c. you see are the same in the plural as in the singular.

In pronouns, the vocative, when it exists, is generally the same as the nominative. The preposition cum, *with* (governing the ablative), is put after me, te, &c.; as, mecum, *with me*; tecum, *with thee*: so, secum, *with them*, or *with themselves*; nobiscum, *with us*; vobiscum, *with you*.

In order to give emphasis, met is subjoined to all these forms, except tu, and the genitive plural of ego and tu; thus, egomet, temet, sibimet, nosmet, vosmet: tu takes te, as tute; se, for the sake of force is doubled, as sese.

Nostri and vestri differ in use from nostrum and vestrum. Nostri is simply *of us*; nostrum is *ours*; nostrum denotes a class, and is used with partitives, that is, words which signify one, &c., of a class, as nemo nostrum, *none of us*, considered as a number or a class, and not an individual or individuals.

POSSESSIVE OR ADJECTIVE PRONOUNS.

The personal pronouns which have an adjective force, are formed from the genitive of the personal substantive pronouns. They are called possessive, because they denote an object as the possession of the first, the second, or the third person. From mei, *of me*, is formed meus, mea, meum, *my*; as appears in this table.

Mei	makes meus, m.	mea, f.	meum, n.	*my*	or	*mine*
Tui	„ tuus	tua	tuum	*thy*		*thine*
Sui	„ suus	sua	suum	*his*		*his own*
Nostri	„ noster	nostra	nostrum	*our*		*ours*
Vestri	„ vester	vestra	vestrum	*your*		*yours*

To increase the force, pte is added to the ablative singular of suus, as suapte manu, *with his own hand*; suopte gladio, *with his own sword*. Met with the same view is appended to the oblique cases of suus; as suismet capitibus, *to their own heads*.—N.B. All the cases except the nominative are called oblique.

I must here recall to your mind that the personal pronouns are in Latin used only when emphasis is required, or to express a contrast; as, *ego* stultus sum, *tu* sapiens, *I* am foolish, *thou* art wise. The same is the case with the possessive pronouns.

VOCABULARY.

Magister, tri, m. *a teacher* (E. R. *master*); praeceptum, i, n. *a precept, a command*; praecepter, óris, m. *a preceptor, or instructor*; tractatio, ónis, f. *a handling, a treatise* (E. R. *to treat of*); veritas, átis, f. *truth*; iratus, a, um, *angry*; aequális, e, *equal*; salutáris, e, *salutary, healthful*; canto 1, *I sing* (E. R. *canticle*); clamo 1, *I cry out* (E. R. *exclamation*. impero 1, (with dative) *I command* (E. R. *imperial*); imperium, i, n. *a command, a government* (E. R. *empire*); narro 1, *I relate* (E. R. *narrative*). voco 1, *I call* (E. R. *vocative*); doleo 2, *I am in pain, I grieve* (E. R. *dolorous*) disco 3, *I learn* (E. R. *disciple*); ludo 3, *I play* (E. R. *illusory*); attente, adv. *attentively*; inter, prep. (with acc.) *between, among*; apud, *with, at home*; apud se, *with himself, in, his own master*; semper, *always*.

EXERCISES.—LATIN-ENGLISH.

Ego canto, tu clamas, amicus vocat; nos narrámus, vos saltátis, fratres labórant; ego fleo, tu rides, frater dolet; nos praeceptores (*we teachers*) docémus, vos, discipuli, discítis; ego ludo, tu discis, soror acu pingit; nos scribímus, vos legitis, fratres pingunt; ego salto, tu ferís, puer dormit; nos magistri erudímus, vos, O discipuli; vos, boni discipuli, attente audítis praecepta nostra; virtutes inter se aequales sunt; imperare sibi (*one's self*) maximum est imperium, iratus non est apud se; tractatio litterarum nobis est salutaris; veritas semper mihi grata est.

ENGLISH-LATIN.

I relate, thou danceest, (our) brother labours; we sing, you labour, (our) friends dance; I, the teacher, teach; you, O scholars, learn; we grieve, thou paintest, the young men strike; we instructors do not try to teach you, O angry boys; good scholars ought (*debeo*) to command themselves; to command one's self is a virtue; it is difficult for (Dat.) the angry man to command himself; the angry are not masters of themselves (*apud se*); command is always pleasant to thee; is not command pleasant to us? to thee not to me is truth pleasant; truth is salutary to thee, to me, to us, to all.

VOCABULARY.

Modus, i, m. *a mode* or *manner* (E. R. *mood, modify*); vitium, i, n. *vice, fault*; cives, is, m. *a citizen* (E. R. *city*); parentes, ium, m. *parents*; caput, itis, n. *a head*; cantus, ûs, m. *a song*; réditus, ûs, m. *a return*; proximus a, um, *nearest, next, a neighbour*; par, paris, *like* (E. R. *pair, peer*); discordo 1, *I disagree*; porto 1, *I carry* (E. R. *porter*); faveo 2, *I am favourable to*; splendeo 2, *I shine* (E. R. *splendid, resplendent*); expĕto 3, *I desire, strive after*; obrepo (with Dative) *I creep upon*; acriter, *valorously, energetically*; per, prep. (with Acc.) *through*; propter (with Acc.) prep. *on account of*; de (with Abl.) *of, concerning*; nunquam, *never*.

LATIN-ENGLISH.

Obrēpunt vitia nobis nomine (*under the name*) virtutum; nos favemus vobis, vos non favetis nobis; tu me amas, ego te amo; mihi mea vita, tibi tua cara est; virtus per se splendet semper; cantus nos delectat; parentes a nobis diliguntur; O mi fili, nunquam mihi pares! frater me et te amat; egomet mihi sum proximus; tute tibi imperas bene; virtus propter sese colitur; suapte naturâ virtus expetitur; cives de suismet capitibus dimicant; sapiens omnia sua secum portat; nos vobiscum de patris reditu gaudebimus; tu tecum pulchre pugnas; Deus tecum est; saepe animus secum discordat; hostes nobiscum acriter pugnant; oratio tua tecum pugnat.

ENGLISH-LATIN.

I carry all mine (my things) with me; do wise men carry all their property (all theirs) with them? thou lovest me, I love thee, thy life is pleasant to me, my life is pleasant to thee; bad men always disagree with themselves; the handling (pursuit) of letters is very pleasant to us; men love themselves; do women love themselves? bad men love themselves very badly; virtue is beautiful by (*per*) itself; on account of thyself I love thee; my native country is more pleasant to me than thine to thee.

VOCABULARY.

Cura, ae, f. *care* (E. R. *a cure, curacy, curate*); ira, ae, f. *anger* (E. R. *ire*); desiderium, i, n. *a desire, an object of desire*; conservátrix, icis, f. *preservative* (E. R. *conservative*); benignus, a, um, *benignant, kind* (E. R. *benign*); industrius, a, um, *industrious*; mirus, a, um, *wonderful* (E. R. *admire*); perfidus, a, um, *treacherous* (E. R. *perfidy*); absens, tis, *absent*; insipiens (in and sapiens) *unwise*; memor, óris, *mindful* (E. R. *memory*); immĕmor, óris, *unmindful*; potens, tis, *powerful* (E. R. *potent*); impŏtens, *powerless* (E. R. *impotent*); teneo 2, *I hold* (E. R. *tenet*); ango 3, *I torture*.

LATIN-ENGLISH.

Omnis natura est conservatrix sui; mirum desiderium urbis, meorum et tui tenet me (*desire for, or after*) pater vehementer tuâ sui memoriâ (*thy recollection of him*) delectatur; ira est impotens sui (*has no power over itself*) sapiens semper potens sui est; vestri cura (*care for you*) me angit; omnes homines benigni judices sui sunt; vehementer grata mihi est memoria nostri tua; amicus mei et tui est memor; pater absens magno desiderio tenetur mei, et tui, mi frater, et vestri, O sorores; amici sunt nostri memores; multi vestrum mihi placent; plurimi nostrum te valde diligunt.

ENGLISH-LATIN.

The unwise man (fool) has no power over himself (impotens sui) (my) father has power over himself: virtue has power over herself; vice has not power over itself; has anger power over itself? nature is preservative of herself; the nature of virtue is preservative of itself; no one of you has power over himself; very many of us have power over ourselves; a treacherous friend is unmindful of me; faithful friends are not mindful of themselves; thy recollection and desire of me are very pleasant to me; care for thee tortures me; most of you, my scholars, are industrious; wonderful is the love of self.

Certain pronouns in Latin bear the name of demonstrative, because they point out (in Latin, demonstro, *I point out*; E. R.

demonstrates) the person or persons that are intended. The demonstrative pronouns are is, ea, id; ille, illa, illud; iste, ista, istud; hic, haec, hoc. Of these, is, signifies *this* or *that*, and approaches to our personal pronoun *he, his*, &c., hic denotes *this person*, that is, the nearer to the speaker; ille, *that person*, farther from the speaker; iste, *that person*, particularly when a person is addressed, the second person. From is, ea, id, idem, *the same*, is formed by the addition of dem; thus, is-dem contracted into idem, eă-dem, id-dem or idem. To these, may be added, ipse, ipsa, ipsum, *he himself, that very person*. In the following manner decline the

Demonstrative Pronouns.

Is, m.; ea, f.; id, n. *he or that.*

	Singular.				*Plural.*	
Cases	m.	f.	n.	m.	f.	n.
Nom.	is	ea	id	ii	eae	ea
Gen.	ejus	ejus	ejus	eorum	earum	eorum
Dat.	ei	ei	ei	iis (eis)	iis	iis
Acc.	eum	eam	id	eos	eas	ea
Abl.	eo	ea	eo	iis (eis)	iis	iis

Also, the Pronoun.—**Idem, m.; eadem, f.; idem, n. *the same.***

Cases.	*Singular.*			*Plural.*		
Nom.	idem	eădem	idem	iidem	eaedem	eădem
Gen.	ejusdem	ejusdem	ejusdem	eorundem	earundem	eorundem
Dat.	eidem	eidem	eidem	iisdem (eisdem)	iisdem	iisdem
Acc.	eundem	eandem	idem	eosdem	easdem	eadem
Abl.	eodem	eadem	eodem	iisdem (eisdem)	iisdem	iisdem

Iste, m.; ista, f.; istud, n. *that person.*

Cases	*Singular.*			*Plural.*		
Nom.	iste	ista	istud	isti	istae	ista
Gen.	istius	istius	istius	istorum	istarum	istorum
Dat.	isti	isti	isti	istis	istis	istis
Acc.	istum	istam	istud	istos	istas	ista
Abl.	isto	istă	isto	istis	istis	istis

Ille, m.; illa, f.; illud, n. *that person.*

Cases.	*Singular.*			*Plural.*		
Nom.	ille	illa	illud	illi	illae	illa
Gen.	illius	illius	illius	illorum	illarum	illorum
Dat.	illi	illi	illi	illis	illis	illis
Acc.	illum	illam	illud	illos	illas	illa
Abl.	illo	illă	illo	illis	illis	illis

Ipse, m.; ipsa, f.; ipsum, n. *the very person.*

Cases.	*Singular.*			*Plural.*		
Nom.	ipse	ipsa	ipsum	ipsi	ipsae	ipsa
Gen.	ipsius	ipsius	ipsius	ipsorum	ipsarum	ipsorum
Dat.	ipsi	ipsi	ipsi	ipsis	ipsis	ipsis
Acc.	ipsum	ipsam	ipsum	ipsos	ipsas	ipsa
Abl.	ipsŏ	ipsă	ipso	ipsis	ipsis	ipsis

Hic, m.; haec, f.; hoc, n. *this person.*

Cases.	*ngular.*			*Plural.*		
Nom.	hic	haec	hoc	hi	hae	haec
Gen.	hujus	hujus	hujus	hórum	hárum	hórum
Dat.	huic	huic	huic	his	his	his
Acc.	hunc	hanc	hoc	hos	has	haec
Abl.	hoc	hac	hoc	his	his	his

Examples.—After these models decline idem equus, *the same horse*; eadem rana, *the same frog*; idem vitium, *the same vice*; isto vir, *that man*; ista femina, *that woman*; istud nomen, *that name*; hic puer, *this boy*; haec puella, *this girl*; hoc praeceptum, *this command*; ille sensus, *that sense*; illa res, *that thing*; illud cornu, *that horn*.

Vocabulary.

Diligentia, ae, *f. diligence*; ignavia, ae, f. *idleness*; sententia, ae, *f. an opinion* (E. R. *sentence*); schola, ae, *f. a school*; memoria, ae, *f. memory*; Sallustius, i, *Sallust, the name of a Roman historian*; scriptor, ōris, m. *a writer*; auctoritas, ātis, *f. an authority*; tarditas, ātis, f. *slowness* (E. R. *tardy*); carmen, ĭnis, n. *a poem*; addictus, a, um, *given to, attached to*; fidus, a, um, *faithful*; saevus, a, um, *cruel*; elegans, ntis, *elegant*: iners, rtis, *inactive, sluggish*; mendax, ācis, *lying* (E. R. *mendacity*); hebĕto 1, *I grow dull*; firmo 1, *I strengthen* (E. R. *firm*); placeo 2, *I please*; displiceo 2, *I displease*; credo 3, *I believe* (E. R. *creed*); vita (imperative mood) *avoid*; expete (imp. mood), *seek for*.

Exercises.—Latin-English.

Sallustius est elegantissimus scriptor; ejus *(his)* libros libenter lego; amicum fidum habeo; ei addictissimus sum; fratris carmen valde mihi placet, id legere debes; ignavia corpus hebetet, labor firmat; illam vita, hunc expete; hae litterae graviter me movent; haec carmina suavissima sunt; isti homini mendaci non credo; huic duci milites libenter parent; illi viro omnes favent; praeclarum est istud tuum praeceptum; haec sententia mihi placet, illa displicet; hoc bellum est saevissimum; hic puer industrius est, ille iners; memoriā teneo praeclarum illud praeceptum; iste tuus amicus est vir optimus; ista vestra auctoritas est maxima; hujus discipuli diligentiam laudo, illius tarditatem vitupero; illi schola est gratissima, huic molestissima.

English-Latin.

Sallust is an elegant writer, Livy a more elegant (writer) and Cicero the most elegant; I gladly read their books; his *(ejus)* brother and friend are dear to me; thou hast a faithful friend, and art attached to him; my sons have faithful wives and love them much; I am greatly moved by that letter; thou dost not believe a lying woman (dative); this boy pleases, that boy displeases me; this poem is very elegant, that more elegant; this thy soldier is brave; the diligence of this scholar is praised by me the teacher; in this school [there] are more diligent scholars than in yours.

Vocabulary.

Fortūna, ae, *f. fortune*; Pompeius, i, m. *Pompey, the name of a Roman general*; clārus, a, um, *illustrious*; factum, i, n. *a deed*; meritum, i, n. *a merit*; oraculum, i, n. *an oracle*; Caesar, ăris, m. *Caesar, the name of a Roman general*; imperātor, ōris, m. *a commander* (E. R. *emperor*); virtus, tūtis, *f. bravery*; opus, operis, n. *a work* (E. R. *operative*); Delphicus, a, um, *Delphian, belonging to the oracle at Delphi, in Northern Greece*; inimicus, a, um, *unfriendly* (E. R. *enmity*); seditiosus, a, um, *seditious*; admirabilis, e, *admirable*; laudabilis, e, *laudable, praiseworthy*; expugno 1, *I take by storm*; tracto 1, *I treat, pursue*; obsideo 2, *I besiege*; studeo 2, *I strive after, endeavour* (E. R. *student*); fido 3, *I trust*; diffido 3, *I distrust* (E. R. *diffident*); nosco 3, *I become acquainted with*; agnosco 3, *I recognise, know*; resisto 3, *I stand against, resist* (with dative); sentio 4, *I feel, think* (E. R. *sentient*); pro (prep.), *for* (with the ablative); quia (conj.), *because* modo-modo, *now-now, at one time, at another*.

Latin-English.

Multi homines de iisdem rebus eodem die non eadem sentiunt; insipiens eidem sententiae modo fidit, modo diffidit; ipsi imperatori seditiosi milites resistunt; animus ipse se movet; virtus est per se ipsa laudabilis; saepe nihil est homini inimicius quam sibi ipse *(himself to himself; than he is to himself)* omne animal se ipsum diligit; cariōr nobis esse debet patria quam nosmet ipsi *(we ourselves)*; praeclarum est illud praeceptum oraculi Delphici, nosce *(know, imp.)* te ipsum; mendax saepe sibi ipsi diffidit.

English-Latin.

The enemies besiege the city and endeavour to take it by storm; the deed of that great man is praised by all writers; Caesar and Pompey are very illustrious Roman generals; to that (one) fortune is more favourable than to this (one); the bravery of that (one) and this (one) is wonderful; the king himself is the general of the army; not always dost thou think the same concerning the same things; the father and the son pursue the same learning (litterae); virtues are lovely in (by) themselves; all men love themselves; thy native country ought to be dearer to thee than thyself; know yourselves, young men; a liar often distrusts himself.

LESSONS IN ANCIENT HISTORY.—No. V.

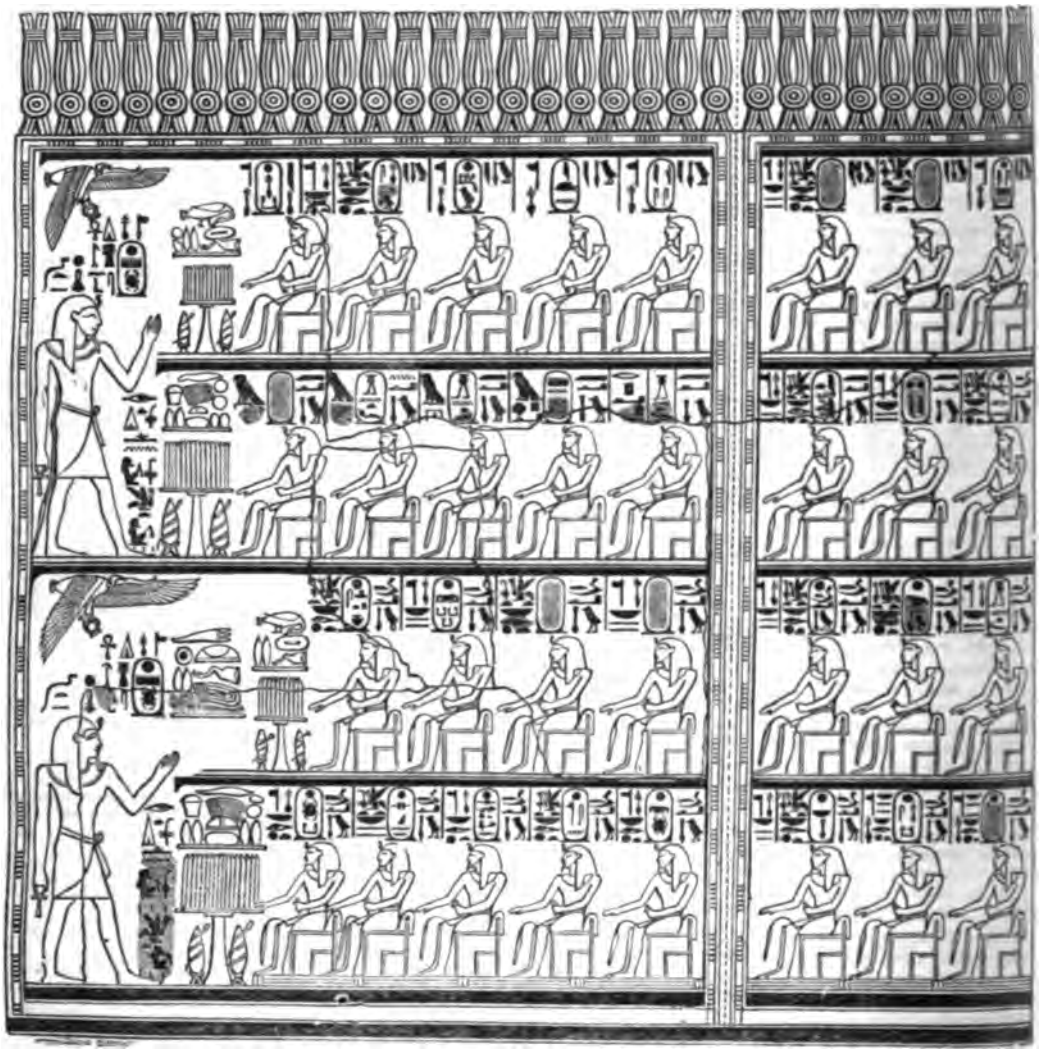
By Robert Ferguson, LL.D.

Rich as Egypt was in agricultural produce, it held no common place in manufactures and in commerce. There cotton and flax were carefully cultivated; and the fibres of many water-plants supplied the materials for nets and coarser canvass. Silk was not much used; but in weaving their cotton stuffs into cloth, it was not unusual to introduce some gold or silver threads, or to embroider them with flower-work, which proves that the people must have made some considerable progress in the mechanical arts. The wool was sometimes dyed, and though the Egyptian never mixed their colours to produce that variety of shade with which we are familiar, they yet possessed each colour in great perfection, and their cloth exhibited all those brilliant hues of the East, which the most ingenious nation of Europe has not been able to rival. Their muslins were of the finest texture, and were used for the official robes of the priesthood, and even of royalty itself.* All the manufactures were

* See Ezekiel xxvii. 7.

under the superintendence of the priests, who claimed a monopoly of all the cloth which was used for sacred purposes.

Not only did Egypt export large quantities of grain, but also much of the produce of her looms. It was not a maritime commerce, or a trade carried on by sea. The country was nearly destitute of timber for ship-building; the sea-coast was unhealthy; the harbours were few and of difficult navigation; and such were the advantages which the Nile, with its numerous canals, presented for intercommunication and traffic, that the Egyptians allowed this species of commerce to be wholly engrossed by foreigners. It is true that their maritime position on the Mediterranean, their own noble and navigable Nile, and at no great distance from it, the Red Sea, which was almost as favourable for commerce and navigation as the Mediterranean itself, offered many advantages for a wider and a freer traffic; but they neglected it. And so of their inland trade. "Though the intervening deserts of Nubia and Barca might at first seem to oppose insuperable obstacles to commercial intercourse with the interior of Africa, yet Providence had benevolently and wisely provided for the difficulty arising from this by the creation of the camel—that ship of the desert—by whose means intercommunication could be carried on with the regions beyond the deserts, even to the shores of the Niger. Notwithstanding these advantages, the Egyptians were decidedly averse to maritime affairs, whether commercial or warlike. They were an agricultural people, and could, at any time, command the introduction of foreign commodities. The superabundance of their agricultural productions, ensured for them a supply of such articles as their own country did not produce." Gold, ivory, ebony, and even slaves, were brought from Ethiopia and the Negro country to Syene; incense was imported from Arabia, and spices from India; and these were sold to the Greek and Phœnician merchants at the northern ports. Though Egypt had no ships of her own



BAS-RELIEF FROM THE HALL OF KINGS AT CARNAC.

thither sailed the ships of all other nations; and so long as she was under the dominion of her native princes, Sidon, Tyre, Arabia, Palestine, Cyprus, Greece, Sicily, and Carthage, were all enriched by the trade carried on in her ports, and by the articles of commerce which could be obtained there, and only there. It is said, that after the time of Sesostris, the Phœnicians carried on a large and lucrative commerce with Egypt, and that for a long period, they were the only people to whom her ports were open. Be this as it may, it is well known that Psammetichus was the first king who threw those ports open to foreigners in general. Commerce with the Greeks he particularly encouraged. This received a severe check b

Persian conquest, and suffered many interruptions until the time of the Ptolemies, under whom it revived in all its former greatness.

The Nile abounded in fish, and must have been, as an article of consumption, the source of a considerable revenue. Nor could those who were engaged in this species of traffic be men of very little weight in the state, since they are named next to the agriculturist. Hence it is that the prophet Isaiah, in describing the miseries that were to befall Egypt, and her population, represents the failure of the fishery as next to the decay of manufactures, and the cessation of commerce.

"Then shall the waters fail from the sea,
And the river shall be wasted and dried up.
And the streams shall become putrid;
The canals of Egypt shall be emptied and dried up;
The reed and the lilies shall wither;
The meadow by the canal, even at the mouth of the canal,
And all that is sown by the canal,
Shall wither, be blasted, and be no more.
And the fishes shall mourn and lament;
All those that cast the hook in the river,
And those that spread nets on the face of the waters, shall languish.
And they that work the fine flax shall be confounded,
And they that weave net-work.
And her stores shall be broken up;
Even of all that make a gain of pools for fish."*

Egypt made a boast of her river, and her soil, and her government, and her learning; but the prophet represents the besom of destruction sweeping over her, and leaving her destitute of all her ancient grandeur.

To the manufactures in metal, the Egyptians must have devoted considerable attention. Although iron appears to have been little known to them, they had a preparation of copper of such temper and hardness as rendered it fit for all the instruments of war, and of mechanical use. Nearly all the implements not made of gold or silver, as they are depicted on monuments and public buildings, seem to be either of copper or brass. The use of these metals is almost as old as the world, and in the first ages of human development were held of more utility than gold and silver. They could be turned to more practical account, and became objects of more general pursuit. It was enough that they were to be found in any country; people came from all parts in quest of them. When, where, and by whom these metals were discovered, we pause not to enquire. Certain it is that the Egyptians knew how to work them, and turn them to all the more important uses of life. The workmanship which they bestowed upon them was superior to that of any other nation at the same period of time. "The forms of their beds and couches may even now be taken as models; their harps far surpassed ours in the elegance of their shapes; the spindles and work-baskets of the ladies inspire a high notion of the refinement of their domestic life." The same may be said of their manufacture of clay. Their pottery and earthenware were of the first description. Their vases were of the most exquisite beauty and variety; their shapes and colours seem to challenge comparison with the most elaborate and finished specimens of Grecian art.

Of NAVIGATION, the Egyptians knew but little. They had become masters of the Phœnician forests before ship-building was attempted. The boats with which they navigated the Nile were strong, large, and well worked. It is very likely that as their most extensive quarries were on the banks of the river, advantage was taken of the annual rise of its waters to raise and float those immense blocks and masses of stone which composed their ancient edifices.

Respecting the origin and early progress of ARCHITECTURE, we know almost nothing. That it rose to considerable perfection in Egypt and in India is certain; but whether India borrowed from Egypt, or Egypt from India, is a question which remains still to be settled. But suppose we give the first place to Egypt, the history of its ancient cities, palaces, and temples, is all wrapped up in darkness and uncertainty. The ancient structures of Upper Egypt consisted of the simple pyramid; next of apartments enclosed by sculptured walls with flat roofs, supported by rows of columns, and connected by open porticos; and, lastly, of caverns, grottos, and tombs. The Egyptians built for permanence and perpetuity. They shrunk from the idea of annihilation, and hence their mummies, and obelisks, and sepulchres. The ruins of Thebes are such as still witness to the extent and magnificence of their architectural design. The royal edifices of Karnac, Luxor, and Memnonium, with their sculptures, decorations, and distribution of apartments, may challenge comparison with any palaces of more modern times. (See No. 1). The temple of Tentyra, situated upon the Libyan shore of the Nile, is considered to be amost finished superstructure. (See No. 8). The façade or front of the building is seventy-two paces in breadth, one hundred and forty-five in depth, and seventy feet in height. A doorway of elegant form and workmanship leads into a portico which is sixty paces by thirty, supported by twenty-four columns of seven feet diameter, and fifty-five feet in height. The hall, into which this portico conducts, is twenty-four paces square. It is supported by six columns, whose capitals are each composed of four figures of the head of Isis, with the ears of a cat. There is a second hall, which measures twenty-four paces by ten; and a third of the same dimensions. In the second hall there are two staircases, which lead to the terrace of roof; and from the third you pass into the inner sanctuary, which is twenty-four paces by six, and is insulated by a space on each side.

In the outlines and decorations of their columns, we pass from a simple bundle of reeds bound together with a cord, to hieroglyphics and triangular flutings. After this, we have elegant vase shapes, adorned with the stalks, leaves, buds, and blossoms of the palm, the vine, the papyrus, and the date. At the Memnonium, human figures were substituted for these columns, as was afterwards done by the Greeks. But in no instance did these decorations interfere with those outlines of the building which produced that imposing effect so peculiar to Egyptian architecture.

EGYPTIAN MUMMY.

SCULPTURE was practised extensively among the Egyptians, and yet they made but little progress in this beautiful art. Their reverence for the bodies of the dead deprived them of a sound knowledge of anatomy or of the structure of the human frame. Nor did their laws permit any innovation in the attitude and figure of the objects of their veneration; while in their own persons they possessed no elegant or symmetrical standard whereby to model their taste. Hence it is that their statues are so uniform and alike, displaying no disposition of parts. Neither muscle nor vein is made to appear as such. The prohibition which applied to the human figure did not extend to animals; and hence they succeeded in forming the animal figure so as to exhibit correctness and elegance in every part. "It was the popular belief among them that the spirit, when separated by death from the body, hovered round its former tenement so long as it could be preserved from corruption, but quitted it as soon as it was reduced to dust. Anxious, therefore, to preserve this link between their earthly and spiritual nature, they not only embalmed their dead with the most successful skill, but placed them in costly sepulchres, laboriously adorned with ornaments, devices, and hieroglyphic

* Isaiah xix. 5—10. (Louth's translation).

representations. The coffin, also, in which the body was enclosed, they curiously carved with forms expressive of the course pursued by the deceased in his lifetime, of religious rites, or of philosophical mysteries."

Painting existed among the Egyptians at a very early period. Their letters are nothing less than symbolical paintings. It was in these characters they wrote their laws, their mythology, their history, their science, their philosophy, and even their private records. Of this symbolical writing we have not yet found the key, and hence the language of Egypt is to the world still a language of mystery. In painting they never mixed one colour with another, and yet some of their productions are possessed of more than common merit. A French traveller has described a ceiling ornamented with figures painted of a yellow colour on an azure ground. The figures are represented in different attitudes, and accompanied with a variety of arms, musical instruments, and pieces of furniture. In one apartment everything was agricultural—the paintings being a representation of the plough, and various other instruments of husbandry, a man sowing grain on the brink of a canal, fields of rice, and harvest scenes. In another room, was a figure clothed in white, playing on a harp of eleven strings. Several figures—all of them Ethiopians, and painted black—were represented without heads, and one with the head being cut off; while the persons that were performing the decapitation, and held the swords, were painted in red. In whatever attitude the figure is represented, the head is always in profile.

HEAD OF THOTHMOSIS III.

From this simple style they seldom, if ever, departed. In painting the portraits of their dead upon the linen that enveloped the bodies of the mummy, they generally succeeded in producing a very correct likeness. Great care appears to have been bestowed upon the colouring, for after the lapse of ages on ages, it remains unchanged. Of the blending of colours, of light and shade, and even of grouping, they seem to have had little idea.

Music must ever be held as inferior to painting. The use of song is known among the rudest and most barbarous tribes. According to some authors, the history of music commenced with the history of Egypt; while others tell us, that the cultivation of music was forbidden among the Egyptians, and that they regarded it not only as useless, but as pernicious, since it rendered the minds of men effeminate. According to Plato, however, music formed an essential part of Egyptian education; that nothing but beautiful forms and fine music were permitted to enter into the assemblies of the young; that it was fixed by law, what forms and what music should be exhibited in the temples; and that it was the belief of the people, that their music was the gift of some deity or divine man. Herodotus tells us, that music was used in Egyptian festivals, and in religious rites; that in the great festival of Diana, at Bubastes, there was both vocal and instrumental music, and performed by both sexes; that in the processions of Bacchus or Osiris, the women bore the sacred images, and sung the praises of the god. The Greeks, themselves, admit that such musical instruments as the triangular lyre, the single flute, the tymbal or kettle-drum, and the sistrum or cymbal, were all of Egyptian invention. Nor must we overlook the fact, that in one of the Egyptian obelisks which now lies broken and prostrate in the Campus Martius at Rome, there is represented a musical instrument of two strings, and that this obelisk dates as far back as the reign of Sesostris, which was more than thirteen hundred years before the Christian era. The Egyptians referred all their useful inventions to the gods; and we are told that Hermes walking one day along the banks of the Nile, happened to strike his foot against a tortoise, the flesh of which being dried and wasted by the sun, nothing was left within the shell but nerves and cartilages, which being braced and concentrated by the heat, gave forth certain tones or sounds. The sound produced so pleased Hermes, as to suggest to him the idea of a lyre, which he constructed in the shape of the tortoise, and strung it with the dried sinews of dead animals. This lyre had three strings, which produced as many different sounds,—the grave, the mean, and the acute;—the first corresponding to winter, the second to spring, and the third to summer, for in their calendar the year was divided into these three seasons.

Questions for Examination.

What were the principal manufactures of Egypt?
What reason can be given for the Egyptians neglecting maritime commerce?
Which nations enjoyed the trade of her ports?
What proof is there that the fisheries of Egypt formed a source of considerable revenue?
Which was the principal metal employed by the Egyptians?
Of what character was the workmanship of these metals?
To what extent was navigation carried on in Egypt?
Describe the progress of her architecture.
To what are we to ascribe the fact that so little progress was made in sculpture?
If the Egyptians never mixed their colours, how was it that they were so successful in painting?
In painting the human figure, what style obtained?
Whether is music or painting superior?
What evidence is there that the Egyptians practised music?
How did instrumental music come into use?

LESSONS IN FRENCH.—No. X.

By Professor Louis Fasquelle, LL.D.

Section XXII.

1. If the ending or distinguishing characteristic of the conjugation of a verb, in the present of the infinitive, be removed, the part remaining will be the *stem* of the verb:—

Chant-er	Fin-ir	Rec-evoir	Rend-re

2. To that *stem* are added, in the different simple tenses of a regular verb, the terminations proper to the conjugation to which it belongs [§ 60].

3. Participle Present.

Chant-ant	Fin-issant	Rec-evant	Rend-ant
Singing	*Finishing*	*Receiving*	*Rendering*

4. Participle Past.

Chant-é	Fin-i	Reç-u	Rend-u
Singing	*Finished*	*Received*	*Rendered*

5. Termination of the Present of the Indicative.

Je	chant -e	fin -is	reç -ois	rend -s
	sing	*finish*	*receive*	*render*
Tu	parl -es	chér -is	aperç -ois	vend -s
	speakest	*cherishest*	*perceivest*	*sellest*
Il	donn -e	fourn -it	perç -oit	tend
	gives	*furnishes*	*gathers*	*tends*
Nous	cherch -ons	pun -issons	conç -evons	entend -ons
	seek	*punish*	*conceive*	*hear*
Vous	port -ez	sais -issez	d -evez	perd -ez
	carry	*seize*	*owe*	*lose*
Ils	aim -ent	un -issent	déç -oivent	mord -ent
	love, like	*unite*	*deceive*	*bite*

6. The present of the indicative has but one form in French, therefore Je chante, may be rendered in English by, *I sing*, *I do sing*, or *I am singing*.

7. The plural of the present of the indicative may be formed from the participle present by changing *ant* into *ons, ez, ent*. Ex.: chantant, *nous chantons*; finissant, *nous finissons*; recevant, *nous recevons*; rendant, *nous rendons*.

8. This rule holds good not only in all the regular, but in almost all the irregular verbs.

9. Verbs may be conjugated interrogatively in French (except in the first person singular of the present of the indicative) [§ 98 (4) (*b*)], by placing the pronoun after the verb in all the simple tenses, and between the auxiliary and the participle in the compound tenses.

Chantez vous bien ?	*Do you sing well?*
Avez vous bien chanté ?	*Have you sung well?*
N'avez vous pas bien chanté ? [Sect. 5, R. 2.]	*Have you not sung well?*
Ne chantez vous pas bien ?	*Do you not sing well?*
Votre père parle-t-il bien ? [Sect. 2, R. 6—Sect 4, R. 4.]	*Does your father speak well?*

10. The verb porter means *to carry*. It means also *to wear*, in speaking of garments; apporter means *to bring*, and emporter *to carry away*; aimer means *to love, to like, to be fond of*, and takes the preposition *à* before another verb.

Quel habit portez vous ?	*What coat do you wear?*
Je porte un habit de drap noir.	*I wear a coat of black cloth.*
Votre frère qu'apporte-t-il ? [Sect. 2, R. 6.]	*What does your brother bring?*
Il apporte de l'argent à son ami.	*He brings money to his friend.*

11. A noun used in a general sense [§ 77 (1)] takes the article le, la, l', or les.

Aimez vous le bœuf ou le mouton ?	*Do you like beef or mutton?*
Je n'aime ni le bœuf ni le mouton.	*I like neither beef nor mutton.*

Résumé of Examples.

Chantez vous une chanson italienne ?	*Do you sing an Italian song?*
Nous chantons des chantons allemandes.	*We sing German songs.*
Portez vous ce livre à l'homme ?	*Do you carry this book to the man?*
Non, je le porte à mon frère.	*No, I carry it to my brother.*
Emportez vous tout votre argent ?	*Do you carry away all your money?*
J'en emporte seulement une partie	*I carry away only a part of it.*
Finissez vous votre leçon aujourd'hui ?	*Do you finish your lesson to-day?*
Nous la finissons ce matin	*We finish it this morning.*
N'aimez vous pas les enfants attentifs?	*Do you not like attentive children?*
Je les aime beaucoup.	*I like them much.*
Ne recevez vous pas beaucoup de lettres ?	*Do you not receive many letters?*
Nous en recevons beaucoup.	*We receive many letters.*
Vendez vous beaucoup de marchandises ?	*Do you sell many goods?*
Nous en vendons beaucoup.	*We sell many.*
Votre frère aime le bœuf et le mouton.	*Your brother likes beef and mutton.*

Exercise 43.

[*We shall hereafter put a hyphen between the stem and the termination of the verbs placed in the vocabularies. The number indicates the conjugation.*]

Aim-er, 1. *to love, to like, to be fond of*; Autre, *other*; Assez, *enough*; Chapeau, m. *hat*; Chér-ir, 2. *to cherish*; Cherch-er, 1. *to seek, to look for*; Compagnon, m. *companion*; Dame, f. *lady*; De bonne heure, *early*; D-evoir, 3. *to owe*; Donn-er, 1. *to give*; Fin-ir, 2. *to finish*; Fourn-ir, 2. *to furnish*; Gard-er, 1 *to keep*; Guère, *but little*, Habits, m. p. *clothes, garments*; Mais, *but*; Maison, f *house*; Marchand, m. *merchant*; Marchandises, f. p. *goods*; Neveu, m. *nephew*; Non seulement, *not only*; Lecture, f. *reading*; Paille, f. *straw*; Perd-er, 4. *to lose*; Port-er, 1. *to carry, to wear*; Rec-evoir, 3. *to receive*; Souvent, *often*; Toujours, *always*; Travail, m. *labour*; Trouv-er, 1. *to find*; Vend-re, 4. *to sell*.

1. Votre mère aime-t-elle la lecture? [R. 11.] 2. Oui, Mademoiselle, elle l'aime beaucoup plus que sa sœur. 3. Quel chapeau votre neveu porte-t-il? 4. Il porte un chapeau de soie, et je porte un chapeau de paille. 5. Cette dame aime-t-elle ses enfants? 6. Oui, Monsieur, elle les chérit. 7. Fournissez vous des marchandises à ces marchands? 8. Je fournis des marchandises à ces marchands, et ils me donnent de l'argent. 9. Vos compagnons aiment ils les beaux habits? [R. 11.] 10. Nos compagnons aiment les beaux habits et les bons livres. 11. Cherchez vous mon frère? 12. Oui, Monsieur, je le cherche mais je ne le trouve pas. 13. Votre frère perd-il son temps. 14. Il perd son temps et son argent. 15. Perdons nous toujours notre temps? 16. Nous le perdons très souvent. 17. Devez vous beaucoup d'argent? 18. J'en dois assez, mais je n'en dois pas beaucoup. 19. Vendez vous vos deux maisons à notre médecin? 20. Je n'en vends qu'une, je garde l'autre pour ma belle-sœur. 21. Receves vous de l'argent aujourd'hui? 22. Nous n'en recevons guère. 23. Votre menuisier finit il son travail de bonne heure? 24. Il le finit tard. 25. A quelle heure le finis il? 26. Il le finit à midi et demi. 27. Nous finissons le nôtre à dix heures moins vingt minutes.

Exercise 44.

1. Does your companion like reading? 2. My companion does not like reading. 3. Does your father like good books? [R. 11.] 4. He likes good books and good clothes.* 5. Do you owe more than twenty dollars? 6. I only owe ten, but my brother owes more than fifteen. 7. Are you wrong to finish your work early? 8. I am right to finish mine early, and you are wrong not to (*de ne pas*) finish yours. 9. Do you receive much money to-day? 10. I receive but little. 11. Do we give our best books to that little child. 12. We do not give them, we keep them because (*parceque*) we want them. 13. Do you sell your two horses? 14. We do not sell our two horses, we keep one of them. 15. Do you finish your work this morning (*matin*)? 16. Yes, Sir, I finish it this morning early. 17. Does your brother-in-law like fine clothes? 18. Yes, Madam, he likes fine clothes. 19. Do you seek my nephew? 20. Yes, Sir, we seek him. 21. Does he lose his time? 22. He loses not only his time, but he loses his money. 23. How much money has he lost to-day? 24. He has lost more than ten dollars. 25. Does your joiner finish your house? 26. He finishes my house and my brother's. 27. Do you sell good hats? 28. We sell silk hats, and silk hats are good [R. 11]. 29. How old is your companion? 30. He is twelve years old, and his sister is fifteen. 31. Does your brother like meat? 32. He likes meat and bread. 33. Do you receive your goods at two o'clock? 34. We receive them at half after twelve. 35. We receive them ten minutes before one.

Section XXIII.

1. There are in French, as in other languages, verbs which are called irregular, because they are not conjugated according to the rule, or model verb of the conjugation to which they belong [§ 62].

2. Many irregular verbs have tenses which are conjugated regularly.

3. The singular of the present of the indicative of the irregular verbs, is almost always irregular.

4. In verbs ending in *yer*, the *y* is changed into *i* before an *e* mute [§ 49].

* Repeat the article.

5. Present of the Indicative of the Irregular Verbs.

Aller, 1. *to go*,	Envoyer, 1. *to send*;	Venir, 2 *to come*;
Je vais, *I go, do go, or am going*;	J'envoie [R. 4], *I send, do send, or am sending*;	Je viens, *I come, do come, or am coming*,
Tu vas,	Tu envoies,	Tu viens,
Il va,	Il envoie	Il vient,
Nous allons,	Nous envoyons,	Nous venons,
Vous allez,	Vous envoyez,	Vous venez,
Ils vont	Ils envoient [R. 4].	Ils viennent.

6. All verbs ending in *enir* are conjugated like venir.

7. The student will find in § 62 the irregular verbs alphabetically arranged. He should always consult that table, when meeting with an irregular verb.

8. The expression, à la maison, is used for the English *at home, at his* or *her house*, &c.

Le chirurgien est il à la maison ?	*Is the surgeon at home?*
Mon frere est à la maison.	*My brother is at home.*

9. The preposition chez, placed before a noun or pronoun, answers to the English, *at the house of, with* (meaning *at the residence of*), *among*, etc. [§ 142 (3)].

Chez moi, chez lui, chez elle.	*At my house, at his house, at her house.*
Chez nous, chez vous, chez eux, m. chez elles, f.	*At our house, at your house, at their house.*

That is literally, *at the house of me, at the house of him*, &c.

Chez mon père, chez ma sœur.	*At my father's, at my sister's.*

10. The word avec answers to the English *with*, meaning merely *in the company of*.

Venez avec nous, ou avec lui.	*Come with us, or with him.*

11. The word y means *to it, at it, at that place, there*. It is generally placed before the verb, and refers always to something mentioned [§ 39, § 103, § 104].

Votre sœur est elle chez vous ?	*Is your sister at your house?*
Oui, Monsieur, elle y est.	*Yes, Sir, she is there.*

12. In French, an answer cannot, as in English, consist merely of an auxiliary or a verb preceded by a nominative pronoun; as, Do you come to my house to-day? *I do*. Have you books? *I have*. The sentence in French must be complete; as, *I go there; I have some*. The words oui or non, without a verb would however suffice.

Venez vous chez moi aujourd'hui ?	*Do you come to my house to-day?*
Oui, Monsieur, j'irai.	*Yes, Sir, I will.*
Avez vous des livres chez vous ?	*Have you books at home?*
Oui, Monsieur, nous en avons.	*Yes, Sir, we have.*

Résumé of Examples.

Où est le colonel ?	*Where is the colonel?*
Il est chez son frère aîné.	*He is at his eldest brother's?*
N'est il pas chez nous ?	*Is he not at our house?*
Non, Monsieur, il n'y est pas.	*No, Sir, he is not.*
Madame votre mère est elle à la maison ?*	*Is your mother at home?*
Non, Madame, elle n'y est pas.	*No, Madam, she is not.*
Allez vous chez nous, ou chez lui ?	*Do you go to our house, or to his house?*
Nous allons chez le capitaine.	*We go to the captain's?*
N'est il pas chez votre frère ?	*Is he not at your brother's?*
Non, Monsieur, il est chez nous.	*No, Sir, he is at our house.*
N'envoyez vous pas vos habits chez vos sœurs ?	*Do you not send your clothes to your sisters?*
Je les envoie chez elles.	*I send them to their house.*
N'allez vous pas chez ce monsieur ?	*Do you not go to that gentleman's?*
Je n'y vais pas, je n'ai pas le temps d'y aller aujourd'hui.	*I do not* [R. 12], *I have not time to go there to day?*

Exercise 45.

All-er, 1. ir, *to go*.	Horloger, m. *watch-maker*.	Relieur, m. *bookbinder*.
Ami, m. *friend*.	Hollandais, e, *Dutch*.	Rest-er, 1, *to remain, live*.
Associé, m. *partner*.	Magasin, m. *warehouse*.	Russe, *Russian*.
Capitaine, m. *captain*.	Maison, f. *house*.	Ven-ir, 2. ir, *to come*.
Demeur-er, 1. *to live, dwell*.	Matin, m. *morning*.	Voisin, e, *neighbour*.
Gilet, m. *waistcoat*.	Peintre, m. *painter*.	

1. Où allez vous mon ami ? 2. Je vais chez Monsieur votre père, est il à la maison ? 3. Il y est ce matin. 4. D'où venez vous ? 5. Nous venons de chez vous et de chez votre sœur. 6. Qui est chez nous ? 7. Mon voisin y est aujourd'hui. 8. Où avez vous l'intention de porter ces livres ? 9. J'ai l'intention de les porter chez le fils du médecin. 10. Avez vous tort de rester chez vous ? 11. Je n'ai pas tort de rester à la maison. 12. L'horloger a-t-il de bonnes montres chez lui ? 13. Il n'a pas de montres chez lui, il en a dans son magasin. 14. Chez qui portez vous vos livres ? 15. Je les porte chez le relieur. 16. Allez vous chez le capitaine hollandais ? 17. Nous n'allons pas chez le capitaine hollandais, nous allons chez le major russe. 18. Est il chez vous ou chez votre frère ? 19. Il demeure chez nous. 20. Ne demeurons nous pas chez votre tailleur ? 21. Vous y demeurez. 22. Votre peintre d'où vient il ? 23. Il vient de chez son associé. 24. Où portez vous mes souliers et mon gilet ? 25. Je porte vos souliers chez le cordonnier et votre gilet chez le tailleur.

* The French in speaking to a person whom they respect, prefix the word Monsieur, Madame, or Mademoiselle, to the word representing their interlocutor's relations, or friends.

Exercise 46.

1. Where does your friend go? 2. He is going [Sect. 22, R. 6] to your house or to your brother's. 3. Does he not intend to go to your partner's? 4. He intends to go there, but he has no time to-day. 5. What do you want to-day? 6. I want my waistcoat, which (*qui*) is at the tailor's. 7. Are your clothes at the painter's? 8. They are not there, they are at the tailor's. 9. Where do you live, my friend? 10. I live at your sister-in-law's. 11. Is your father at home? 12. No, Sir, he is not. 13. Where does your servant carry the wood? 14. He carries it to the Russian captain's. 15. Does the gentleman who (*qui*) is with your father live at his house? 16. No, Sir, he lives with me. 17. Is he wrong to live with you? 18. No, Sir, he is right to live with me. 19. Whence (*d'où*) comes the carpenter? 20. He comes from his partner's house. 21. Has he two partners? 22. No, Sir, he has only one, who lives here (*ici*). 23. Have you time to go to our house this morning? 24. We have time to go there. 25. We intend to go there and to speak to your sister. 26. Is she at your house? 27. She is at her (own) house. 28. Have you bread, butter, and cheese at home? 29. We have bread and butter there. 30. We have no cheese there, we do not like cheese. 31. Is your watch at the watchmaker's? 32. It (*elle*) is there. 33. Have you two gold watches? 34. I have only one gold watch. 35. Who intends to go to my father's this morning? 36. Nobody intends to go there.

LESSONS IN GEOMETRY.—No. V.

ON FINDING THE AREA OF PLANE FIGURES.

As we have many applications for lessons in mensuration and surveying, founded on geometrical principles, we proceed to give in this one, the elements of the subject. As to plane geometry itself, which we are also particularly requested to take up, we can only say that we are preparing a cheap edition of Euclid, with annotations and exercises for the use of our students, and we expect that it will be ready in about a month.

Definition 1.—The *altitude* or *height* of a triangle is the perpendicular straight line drawn from the vertex of any angle of the triangle, to the side opposite that angle, taken as the *base*. Thus, in figs. 1 and 2, the perpendicular straight line A E, drawn from the point A, the vertex of the angle B A C, to the opposite side B C, fig. 1, as the base, or to the opposite side B C (fig. 2.), as the base produced, is called the *altitude* or *height* of the triangle. Sometimes it is merely called the *perpendicular* of the triangle. The point E is called the *foot* of the perpendicular, which determines the altitude; sometimes it falls within the triangle as in fig. 1, and sometimes it falls without the triangle, as in fig. 2. If a perpendicular were drawn from the vertex C of the angle A C B, to the opposite side A B, figs. 1 and 2, as the base, then, this perpendi-

Fig. 1.

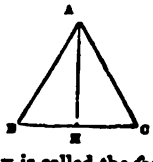
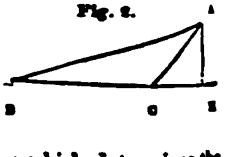


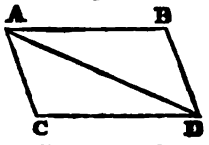
Fig. 2.



cular would be as much entitled to the name *altitude* or *height* of the triangle *to the base* A B, as the perpendicular A H is to the name *altitude* or *height* of the triangle *to the base* B C. The same may be said of a perpendicular drawn from the vertex B.

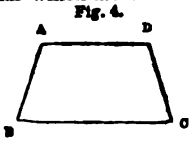
DEFINITION 2.—The altitude of a parallelogram is the perpendicular which measures the distance of its two parallel sides. Thus, in the parallelogram A B D C (fig. 3), if a perpendicular be drawn from the point B, or from any other point in the side A B, to the opposite side C D, it will measure the distance of the parallel sides A B, C D, and will be the *altitude* of the parallelogram A B D C, *to the base* C D. If a perpendicular were drawn from the point C, or from any other point in the side A C, to the opposite side B D, it would measure the distance of the parallel sides A C, B D, and would be the *altitude* of the parallelogram A B C D, *to the base* B D.

Fig. 3.



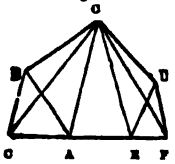
DEFINITION 3.—The altitude of a trapezoid is the perpendicular which measures the distance of its two parallel sides. Thus, in the trapezoid A B C D (fig. 4), if a perpendicular be drawn from the point D, or from any other point in the side A D to the opposite side B C, it will measure the distance of the parallel sides A D, B C, and will be the *altitude* of the trapezoid *to the base* B C.

Fig. 4.



DEFINITION 4.—The altitude of any rectilineal figure, or polygon, is the greatest of all the perpendiculars which can be drawn to any side, or to any side produced, *assumed as the base*, from the vertices of its different angles. Thus, in the polygon A B C D E (fig. 5), the perpendicular drawn from the vertex C to the base A E, being greater than the perpendiculars drawn from the vertices B and D, to the same base, is the *perpendicular* of the polygon A B C D E *to the base* A E.

Fig. 5.

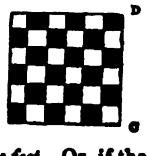


DEFINITION 5.—The extent of surface contained within the boundary of any plane figure, is called its *area*. Thus in the triangle A B C (figs. 1 and 2), the extent of surface contained within the three sides A B, B C, C A, is called the *area* of the triangle A B C. Again, in the parallelogram A C D E, the extent of surface contained within the four sides A B, E D, D C, C A, is called the *area* of the parallelogram A C D E.

DEFINITION 6.—Surfaces of ordinary extent are measured by the number of *square inches*, *square feet*, or *square yards*, which they contain, according as inches, feet, or yards, *in length*, have been used in taking their *dimensions*,—namely, their *length*, and their *breadth*. A *square inch* is a square whose side is *one inch long*. A *square foot* is a square whose side is *one foot long*. A *square yard*, is a square whose side is *one yard long*.

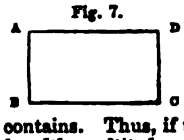
PROBLEM 1.—*To find the area of a given square.*—In order to determine the number of square inches, which are contained in a square of any size, as A B C D (fig. 6), measure the number of inches *long* in its side, and multiply this number by itself; the product will be the area or number of *square* inches which it contains. Thus, if A B the side of the square be measured, and found to be 6 inches *long*; then multiplying 6 by 6, you have 36 for the number of *square* inches in the square A B C D. The reason of this process is very obvious. For, if the inches be carefully marked along the sides A B, B C, and straight lines parallel to these sides be drawn through each inch-mark, it is plain that there will be 6 rows of six square inches; and these will all together contain 36 square inches; for $6 \times 6 = 36$. If the side of a square were measured and found to be 6 *feet long*; then, on the same principles, its *area* would be 36 *square feet*. Or, if the side of a square were measured and found to be 6 *yards long*; its area would be 36 square yards. In like manner, if the side of a square were measured and found to be 6 *miles long*, then, its area would be 36 *square miles*; and so on, for any other measurement, in inches, feet, yards, or miles.

Fig. 6.



PROBLEM 2.—*To find the area of a given rectangle.* In order to determine the number of square inches which are contained in a rectangle of any size, as A B C D (fig. 7), measure the number of inches in its *length*, and the number of inches in its *breadth* or *altitude*; then multiply these two numbers together; and the product will be the number of *square* inches it contains. Thus, if the *length* A D measures 10 inches, and the *breadth* or *altitude* A B 4 inches, then, multiplying 10 by 4, you have 40 for the number of square inches in the rectangle A B C D. The reason of this process is also very obvious. For if the inches be carefully marked along the sides A D, A B, and straight lines parallel to these sides be drawn through each inch-mark as before, it is plain that, like the case of the square, there will be 10 rows of 4 square inches, and these altogether will contain 40 square inches; for $4 \times 10 = 40$. Also, as in the case of the square, the area of the rectangle will be in square inches, square feet, square yards, or square miles, according as the measurements of the dimensions (that is, of the length and breadth) are taken in inches, feet, yards, or miles of length.

Fig. 7.



PROBLEM 3.—*To find the area of a given parallelogram.* In order to determine the area of a parallelogram, draw a perpendicular from any point in the base to the opposite side, or to that side produced; measure the length of the *base*, and the length of the perpendicular or *altitude*, multiply these two lengths together, and their product will be the area of the parallelogram. This rule is founded on the 35th proposition of Book I., Euclid's Elements, in which it is demonstrated that *parallelograms upon the same base and between the same parallels are equal.* Hence, if a rectangle and a parallelogram stand on the same base and between the same parallels, they are also equal. Now the breadth of the rectangle is the same as the breadth of the parallelogram; whence the area of the parallelogram is obtained, by finding the area of the rectangle that stands on the same base, and has the same *breadth* or *altitude*,—namely, the distance between the parallels. It is plain that the length of the oblique side of the parallelogram, that is, oblique to the assumed base, is not to be taken into consideration, in calculating its area; for, if it extended to an indefinite number of miles between the parallels, still its area would be the same.

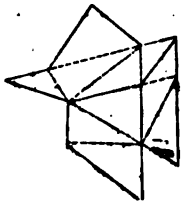
PROBLEM 4.—*To find the area of a given triangle.* For this purpose draw a *perpendicular* from the vertex of any angle, to the opposite side considered as the *base*, or to the base produced, if necessary; measure the length of the base, and the length of the perpendicular or altitude, multiply these two lengths together, and half their product will be the area of the triangle. This rule is founded on the 41st proposition of Book I., Euclid's Elements, in which it is demonstrated that *if a parallelogram and a triangle be on the same base and between the same parallels, the parallelogram is double of the triangle.* Now, since the rectangle formed by the base and the perpendicular breadth or altitude, is equal to the parallelogram on the same base and of the same breadth or altitude, it follows that the area of this rectangle is double the area of the triangle. Hence, the truth of the rule is evident.

PROBLEM 5.—*To find the area of a given trapezoid.* For this purpose, draw a perpendicular from any point in the base to the opposite side, or to that side produced; measure the length of the base, the length of the opposite side, and the length of the perpendicular or altitude; then add the lengths of the two parallel sides, and multiply their sum by the length of the perpendicular, and half this product will be the area of the trapezoid. This rule is plainly founded on the principle that if a diagonal be drawn joining two opposite extremities of the parallel sides, it will divide the trapezoid into two triangles, whose areas might be found separately, by Prob. 4, or conjointly by this rule.

PROBLEM 6.—*To find the area of a given rectilineal figure.* Divide the given rectilineal figure into triangles by drawing straight lines from one angular point to another, as shown in fig. 8. Then find the area of each triangle in this figure by Prob. 4. Add all these areas together, and their sum will be the area of the figure. It will shorten the process a little, and save fractions in the operation, first, to multiply the lengths of the bases and perpendiculars of the triangles together; then,

to add all these products together, and take half their sum, for the area of the figure.

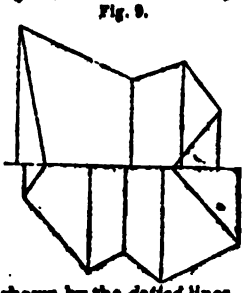
Fig. 8.



In fig. 8, the contour or boundary of the rectilineal figure is denoted by the *full* lines; and the straight lines drawn within it, to form the triangles necessary for determining its area, are denoted by the *dotted* lines. The perpendiculars requisite to be drawn and measured for the computation of the triangles, are not shown; but from the explanations already given, they can very easily be conceived.

A more convenient mode of finding the area of a rectilineal figure, and one more frequently used in practice, is to divide it into trapezoids and triangles, as shown in fig. 9. Then find the area of each trapezoid by Prob. 5, and of each triangle by Prob. 4; add all these areas together, and their sum will be the area of the figure. In planning this division of the figure it is best to draw as near as possible a straight line across the middle of it, and then from the angular points or vertices of the angles on each side of this straight line to draw perpendiculars to it. In fig. 9 these perpendiculars are shown by the *dotted* lines. The contour or boundary, and the central line, are denoted by the *full* lines. It will be seen from the consideration of this figure, that the areas of most of the triangles will in this case require to be subtracted from those of the trapezoids of which they form a part, because they are on the outside of the figure. Cases, however, can easily be supposed in which they will have to be added,—viz., when they are within the figure. In all such cases the computer of areas must use his judgment, or he may produce a serious error in the result.

Fig. 9.



The problems and rules we have just given, are sufficient to enable the intelligent and careful student to measure the area of any rectilineal figure, polygon, or surface, that may be presented to him. The fact is that they are the foundation of all the common processes of mensuration and land-surveying. With a foot rule, or a yard measure, the student may, if he understands these problems, proceed to measure surfaces of all kinds bounded by straight lines, in engineering, carpentry, plastering, roofing, building, painting, &c. With a measuring chain and measuring rods, he may also proceed to measure fields, commons, estates, and even townships, that are tolerably level and accessible to the taking of measurements. When greater accuracy is required, he will learn from future lessons what is necessary to be done, to accomplish this end.

LESSONS IN ENGLISH.—No. II.

By JOHN R. BEARD, D.D.

INTRODUCTORY.

LANGUAGE is the expression of thought by means of articulate sounds, as painting is the expression of thought by means of form and colour. The relations which subsist between our thoughts, when carefully analysed and set forth systematically, give rise to logic. The laws and conditions under which the expression of our thoughts takes place form the basis of grammar. The logician has to do with states of the intellect, the grammarian is concerned with verbal utterances.

That there are laws of speech a cursory attention to the subject will suffice to prove. There is, indeed, no province of the universe of things but is subject to law. Each object has its own mode of existence, which, in conjunction with the sphere of circumstances in the midst of which it is, gives rise to the laws and conditions by which it is controlled. Accordingly language takes its laws from the organs by which sound is made articulate, from the culture of the intelligent beings by whom these organs are employed, from the purposes for which speech is designed, and from even the medium and other outward influences in union with which these purposes are pursued.

Were there no such laws the science of grammar could not exist. The sciences are in each case a systematic statement of generalised facts, in other words of definite laws; and grammar rests on phenomena clearly ascertained, invariable in themselves, capable of being distinctly stated, and equally capable of being wrought into a system of general truths. In many instances, indeed, the facts with which grammarians have to deal present themselves in the actual state of language, in a fragmentary and almost evanescent condition. The quick and piercing eye, however, of modern philology has succeeded in detecting no few of these, and the highly-cultivated powers which have been applied to the subject, have been able of themselves to supply deficiencies, and to construct edifices out of ruins. Still many things remain involved in darkness; in relation to others sagacious conjecture has authorised only bare probability. These, however, are not embraced within the science of grammar. When doubt begins science ends. What is still unascertained or subject to difficulties remains to be explored, and can take its place as part of scientific grammar only when it has ceased to be a subject of doubt and debate.

If the conditions under which thought became speech had been in all cases the same, there would only have been one language on the face of the earth. Descending as mankind did from a common progenitor the various tribes would have spoken a common tongue. But diversities soon arose. The organs of speech, while in all cases they remain substantially the same, vary in minor particulars with each individual. Outward influences are most diversified. Men's pursuits were different almost from the first. Climate and soil change with every change of locality. And both original endowments and the degree of culture superinduced by external influences (or what may be termed indirect education) would be as diverse as the tribes, not to say the individuals of which the species consisted. All these diversified influences would speedily beget varieties in speech which time would increase and harden into different languages.

From this diversity, there arise two kinds of grammar, the universal, the particular. Universal grammar is formed by studying language in general, by passing in review the several languages which exist (or most of them), and selecting and classifying those facts which are common to all. Particular grammar is the result of the study of any one given language. By a careful consideration of the usages of the best English writers we discover what constitutes English grammar. If, after we have ascertained the laws of a number of separate languages, we then compare our discoveries one with another, and mark and systematise what we find common to them all, we compose a treatise on general grammar. Particular grammar resembles the anatomy of the human frame, and limits its teachings to one set of objects. Universal grammar is like comparative anatomy which treats of the general laws of animal life, as deduced from a minute study of the animal kingdom in general.

It is with particular grammar that I am here concerned;—of the grammar of our nation,—namely, the English, I have to treat.

Grammar and logic, or the laws of expression and the laws of thought are, we have seen, closely connected together in the nature of things. Not easily, then, can they be sundered in manuals of instruction. If separate they are related sciences; as being related to each other, they may afford mutual light and aid. Requiring separate treatment, they each give and receive illustration. Grammar assists the logician to put his thoughts into a lucid form; and logic assists the grammarian to make his utterances correspond to the exact analogy of his thoughts. No one can be a good grammarian who is without skill in logic; and no logician who neglects grammar can successfully convey his ideas to others.

But in a manual which proposes to handle the subject of grammar, and of English grammar, reference to logic must be tacit and latent; it may be felt, it must not be displayed. Yet, in at least one or two terms will our obligations to logic be more positive and outward, for I shall borrow from that science, the words *subject*, *attribute*, *predicate*, &c.; and this I shall do, because these terms, when once their import is understood, afford facilities for explanation far greater than the ordinary terms employed in English grammars. In these cases, however, and in other things in which I shall depart from what is usual, I shall also supply the customary views and the ordinary terms.

As the English language, like other languages, was spoken before its laws were formed into a systematic treatise called a grammar, so the real facts of the language in their primary and

their model form, exist and are to be looked for in the every-day speech of well-educated mothers and fathers. But for the constant change, to which language is subject, I should not have needed to add the qualifying epithet "well-educated." But as language changes, so grammar changes; and thus what was good grammar under the Tudors is not good grammar in the age of Queen Victoria. Consequently it is not all usage that is of authority, but only the usage of the educated. Yet what is now educated usage will by and by become bad grammar and be accounted vulgar. So has it been in the past. Many of the present inaccuracies of the uneducated once possessed the authority which belongs to cultured speech. Provincialisms in word, in idiom, and in pronunciation may be traced back to lips which of old gave laws to other fashions besides the fashion of utterance. It may seem strange, but strange as it seems it is true, that among our forefathers legislators talked and harangued in terms and in tones the faithful representatives of which may now be heard at the ploughtail and in the smithy. Yet was that language the correct language of the day. And it was the correct language of the day because it was the language of the educated. Hence the speech of educated persons is of authority in grammar no less than the language of the best authors. Nay, we seem likely to find a language in its greater purity when we take it from the lips of educated persons generally than when we derive it from the somewhat artificial shapes which it assumes in the learned or the popular volume. If so "household words" are good for grammar as well as for practical wisdom. And so it is in the nursery we may look for the English tongue in a form the most simple and yet the most idiomatic. Of all teachers of English grammar the best is a well-educated English mother. Speaking from her own Saxon soul, and speaking to her own Saxon offspring, she pours forth from that "well of English undefiled," the Saxon element of our language, a stream of words and sentences which are sterling coin of the royal mint, current in all parts of the kingdom, the very substratum of English thought, whether found in books, in living speech, or in time-honoured institutions. Hence it is evident that a nursery in a cultivated English home, is the best school of English grammar. As a matter of fact, it is in such schools that, among the upper classes of this country, the young learn to speak correct English from their earliest days. Were all English children trained in such schools, the language would be everywhere well, and grammatically spoken. Consequently, could we place our students in cultivated nurseries, they would soon speak and write their mother tongue with correctness and propriety. We are unable to accomplish this. In nurseries of a different kind have they been brought up. They have been in schools, that is, their own houses, where they have learnt inaccuracies, where they have formed practices wrong in word, wrong in pronunciation, wrong in form. They have, therefore, not only to learn the right, but they have also to unlearn the wrong. A twofold difficulty attaches to their task. This twofold difficulty I shall constantly bear in mind, while I endeavour to introduce into these pages the language and the training of a cultivated English home, in such a way as to exhibit the fundamental usages and essential laws of the English language, as spoken by educated persons, and written by first-class authors. I cannot place the young of the working classes in cultivated nurseries, but I may attempt to do the next best thing; and that is, to bring forth and set before them in a living and organic form, the spoken language of such nurseries. And this shall I undertake, the rather because, as the mother is the child's natural educator, or, to speak more correctly, as the mother is an educator of God's own appointment, so every system of education will be good and effectual in proportion, as it is in form, substance, and spirit, motherly.

CORRESPONDENCE.

DOUBLE POSITION.

A correspondent requests an *intelligible* solution to the following question, No. 773, in "Walkingame's Arithmetic" (1826), under the rule of *Double Position*:—

"A man had 2 silver cups of unequal weight, having one cover to both of 5 oz.; now if the cover be put on the less cup, it will be double the weight of the greater; and if set on the greater cup, it will be thrice as heavy as the less; what is the weight of each?"

The rule of double position requires two suppositions to be made, and the errors to be noted; the 1st supposition to be multiplied by the second error, and the 2nd supposition by the first error; and then the difference of the products divided by the difference of the errors, when the errors are both in excess or both in defect; but the sum of the products divided by the sum of the errors, if one be in excess and the other in defect.

In this question suppose the less cup to weigh 7 ounces, then adding to this 5 ounces (the cover), the weight is 12 ounces; this is double the weight of the greater cup, which accordingly weighs 6 ounces. Now, adding 5 ounces to this, the weight of the greater cup and cover is 11 ounces; but by the question, this weight is three times 7 ounces, or 21 ounces, this gives an error of 10 ounces in excess.

Again, suppose the less cup to weigh 9 ounces; then, adding to this, 5 ounces (the cover), the weight is 14 ounces; this is double the weight of the greater cup, which accordingly weighs 7 ounces. Now, adding 5 ounces to this, the weight of the greater cup and cover is 12 ounces; but by the question, this weight is three times 9 ounces, or 27 ounces; this gives an error of 15 ounces in excess.

Now, the product of the first supposition 7, by the second error 15, is 105; and the product of the 2nd supposition 9, by the first error 10, is 90; whence, the difference of these errors is 15; but the difference of the errors is 5; whence, 15 divided by 5, gives 3 ounces for the weight of the less cup.

Now, to find the weight of the greater cup, add the weight of the cover, 5 ounces to 3 ounces the weight of the less cup, and the whole is 8 ounces; by the question, this is double the weight of the greater cup, which is accordingly 4 ounces. Thus, the answer is 3 ounces the less cup and 4 ounces the greater cup.

The proof is as follows:—Add 5 ounces, the weight of the cover, to 4 ounces, the weight of the greater cup, and you have 9 ounces; by the question, this is three times the weight of the less cup, which accordingly is 3 ounces, as it ought to be.

LITERARY NOTICES.

LIVES AND WORKS OF THE PAINTERS OF ALL NATIONS.—On July the 1st, JOHN CASSELL will publish the first part of a magnificent work, in imperial quarto, under the above title, containing a portrait of Murillo, and seven specimens of his choicest works including the "Conception of the Virgin," lately in the collection of Marshal Soult, and recently purchased by the French Government for the Gallery of the Louvre, for the sum of £23,440. The general editorship will be intrusted to MR. M. DIGBY WYATT, architect. Each Monthly Part will consist of sixteen pages of letter-press, with numerous illustrations inserted in the type, together with several separate plate engravings, and will appear on the first of every month, at 2s. each, and will be supplied through every bookseller in town or country.

CASSELL'S SHILLING EDITION OF EUCLID.—In consequence of the interest excited among all classes of the readers of the POPULAR EDUCATOR, since the publication of our Lessons in Geometry in that work, John Cassell has determined to issue a Popular Edition of THE ELEMENTS OF GEOMETRY, to contain the First Six, and the Eleventh and Twelfth Books of Euclid, from the text of Robert Simson, M.D., Emeritus Professor of Mathematics in the University of Glasgow; with corrections, Annotations, and Exercises, by Robert Wallace, A.M., of the same university, and Collegiate Tutor of the University of London. This work will be ready the first week in July, price 1s. in stiff covers, or 1s. 6d. neat cloth.

SCRIPTURE LIBRARY FOR THE YOUNG, in Shilling Volumes.—The first two volumes of this instructive series of works, "The LIFE of JOSEPH," illustrated with sixteen choice engravings and maps, and "The TABERNACLE, its PRIESTS, and SERVICES," with twelve engravings, are now ready. The "LIFE OF MOSES" is in the press.

THE ILLUSTRATED EXHIBITOR AND MAGAZINE OF ART.—The First Volume of this splendidly embellished work, handsomely bound, price 6s. 6d., or extra cloth gilt edges, 7s. 6d., will be ready July 1, and will contain upwards of Two Hundred Principal Engravings, and an equal number of Minor Engravings, Diagrams, &c.

COMPLETION OF JOHN CASSELL'S LIBRARY.—This invaluable Work is now complete, in 26 Volumes, 7d. each in paper covers; double Volumes, cloth, 1s. 6d., or when 3 Vols. in 1, 2s. 3d. The entire Series may be had, bound in cloth, 19s. 6d., or arranged in a Library Box 20s.

The EMIGRANT'S HANDBOOK, a Guide to the Various Fields o Emigration in all Parts of the Globe, is now ready, price 6d.

THE PATHWAY, a Monthly Religious Magazine, is published on the 1st of every month, price twopence—32 pages enclosed in a neat wrapper. Vols. I. and II., neatly bound in cloth and lettered, price 2s. 3d. each, are now ready.

*** PORTFOLIOS for enclosing 26 numbers of THE POPULAR EDUCATOR, price 1s. 6d., may be procured at our office. These Portfolios are so constructed as to form, upon the completion of each volume, a neat Case for binding the same, which will be done at a trifling expense by any bookbinder.

ANSWERS TO CORRESPONDENTS.

WILLIAM SMITH.—We thought we had explained all the more difficult terms in our Lessons on Physiology, and that what we have left undefined could be found in any common English dictionary. But as it is our duty to teach, if he will favour us with a list of the terms, we promise to furnish him with the meaning and pronunciation of each of them. Let him persevere.

J. A. STANLEY (Macclesfield).—*Allor* must be a misprint; *aller* means *to go*; *bon* is pronounced *bong*, exactly like our English word *long*. —C.K.K.—The first *c* in *succès* is pronounced like *k*.—L.W. has not quoted the passage *correctly*. We do not see his difficulty.—J.G. (Kelso) is right on the subject of the nines and the misprint in the Latin.—G.A. (Stafford): The disk of the moon is covered with a great variety of spots, which are quite permanent, but differ very much in brightness. The inequalities of illumination are visible to the naked eye. Since the invention of the telescope, they have engaged the attention of astronomers, and their relative positions ascertained and laid down in *lunar* maps, and globes. Of the latter, Miss Readehouse, and of the former, Mr. Nasmyth, had fine examples in the Great Exhibition. The bright spots are considered to be the tops of *lunar* mountains enlightened by the sun, the dark spots or places are thought to be cavities similar to our valleys, or even deep and wide caverns which have no parallel on the earth's surface. At first, they were supposed to be seas, but this opinion is exploded.

T. D. R. should apply to the editor of the *Working Man's Friend*, as his queries are out of our province.—J. D—y, Joiner, is right; the solution bears upon the question, but it borrows principles from the 6th book of Euclid.—ר מ: we forgot to acknowledge his solution of query 7, No. 2.—A Friend to Greek is right; we must attend to his suggestion whenever it is possible.—C. LEWIS (Haverfordwest); yes.—EXCELSIOR deserves praise for his good intentions, we hope he will persevere; his questions have been answered among our notices to correspondents. —Thanks to Mr. R. J. RALPH for his kind suggestions.—E. H. (Bradford): his letter to us does his head and heart great credit; we say to him persevere in the acquisition of knowledge under all difficulties; his poetry is very fair, but we do not approve of the subject. An Emigrant has no right either in the sight of God or of man, to leave his wife and child; and if the poem were written with an angel's pen and power we would not, we could not approve.—"Somebody we don't know" at Trowbridge, has sent us some remarks on phrenology, of which we entirely approve. As to the Latin, perseverantia vincit omnia. We are of the same opinion as to phrenography, that he is as to phrenology.—BENJAMINUS (Cottingham): We expect they will be sufficient for any one. Let him study the books he mentions also, they are very excellent. As to our journal being sent to America, why should it be an exception to the general rule?—H. W.: The verb *taceo* is *neuter*, that is, neither active nor passive; and so is its meaning in English. —AMOR (Carlisle): His solutions are correct.—X. Y. Z. (New Basford): *Calligraphy* means *beautiful writing*, whether of the characters or of the style. As to the characters, we shall give instructions under the head of penmanship; and as to the style, let him study Dr. Beard's Lessons in English.—DAVID CADWALLADER (Tipton): His answer to query 2, No. 7, is correct.—WALTER GALT (Glasgow): Thanks for his corrections, he is quite right; they are shameful misprints. The letter *e* is not sounded at the end of a word unless acutely accented; but the letter *i* is sounded.—TROIS ECOLIERS ATTENTIFS (Liverpool). *Très* is used with an adjective or an adverb, to mark excellence or excess; it is rarely used with a participle or a reflective verb; it should only be employed in affirmative phrases; in negative phrases, *bien* and *fort* are used instead.

DARBY (Rathfriland): We shall be glad to indulge her in her favourite study, when possible. The Celts, according to Herodotus, the oldest historian extant, were a people who in his time inhabited the remotest part of Europe westward, at the source of the Ister or Lower Danube. The Seven Wonders of the world were, the Colossus of Rhodes, the Mausoleum of Artemisia, the Labyrinth of Crete, the Hanging Walls of Babylon, the Pyramids of Egypt, the Statue of Jupiter Olympus, and the Temple of Diana at Ephesus. As to heraldry, we must refer her to the Royal Herald office.—Φιλομαθ: We thank him for his useful suggestions. LAND O' CAKES (Alloa). The sounds and many words of the German, are more like those of the Lowland Scotch than those of the modern English. WILLIAM GRIFFITH (Sheffield) is informed that portfolios may be had at this office, price 1s. 6d. each; and when the volume is complete, it may be bound in one of these.—U. I. (the initials of an inquirer at Hull) is advised to write direct to the "Governesses" Benevolent Institution," Kentish Town, for the information she wants. —D. H. DRIFFIELD: Two studies, at least, may be carried on together with advantage; especially the two he likes best. "Common placing" is useful for reference. He has very nearly hit our idea on the mathematics.—J. M. (Haggerston): Right; but there is a more elegant way. —J. S. (Ayrshire): His answers are right.—H. B. (Holmfirth): His solutions are very correct; let him go on and prosper.—E. C. HUGHES (Lisard street): His solutions and observations are correct.—JOHN BURGESS (Manchester): We have not forgotten penmanship.—W. S. WALTON (Fife) has sent us good solutions of several problems.

LATIN.—W. S.: Verbs of motion take after them the accusative with ad. The dative case is immediately dependent on a verb or an adjective. Your words are not Latin.—A. Y. (Manchester) is informed that ornament is from orno, from which is also formed adorn with the aid of the preposition ad. Delight, delectable, &c., are from the Latin delisse, delecto. The querist will in time learn that in etymology one vowel passes into another, under certain conditions.—J. C.'s exercise will do; let him look to his English spelling.—T. G. should pronounce the words as if written, thus, judex, judicis, judici, judicem, judex, judici. A list of books will be given; at present keep exclusively to the lessons of the P. E.—SELF-TAUGHT's progress will depend on the intensity of his application. Two hours a day for twelve months ought to enable any young man to read Latin with ease.—PARVUS is informed that amo denotes the love of a parent, and diligo the love of a friend.—CAESAR'S exercise is carelessly done, and therefore full of errors, such as plantas (for plantae) floreat; if he does not know that the subject of a proposition must be in the nominative case, he should begin his grammatical studies afresh.—INVESTIGATOR: Neuter nouns of the third declension have in the accusative the same ending as in the nominative; dele *(erase)* the words *or N.* p. 91, 2nd. col. line 17, from the bottom.—J. D. OAR: "Inversion" is a Latin word which strictly means *changing*. In the grammatical use of the word, it signifies a change in the position of words, and such a change as puts the words into an order different from that which they commonly hold in English. Inversion in the case of the words "the knight was bold" would place them thus, "Bold was the knight." The effect thus produced is an effect of emphasis; the word *bold* is made prominent and noticeable. The Latin inversion is similar in character and produces a similar effect.

H. W. T. (Colchester): His suggestions are good, and will meet with our earliest possible attention.—G. A. (Reading): Mental arithmetic will find a place.—W. M. STEPHENSON, jun. (Bramley): We shall be glad to insert one of his questions a little more ingenious than what we have received.—S. G. (Belfast): We request him to read our remarks at p. 22, col. 2, near the top.—D. KEAY (Dundee) has sent us a clever solution of Prob. 1, p. 111, which requires the 21st of the 1st Book of Euclid.—L. A. Y. D. (Dewsbury): See note at bottom of p. 72, col. 2.—PHILOMATHES (Temple): Yes, to all his inquiries.—A Draper somewhere in Somerset, wishes us to give lessons in writing, with *a drawing of the hand as it should be when holding a pen*; also remarks on the different styles of caligraphy. This is a very capital suggestion, and one that would be of great advantage to himself; as we find it almost impossible to make out the name of the place in Somerset, or the name of the writer of the letter; although we can make out all the rest pretty well. He says that he holds a situation where there are sixteen young men, not one of whom holds his pen in an easy, gentlemanly manner.—R. M'C. (Smethwick): The rule for pronouncing Latin is very plain: *Pronounce it like English*. In *vincis*, the pronunciation *vinkis* is contrary to the general rule in English, that *c* sounds *soft* like *s* before *e*, *i*, and *y*; and *hard* like *k* before *a*, *o*, and *u*. This rule is not without exceptions in English, but there is *no need* for any exceptions in Latin. Then as to *curro*, were it an English word, the *u* would be pronounced short like *u* in *current*, because of the double *r* in the middle; but if it were *curo*, the *u* would be pronounced long like *u* in *curious*. We thank him for the suggestion regarding a plan for tracing problems; but we do not see how the figures so drawn can be sent to us by post.—SERVANT: His rule wants explanation beyond 19 times 19.—L. (Dublin): His solution of Prob. 1, p. 111, is very neat and correct.—CYMRW (Peckham): Ditto.—P. M. C. (Aberdeen): Correct solutions of of Prob. 1 and 3, p. 111.—L. E.: 1. Christianity was established from the beginning of the world. 2. Its founder called himself the Messiah first. 3. Neither Saturday nor Sunday; but the Lord's day.—R S. N. F.: John Cassell's Edition.—G. F. A. SPILLER: The word *obtuse*, line 26 from the bottom, is a misprint; it should be *oblique*, as may be seen in the 8th line above it. *Salient* means *coming forward*, literally *leaping forward*; *re-entrant*, means *going back*. O tempora! O mores! an exclamation indicating the degenerate state of public morals and practices; it literally means, *Oh what times! Oh what manners!* the word *what* being implied though not expressed.—John WHITAKER (Colne): Being well supported, we shall give in time the higher part of the sciences. We request him to look at our superior edition.—J. B. S. (Haworth): His suggestion is good; it will be considered.—A. B. (Colne): By all means learn English first.—DAVID CRAWFORD (Largo): His solution of Prob 7, p. 32, is very clever.—G. W.'s solution of Prob. 8, p. 32, is correct.—JOHN (Berwick-on-Tweed): His solutions do not come up to the mark.—J. H. GATES (Canterbury): Must be in a mistake about the squaring of his circle.

W. L., of Douglas Forge, will find from the first paragraph of Lesson V. on Physiology, that the word CHYME in the connexion which he indicates in Lesson IV. is an error of the press for "LYMPH." We are happy to think that we have so attentive and devoted a student.

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LESSONS IN GERMAN.—No. II.

Section III.

German Chirography or Handwriting.

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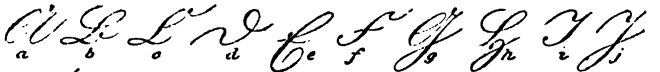
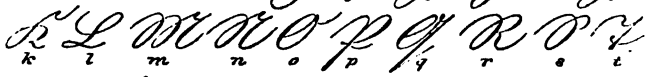
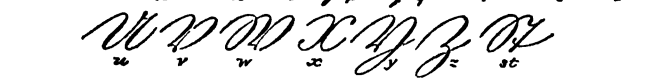
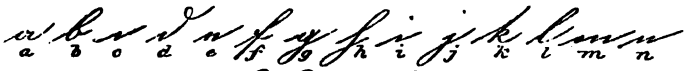
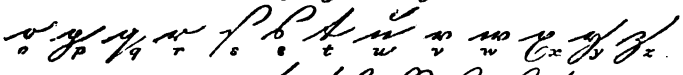
A B C D E F G H I J		A B C D E F G H I J
K L M N O P Q R S T		K L M N O P Q R S T
U V W X Y Z. ſt.		U V W X Y Z. ST.
a b c d e f g h i j k l m n		a b c d e f g h i j k l m n
o p q r ſ s t u v w x y z.		o p q r s s t u v w x y z
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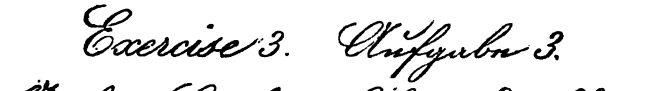
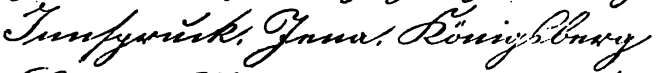
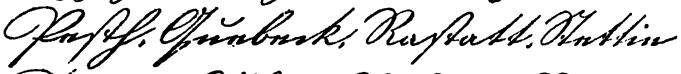
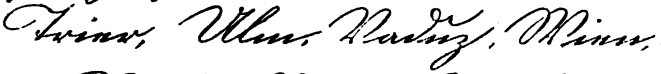
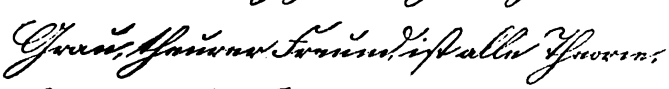
Exercise 3. Aufgabe 3.		Exercise 3. Aufgabe 3.
Aachen, Berlin, Cöln, Dresden,		Aachen, Berlin, Cöln, Dresden,
Ems, Frankfurt, Gotha, Hamburg,		Ems, Frankfurt, Gotha, Hamburg,
Innſpruck, Jena, Königsberg,		Innspruck, Jena, Königsberg,
Leipzig, Mainz, Nürnberg, Ofen,		Leipzig, Mainz, Nürnberg, Ofen,
Peſth, Quebeck, Raſtatt, Stettin,		Pesth, Quebeck, Rastatt, Stettin,
Trier, Ulm, Vaduz, Wien,		Trier, Ulm, Vaduz, Wien,
Xanton, Ypern, Zürich.		Xanton, Ypern, Zürich.
Grau, theurer Freund, iſt alle Theorie,		Grau, theurer Freund, ist alle Theorie,
Doch grün des Lebens goldner Baum.		Doch grün des Lebens goldner Baum.

Section IV.

In German the definite Article has, in the Nominative singular, a distinct form for each gender. Ex.:

Der Mann, the man;	der Bruder, the brother;
Die Frau, the woman;	die Schweſter, the sister;
Das Haus, the house;	das Glas, the glass.

I. Some nouns, denoting *inanimate* objects, are in German, as in most languages, called *masculine* or *feminine*; and some, denoting *animate* objects, are called *neuter*. Ex.:

Masculine: Der Apfel, the apple; der Baum, the tree;
Feminine: Die Traube, the grape; die Nadel, the needle;
Neuter: Das Kind, the child; das Pferd, the horse.

Many words that are treated as *masculine* or *feminine* in one language, are regarded as being of the opposite gender in another: thus, in French, apple (la pomme) is *feminine*, while grape (le raisin) is *masculine*. In German the word *head* (der Kopf) is *masculine*; in French (la tête) it is *feminine*; and in Latin (caput) it is *neuter*. The word *hand* (die Hand, la main, manus) is *feminine* in the three languages.

Conjugation of the present tense singular of haben.

Assertively.		*Interrogatively.*	
Ich habe,	I have	habe ich?	have I?
Sie haben,	you have.	haben Sie?	have you?
Er hat,	he has.	hat er?	has he?

Observation.—The pupil should invariably make himself so familiar with the meaning of the words given in the several Exer-

cises, as to avoid the necessity of referring to them while translating. Nothing is better adapted to fix a word in the *memory* than the *process* of *transcribing* it; and, by doing this in the *German character*, the requisite *familiarity* with the word and the peculiar *chirography* or *handwriting* of the language, are both secured at the same time.

Exercise 4.

Auch, also, too;	Haben, to have;	Nein, no;
Bäcker, m. baker;	Ich, I;	Nur, only;
Bier, n. beer;	Ja, yes;	Sie, you;
Brauer, m. brewer;	Kaffee, m. coffee;	Thee, m. tea;
Brod, n. bread;	Kind, n. child;	Und, and;
Der, das, the;	Korn, n. grain;	Was? what?
Er, es, he, it;	Mädchen, n. girl;	Waſſer, n. water;
Fleiſch, n. meat;	Mehl, n. flour;	Wein, m. wine;
Fleiſcher, m. butcher;	Müller, m. miller;	Wer? who?

Der Brauer hat Wein, Sie haben Kaffee, und ich habe Waſſer. The brewer has wine, you have coffee, and I have water.

Das Pferd hat Heu, das Kind hat Brod, und das Mädchen hat Thee. The horse has hay, the child has bread, and the girl has tea.

1. Wer hat Brod? 2. Der Bäcker hat Brod. 3. Hat der Bäcker Mehl. 4. Ja, er hat auch Mehl. 5. Was hat der Müller? 6. Der Müller hat Mehl und Korn. 7. Wer hat Fleiſch? 8. Der Fleiſcher hat Fleiſch. 9. Haben Sie Bier? 10. Nein, der Brauer hat Bier. 11. Haben Sie Wein? 12. Nein, ich habe Kaffee. 13. Was hat das Mädchen? 14. Das Mädchen hat Thee. 15. Hat der Brauer Korn? 16. Nein, er hat nur Bier und Wein. 17. Was hat das Kind? 18. Es hat Waſſer. 19 Hat es auch Brod? 20. Ja, es hat Brod und auch Fleiſch.

Questions. 1. What is said of the *definite Article* in German? 2. Of the *gender* of German *nouns*? 3. What is the *masculine form* of the definite article in the *nominative singular*? 4. What is the *neuter form*? 5. What is the substance of the *Observation*?

Section V.

All German verbs are conjugated interrogatively, in the present and imperfect tenses, like *have* and *be* in English; that is, by placing the verb before its subject, without an auxiliary. Ex.:

Haben Sie das Buch?	Have you the book?
Leſen Sie das Buch?	Read you the book? (Do you read the book?)
Iſt er hier?	Is he here?
Wohnt er hier?	Resides he here? (Does he reside here?)
Hatte er den Brief?	Had he the letter?
Schrieb er den Brief?	Wrote he the letter? (Did he write the letter?)
War er hier?	Was he here?
Wohnte er hier?	Resided he here? (Did he reside here?)

CONJUGATION OF THE PRESENT TENSE SINGULAR OF lieben.

Assertively.	*Interrogatively.*
Ich liebe, I love;	liebe ich? love I? (Do I love?)
Sie lieben, you love;	lieben Sie? love you? (Do you love?)
Er liebt, he loves;	liebt er? loves he? (Does he love?)

DEFINITE ARTICLE MASCULINE AND NEUTER IN THE NOMINATIVE AND ACCUSATIVE.

THE MASCULINE FORMS.

Nominativ.		Accuſativ.	*Nominative.*		*Objective.*
Der Vater	liebt	den Sohn,	The father	loves	the son.
Der Sohn	liebt	den Vater,	The son	loves	the father.

THE NEUTER FORM.

Nominativ.		Accuſativ.	*Nominative.*		*Objective.*
Das Kind	liebt	das Mädchen,	The child	loves	the girl.
Das Mädchen	liebt	das Kind,	The girl	loves	the child.

Exercise 5.

Bauer, m. peasant;	Lehrer, m. teacher;	Vater, m. father.
Buch, n. book;	lieben, to love;	Wagen, m. wagon;
Glas, n. glass.	Mann, m. man;	Zucker, m. sugar.
Kamm, m. comb;	oder, or;	

Der Brauer hat den Wein, Sie haben den Kaffee, und ich habe das Waſſer. The brewer has the wine, you have the coffee, and I have the water.

Der Vater liebt das Kind, und das Kind liebt das Mädchen. The father loves the child, and the child loves the girl.

Das Kind hat den Apfel, und das Mädchen hat das Kind. The child has the apple, and the girl has the child.

Haben Sie den Hut? Have you the hat?

Nein, das Kind hat den Hut. No, the child has the hat.

Was hat das Mädchen? What has the girl?

Das Mädchen hat den Kamm. The girl has the comb.

1. Lieben Sie das Kind, oder den Mann? 2. Ich liebe das Kind. 3. Haben Sie den Zucker? 4. Nein, das Kind hat den Zucker. 5. Liebt das Kind das Mädchen? 6. Ja, und das Mädchen liebt das Kind. 7. Wer hat das Glas? 8. Das Kind hat das Glas. 9. Hat der Brauer den Wagen? 10. Nein, der Bauer hat den Wagen. 11 Wer hat das Bier? 12. Der Brauer hat das Bier und den Wein. 13. Hat der Müller das Mehl, oder das Brod? 14. Er hat das Mehl. 15. Hat der Bäcker den Wein, oder das Waſſer? 16. Er hat das Waſſer. 17. Lieben Sie den Bauer? 18. Nein, ich liebe den Lehrer. 19. Haben Sie Fleiſch, oder Wein? 20. Ich habe das Fleiſch. 21. Haben Sie das Brod, oder den Zucker? 22. Ich habe das Brod. 23. Hat der Vater das Buch, oder den Kamm? 24. Er hat das Buch.

Questions. How are German verbs conjugated interrogatively? 2. What English verbs are generally thus conjugated? 3. What is the form of the article in the accusative masculine? 4. What in the accusative neuter?

Section VI.

There are, in German, four cases, namely: the
Nominativ, answering to the English *nominative*; the
Genitiv, answering to the English *possessive*; the
Dativ, which has no corresponding case in English; and the
Accuſativ, which answers to the English *objective*.

Of the four cases, the dative without a *preposition*, generally corresponds to our objective governed by *to* or *for*. Ex.: Ich gebe dem Manne das Glas, I give (*to*) the man the glass. Er macht dem Manne einen Hut, he makes (*for*) the man a hat. Often, however, the dative, in German, is construed with a preposition, where, as above, the *objective* is of course employed in English. Ex.:

Das Kind iſt in dem Hauſe, the child is *in* the house.
Der Hund iſt unter dem Baume, the dog is *under* the tree.
Der Jäger geht nach dem Walde, the hunter goes *to* the forest.
Der Mann iſt auf dem Schiffe, the man is *on* the ship.
Der Koch iſt an dem Tiſche, the cook is *at* the table.

DECLENSION OF THE DEFINITE ARTICLE MASCULINE AND NEUTER IN THE SINGULAR.

	Masculine.	*Neuter.*
Nominativ:	der, the;	das, the;
Genitiv:	des, of the;	des, of the;
Dativ:	dem, to or for the;	dem, to or for the;
Accuſativ:	den, the;	das, the.

German nouns have two forms of declension, called the Old and the New. In the old declension, the genitive, like the corresponding case in English, is formed by affixing s to the *nominative*. Ex.:

Nom. der Vater, the father; Gen. des Vaters, the father's.

Nouns ending in s, ß, z, or two consonants, generally add es in the genitive; thus, like our words which end with the sound of s, x, z, soft c or s, forming an additional syllable. Ex.:

Nom. das Roß, the horse; Gen. des Roſſes, the horse's.

RULES FOR FORMING THE CASES OF NOUNS ACCORDING TO THE OLD DECLENSION.

RULE I. The genitive adds *s* or *es* to the nominative.
RULE II. The dative drops the *s* of the genitive (§ 13. Note).
RULE III. The accusative is like the nominative.

DECLENSION OF NOUNS ADDING *S* IN THE GENITIVE.

	Masculine.	*Neuter.*
N.	Der Vater, the father;	das Mädchen, the girl;
G.	des Vaters, the father's;	des Mädchens, the girl's;
D.	dem Vater, to, for the father;	dem Mädchen, to, for the girl;
A.	den Vater, the father;	das Mädchen, the girl.

DECLENSION OF NOUNS ADDING *ES* IN THE GENITIVE.

	Masculine.	*Neuter.*
N.	Der Mann, the man,	das Kind, the child;
G.	des Mannes, the man's;	des Kindes, the child's;
D.	dem Manne, to, for the man;	dem Kinde, to, for the child;
A.	den Mann, the man.	das Kind, the child.

CONJUGATION OF THE PRESENT SINGULAR OF Sein AND Loben.

Ich bin, I am;	ich lobe, I praise;
Sie sind, you are;	Sie loben, you praise;
Er ist, he is;	er lobt, he praises.

EXAMPLE OF THE SEVERAL CASES.

Nominative.

Das Kameel ist stark.	The camel is strong.
Der Hund ist treu und wachsam.	The dog is faithful and watchful.
Das Pferd ist schön und nützlich.	The horse is beautiful and useful.

Nominative and Genitive.

Das Wasser des Meeres ist salzig.	The water of the sea is salt.
Der Baum des Waldes ist groß.	The tree of the forest is large.
Des Kindes Ball ist weich.	The child's ball is soft.

Whether in cases of this kind, where the genitive is used to denote possession, we should say, der Ball des Kindes (the ball of the child), or des Kindes Ball (the child's ball) is a point regulated by no certain rule. The former mode is the more common in German.

Nominative and dative.

Der Brief ist von dem Vater.	The letter is from the father.
Der Bauer ist in dem Felde.	The peasant is in the field.
Er schickt es dem Freunde.	He sends it to the friend.

Nominative and accusative.

Der Hund beißt den Dieb.	The dog bites the thief.
Der Schmied hämmert das Eisen.	The smith hammers the iron.
Das Kind liebt und lobt den Vater.	The child loves and praises the father.

Nominative, dative, genitive, and accusative.

Der Vater des Kindes giebt dem Bruder den Vogel.	The father of the child gives (to) the brother the bird.
Der Herrscher des Staates schickt dem Krieger das Schwert.	The ruler of the state sends (to) the warrior the sword.

EXERCISE 6.

An, at;	In, in;	Sohn, *m.* son;
Auf, on;	Korb, *m.* basket;	Stall, *m.* stable;
Ball, *m.* ball;	Loben, to praise;	Stuhl, *m.* chair;
Bruder, *m.* brother;	Pferd, *n.* horse;	Tischler, *m.* joiner;
Durstig, thirsty;	Sack, *m.* bag;	Unter, under;
Freund, *m.* friend;	Schläfrig, sleepy;	Wo? where?
Hund, *m.* dog;	Schüler, *m.* scholar;	Zimmer, *n.* room;
Hut, *m.* hat;	Sein, to be;	Zimmermann, *m.* carpenter.

Der Wolf lebt in dem Walde.	The wolf lives in the forest.
Das Kind liebt den Bruder.	The child loves the brother.
Der Lehrer lobt des Schülers Fleiß.	The teacher praises the scholar's industry.
Der Schnee liegt auf dem Berge.	The snow lies on the mountain.
Das Mädchen hat des Vaters Hut.	The girl has the father's hat.
Der Sohn des Bäckers hat Brod in dem Korbe; er giebt es dem Bettler.	The son of the baker has bread in the basket; he gives it to the beggar.

1. Sind Sie der Freund des Bäckers? 2. Nein, ich bin der Freund des Tischlers. 3. Was hat der Freund des Fleischers? 4. Er hat den Hund und das Pferd des Bauers. 5. Wo ist das Mehl. 6. Es ist in dem Sacke des Müllers. 7. Wo ist das Korn? 8. Es ist in dem Korbe des Bauers. 9. Wer liebt den Lehrer? 10. Der Schüler liebt den Lehrer. 11. Sind Sie schläfrig? 12. Nein, ich bin durstig. 13. Wo ist der Ball des Bruders? 14. Das Kind hat den Ball des Bruders in dem Hute des Vaters. 15. Wo ist das Pferd des Lehrers? 16. Es ist in dem Stalle. 17. Lobt der Tischler den Zimmermann? 18. Nein, der Sohn des Zimmermanns lobt den Sohn des Lehrers. 19. Wo ist der Stuhl des Tischlers? 20. Er (Sect. 18. III.) ist in dem Zimmer des Lehrers. 21. Liebt der Zimmermann den Lehrer? 22. Ja, er liebt und lobt den Lehrer. 23. Der Mann ist an dem Tische, das Buch ist auf dem Tische, und der Hund ist unter dem Tische.

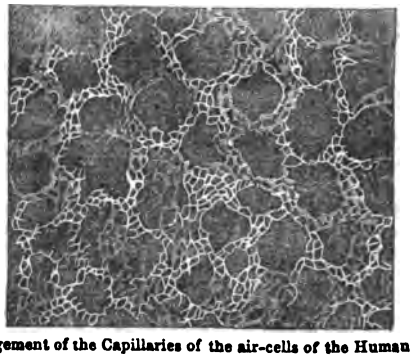
QUESTIONS. 1. How many cases are there in German? 2. To which of these cases are there corresponding ones in English? 3. How is the dative supplied in English? 4. How is the genitive formed in the old declension? 5. How the dative? 6. What is the form of the dative when the genitive adds *es*? 7. What when it adds only *s*? 8. What analogy between the declension of German and English nouns? 9. Can you state the substance of the preceding note?

LESSONS IN PHYSIOLOGY.—No. VI.

MAN.

PERSPIRATION or breathing, is common to all organised beings. If you attempt to hold your breath for even a few seconds of time, you have a peculiar feeling of distress, which so increases as to prompt and force the respiratory movement. If at such a moment anything were to prevent the free admission of air to the lungs, not only would the breathing be difficult, but the most violent effort would be made to get the needed supply of air; and if such supply could not be obtained, there would come on irregular convulsive actions:—these would be followed by insensibility:—within a short time all movement would cease; the circulation of the blood would be arrested, and a stop be put to all the living operations of the body. Keep this fact, then, in your memory—that the process of respiration or healthy breathing, essentially consists of an interchange of oxygen and carbonic acid, and this interchange takes place between the blood, as it passes into the lungs, and the surrounding external atmosphere. Carbonic acid is given out by the blood while the oxygen enters by the air which we breathe.

The number of air-cells in the human lungs has been computed at six hundred millions, and their diameter varies from $\frac{1}{100}$th to the $\frac{1}{75}$th of an inch. In their structure, the lungs possess considerable elasticity, which gives them the power of contraction and dilatation. If you stand before a dressing-



Arrangement of the Capillaries of the air-cells of the Human Lung.

glass, and take a very deep breath or inspiration, you will see the chest dilate and expand. Now this expansion is accomplished by two sets of movements—the rising of the ribs, and the falling of the diaphragm. In these movements the diaphragm plays the more important part. It is a muscle which

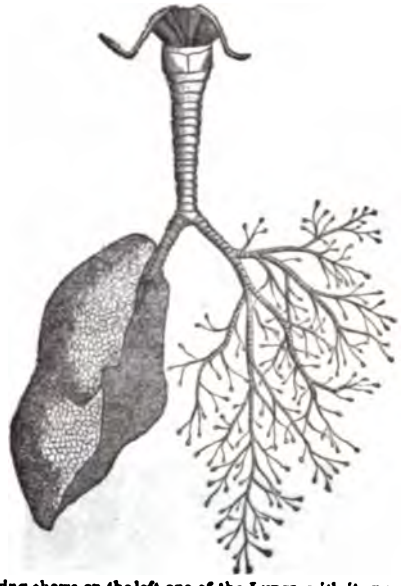
runs across the body in an oblique form, and completely separates the contents of the chest from the contents of the abdomen or belly. It is convex above, and concave below. Now when we inspire or take a breath, this muscle changes its upper surface from the form of a high arch to nearly a plane surface, and the ribs being raised by other muscles, the cavity of the chest is thus enlarged and affords room for the expansion or dilatation of the lungs. In again giving back our breath, the diaphragm assumes its former arch-like form, the ribs contract or draw closer together, and thus the cavity of the chest is diminished. It follows that the air in the lungs is to a certain degree exchanged with every successive breath, and differs in quantity. The following facts are worthy of attention and remembrance :—

In the case of healthy young and middle-aged men, the quantity of air that is changed in the lungs in each act of ordinary tranquil breathing, is from twenty to twenty-five cubic inches.

Each individual draws his breath, upon an average, eighteen times every minute ; at each respiration or breathing, a pint of air is introduced into the lungs, making eighteen pints in a minute, upwards of two hogsheads in an hour, and more than fifty-seven in the twenty-four hours.

In taking a very deep, full breath, we may completely fill the lungs, but in letting our breath go back, we can never empty them. This would be fatal to life. What we give back is not more than one-fifth of what we retain. That is to say, if we give up twenty cubic inches in the act of expiration, there will be one hundred cubic inches still remaining in these organs.

To meet and appropriate the immense volume of air which we take in at every breath, the heart sends to the lungs at each



This engraving shows on the left one of the Lungs, with its numberless air-cells, and on the right those beautiful little blood-vessels which ramify in the lungs, and so bring the blood into contact with the air which we breathe.

pulsation two ounces of blood, that is, one hundred and forty-six ounces, or above a gallon, every minute, four hundred and eighty pints in an hour, or rather more than eleven thousand pints in twenty-four hours.

To ensure the air in the remoter cells being renewed, there comes into play the law of MUTUAL DIFFUSION, which is common to all gaseous substances that do not unite chemically with each other. It is according to this law that there takes place an interchange of oxygen and carbonic acid between the air and the blood in the lungs. Between the blood and the air in the lungs there is nothing but a very thin or delicate membrane. This membrane interferes not with the law of mutual diffusion, as may be proved from the following experiment. Fill a bladder with venous blood, suspend the bladder in an atmosphere of oxygen, and the surface of the venous blood will be found to take on the bright arterial hue. How is this effected? The carbonic acid of the blood, and the surrounding oxygen will overcome by their mutual attraction the obstacle offered by the bladder, and as the carbonic acid leaves the blood, its place will be filled up by the oxygen. The oxygen that passes inwards exceeds the carbonic acid that passes outwards in the proportion of 1,174 to 1,000. Now if the lungs throw off only 1,000 out of this 1,174, in the form of carbonic acid, what becomes of the remaining 174? It is supposed that part of this enters into combination with the sulphur and phosphorus found in the original elements of the body, and passes off in the form of sulphuric and phosphoric acid, and the rest is evaporated in the form of moisture from the lungs.

If the state of the blood conditions and determines all the functions of the body, and if the atmosphere which surrounds us, and which we are constantly inhaling, be the grand purifier and regenerator of the blood, then these two things follow :—

FIRST.—That nothing is more essential to health and life than good air. The atmosphere may be so deteriorated and poisoned as to be fatal to both. For example :—carbonic acid is formed and given off with great rapidity after death, both in the plant and in the animal, and, therefore, all animal and vegetable substance in a state of decomposition or decay, should be at once removed from our dwellings, nor be suffered to have a place in the neighbourhood of living men. It gives birth to disease ;—the evil spreads—and pestilence and death assert their reign. We should study habits of cleanliness. We should make a free use of soap and water, and remove ourselves to the farthest possible distance from all impurity and filth. We should select the best-aired neighbourhood for our dwelling, and every day breathe a pure atmosphere. The blood freed from its excess of carbon, and supplied with fresh oxygen from the inspired air, will bound through the system with unchecked activity, and make the whole man as elastic and buoyant as an angel's wing.

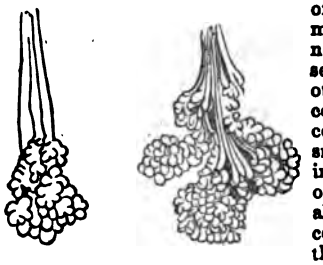
SECONDLY.—Care should be taken that nothing is allowed to interfere with the free play of the lungs. It is a most painful fact that in our country, some sixty thousand of the population—and these chiefly among the young and the most gifted—annually fall victims to pulmonary consumption or disease of the lungs. It is the disease of England :—and yet thousands might be saved. The physical education of man has been too much and too long overlooked. The gymnastic exercises through which children go, not only aid in the development of the bodily frame, but tend very much to give an impulse and even an additional force to mental activity. The children of those schools in which physical training is combined with mental and moral instruction, will ever be found more healthy, more active, and more disposed to apply themselves to their duties. And, therefore, next to the healthy structure of the lungs themselves, are those exercises which favour the free expansion of the chest. If grief and fear, and other depressing passions of the mind, retard the circulation, impair respiration, lower vitality, and render the body more susceptible of disease, then it becomes a duty to cherish all those emotions which will call into exercise our physical powers and functions. There is true philosophy in a good laugh, and it contributes to health ; so does singing, cheerful conversation, good society, and whatever can excite the more pleasurable feelings of the soul. It is true that we cannot always be gay and merry ; yet we may give attention to health. Pure air is essential to life, and what is more invigorating than a good walk into the open field of Nature?—or, if we cannot always get abroad, "the lungs may be exercised indirectly by such kinds of bodily or muscular exertion as require quicker and deeper breathing ; and directly, by the employment of the voice in speaking, reading aloud, crying, or singing. In general, both ought to be conjoined. But where the chief object is to improve the lungs, those kinds which have a tendency to expand the chest, and call the organs of respiration into play, are to be especially preferred. Rowing a boat, fencing, quoits, shuttlecock, and the proper use of the skipping-rope, dumb-bells, and gymnastics are of this description. All of them employ actively the muscles of the chest and trunk, and excite the lungs themselves to freer and fuller expansion."

It matters little what be the mode of exercise, so that it amount to a real recreation. But you ask what degree of exercise should be taken for the purpose of preserving health, or to what point should it be carried? Our answer is, till you begin to perspire or are in a sweat. This is a sure test that exercise has answered its purpose. We shall discover the truth of this when we come to speak of the important functions of the skin.

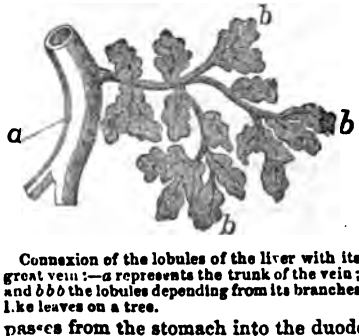
THE PROCESS OF SECRETION.

Just as the blood contains within itself the materials which are required for the renovation of the solid tissues, there are certain substances produced by the decay of these solid tissues which require to be separated from the blood, and thrown off from the body. In this sense, SECRETION is only another term for SEPARATION. For example:—respiration may be regarded as belonging to the process of secretion, inasmuch as in the act of breathing, we throw off a certain quantity of carbonic acid, which could not be retained in the blood without the most injurious consequences. Its retention even for a few minutes would be fatal to life.

For effecting the chief secretions of the body, we have a set of special organs named GLANDS. A secreting gland consists essentially of an assemblage of small cavities in communication with the cutaneous surface, where the secretion is poured out. In other words, a true gland consists of a closely-packed collection of follicles, or small open cells, disposed in clusters at the extremity of the secreting canal, and all of which open into a common channel, from which the product passes by one or more execretory ducts or passages. These organs are divided ded into conglomerate or inferior glands, such as the salivary, lachrymal, mammary, pancreatic, and prostrate glands, and into visceral or superior glands, including the liver, the kidneys, the urethra, and kindred organs. The apparatus for the secretion of the gastric juice in the human stomach, is an arrangement of complex follicles, as may be seen from the annexed engraving. This apparatus never attains any higher condition. The follicles or little cavities are lodged in the walls of the stomach, and by separate openings pour their contents into it to mingle with the food in the process of digestion.



The LIVER, in some form or other, is found in all but the very lowest members of the animal kingdom. It is situated in the human body under the diaphragm, and in the right side. Its figure is convex above, and concave below, and its substance is of a dusky reddish colour. It is divided into two lobes or distinct parts, and on the under surface of the right or great lobe, there are three smaller lobes. It is held in its place by a certain number of ligaments, and by the vessels which enter it and go out from it, the liver is one of the most important organs of the human body. All the veins of the stomach, of the intestines, of the spleen, of the pancreas, and of the omenta or coverings of the intestines, meet in one great vein called the VENA PORTA of the liver. This large vein is thus filled with venous blood, and from this venous blood the bile is secreted. Now bile fulfils three important functions in the human system.



Connexion of the lobules of the liver with its great vein:—*a* represents the trunk of the vein; and *b b b* the lobules depending from its branches like leaves on a tree.

It aids the process of digestion as the food passes from the stomach into the duodenum, and in connexion with some other juices, converts the chyme into chyle.

It carries off impurities from the blood, inasmuch as it shares with the lungs the office of removing a certain portion of the carbon which has entered into the vital and life-giving fluid.

It acts as Nature's aperient or purgative medicine. The regular relief of the bowels depends on the liver doing its duty, and nothing is so good to set the liver at work as exercise. It is a fact, that exercise promotes the circulation of the blood, and this circulation affects the secretion of the bile. When the blood flows with strength and rapidity, a much greater quantity is sent into the liver in a given time, and hence the quantity of bile secreted is much larger. It is on this principle that we explain the excess of bile in those who live in hot climates, and especially in cases of fever. Be assured that the best way to take medicine is to take exercise. Nature will do for you more than the doctor. You will need neither antibilious nor digestive pills. Health and length of days will be your reward.

In His boundless love, has the Creator thus placed life and health in our keeping, and so arranged the laws of our whole being, that we may convert this world and our existence into a never-failing source of happiness and delight. The air which we breathe, the food which we eat, the duties which we perform, the exercise which we take, are all adapted to minister to our enjoyment. It is a grand thing to have a sound mind in a sound body; and in proportion to the health, vigour, and activity of the physical system, will be the freedom and the force of the intellectual power.

QUESTIONS FOR EXAMINATION.

What do you mean by respiration, or the process of healthy breathing?
How many air-cells are there in the human lungs, and what is their diameter?
How do you prove that the lungs have the power of expansion and contraction?
What is the diaphragm?—how is it situated?—and what does it separate?
Can you state the quantity of air that is changed in the lungs in each act of ordinary tranquil breathing?
How much air do we inspire in a minute, in an hour, in a whole day?
What purpose does the air serve in the lungs?
How much blood does the heart send to the lungs at each pulsation, and to what does this amount in twenty-four hours?
What do you understand by the law of mutual diffusion?
Give an example of this law.
What influence has good air on health and life?
Why should nothing be allowed to interfere with the free play of the lungs?
To what point should exercise be carried to keep health?
What is meant by the process of SECRETION?
Give an example of this process in connexion with the lungs
What organs have we for effecting this secretion?
Describe what you mean by a gland.
Is the liver found in all members of the animal kingdom?
Describe its situation, figure, colour, divisions, and importance.
What are the three important functions it performs?
Why is exercise the medicine of nature?

LESSONS IN FRENCH.—No. XI.

By Professor LOUIS FASQUELLE, LL.D.

SECTION XXIV.

1. IN the first person singular of the present of the indicative of almost all those French verbs, which in that person have only one syllable, the common interrogative form [Sect. 22. 9] is not allowed. To render the verb interrogative, the expression *est-ce que* is prefixed to the affirmative form [§ 98, (5) (6)].

Est-ce que je vends du drap?	*Do I sell cloth?*
Est-ce que je joue souvent?	*Do I play often?*

2. The first person singular of the indicative of avoir, *to have;* être, *to be;* aller, *to go;* pouvoir, *to be able;* devoir, *to owe;* savoir, *to know*, etc., may, however, be conjugated interrogatively according to the general rules.

Ai-je vos mouchoirs?	*Have I your handkerchiefs?*
Combien vous dois-je?	*How much do I owe you?*

3. The form *est-ce que* is always allowable, and sometimes

preferable, when the first person singular of the present of the indicative of a verb has several syllables [§ 98, (6)].

Est-ce que je vous envoie des livres?	*Do I send you books?*
Est-ce que je commence à parler?	*Do I begin to speak?*

4. Est-ce que may, in familiar conversation, be used with all the persons of those tenses susceptible of being conjugated interrogatively:—Qu'est-ce que vous lisez? may be said, instead of, que lisez vous? *What do you read?*

5. Interrogative Form of the Indicative Present of

Aller, *to go.*	Envoyer, *to send.*	Venir, *to come.*
Est-ce que je vais? *do I go, or am I going?*	Est-ce que j'envoie? *do I send, or am I sending?*	Est-ce que je viens? *do I come, or am I coming?*
Vas-tu?	Envoies-tu?	Viens-tu?
Va-t-il?	Envoie-t-il?	Vient-il?
Allons nous?	Envoyons nous?	Venons nous?
Allez vous?	Envoyez vous?	Venez vous?
Vont ils?	Envoient ils?	Viennent ils?

6. The article le, preceded by the proposition à is contracted into au before a noun masculine commencing with a consonant, or an *h* aspirate; and into aux before a plural noun. [§ 13, (8)].

Allez vous au bal ou au marché? *Do you go to the ball or to the market?*

7. A l'église means *at* or *to church*; à l'école, *at* or *to school*:—

Nous allons à l'église et à l'école. *We go to church and to school.*

8. Quelque part, means *somewhere, anywhere*; nulle part, *nowhere.*

Votre neveu où est il?	*Where is your nephew?*
Il est quelque part.	*He is somewhere.*
Il n'est nulle part.	*He is nowhere.*

Résumé of Examples.

Est-ce que je vais à l'école?	*Do I go to school?*
Vous allez à l'église aujourd'hui.	*You go to church to-day.*
Est-ce que je commence mon travail?	*Do I begin my work?*
Est-ce-que je parle anglais?	*Do I speak English?*
Est-ce que j'envoie ce livre à mon frère?	*Do I send this book to my brother?*
Allez vous au marché demain?	*Do you go to market to-morrow?*
J'y vais après-demain.	*I go there the day after to-morrow.*
Envoyez vous vos enfants à l'école?	*Do you send your children to school?*
Je les envoie chez le professeur.	*I send them to the professor's.*
Je les y envoie cette après-midi.	*I send them there this afternoon.*
Vos habits où sont ils?	*Where are your clothes?*
Ils sont quelque part.	*They are somewhere.*
Ils ne sont nulle part.	*They are nowhere.*
Est-ce que je demeure chez vous?	*Do I live at your house?*
Est-ce que je mange trop?	*Do I eat too much?*

Exercise 47.

Absent, e, *absent.*	Cuir, m. *leather.*	Perruquier, m. *hair-dresser.*
Adresse, f. *address.*	Depuis, *since.*	Point, *not.*
Banque, f *bank.*	Ecole, f. *school.*	Poste, f. *post office.*
Banquier, m *banker.*	Ecolier, m. *scholar.*	Rouge, *red.*
Billet, m. *note.*	Eglise, f. *church.*	Village, m. *village.*
Chapelier, m. *hatter.*	Marché, m. *market.*	Vert, e, *green.*
Concert, m. concert.	Noir, e, *black.*	
Couper, 1. *to cut.*		

1. Où est-ce que je vais? 2. Vous allez chez le chapelier. 3. Est-ce que je vais à la banque? 4. Vous allez à la banque et au concert. 5. Est-ce que je coupe votre bois? 6. Vous ne coupez ni mon bois ni mon habit. 7. Est-ce que je porte un chapeau vert? 8. Vous ne portez pas un chapeau vert, vous en portez un noir. 9. Votre écolier va-t-il quelque part? 10. Il va à l'église, à l'école et au marché. 11. Ne va-t-il pas chez le perruquier? 12. Il ne va nulle part. 13. Ne portez vous point des bottes de cuir rouge? 14. J'en porte de cuir noir. 15. N'allez vouz pas chez le banquier? 16. Je ne vais pas chez lui, il est absent depuis hier. 17. Vient il à la banque ce matin? 18. Il a l'intention d'y venir, s'il a le temps.* 19. A-t-il envie d'aller au concert? 20. Il a grande envie d'y aller, mais il n'a pas de billet. 21. Demeurez vous dans ce village? 22. Oui, Monsieur, j'y demeure.

* The *i* of *si* is elided before il, ils, but in no other case. This is the only instance of the elision of *i*.

24. Envoyez vous ce billet à la poste. 25. Je l'envoie à son adresse.

Exercise 48.

1. Do I wear my large black hat? 2. You wear a handsome green hat. 3. Does the banker go to the hair-dresser's this morning? 4. He goes there this morning. 5. Does he intend to go to the bank this morning? 6. He does not intend to go there, he has no time. 7. Do you send your letters to the post-office? 8. I do not send them, they are not yet written (*écrites*). 9. Do I send you a note? 10. You send me a ticket, but I have no wish to go to the concert. 11. Does your brother go to school to-morrow? 12. He goes (there) to-day, and remains at home to-morrow. 13. Do I go there? 14. You do not go anywhere. 15. Where do you go? 16. I am going to your brothers, is he at home? 17. He is not at home, he is absent since yesterday. 18. Does your brother live in this village? 19. He does not [Sect. 23. 12], he eats at my nephew's. 20. Are you wrong to go to school? 21. No, Sir, I am right to go to church and to school. 22. Do you wish to come to my house? 23. I like to go to your house, and to your brother's. 24. When are you coming to our house? 25. To-morrow, if I have time. 26. Does the banker like to come here? 27. He likes to come to your house. 28. Is the hair-dresser coming? 29. He is not coming. 30. What are you sending to the scholar? 31. I am sending books, paper, and clothes. 32. Where is he? 33. He is at school. 34. Is the school in the village? 35. It is there.

Section XXV.

1. The verb aller, is used, in French, in the same manner as the verb *to go*, in English, to indicate a proximate future.

Allez vous écrire ce matin?	*Are you going to write this morning?*
Je vais écrire mes lettres.	*I am going to write my letters.*

2. The verb venir is used idiomatically, in French, to indicate a past just elapsed. It requires, in this signification, the preposition de before another verb.

Je viens d'écrire mes lettres.	*I have just written my letters.*
Nous venons de recevoir des lettres.	*We have just received letters.*

3. Aller trouver, venir trouver, are used in the sense of *to go to, to come to*, in connexion with nouns or pronouns representing persons:—

Allez trouver le ferblantier.	*Go to the tinman.*
J'ai envie d'aller le trouver.	*I have a desire to go to him.*
Venez me trouver à dix heures.	*Come to me at ten o'clock.*

4. Aller chercher, means *to go for, to go and fetch*:—

Allez chercher le médecin.	*Go and fetch the physician.*
Je vais chercher du sucre et du café.	*I am going for sugar and coffee.*

5. Envoyer chercher, means *to send for, to send and fetch*:—

Envoyez chercher le marchand.	*Send for the merchant.*
J'envoie chercher des légumes.	*I send for vegetables.*

6. The first and second persons of the plural of the imperative are, with few exceptions, the same as the corresponding persons of the present of the indicative. The pronouns nous, vous, are not used with the imperative.

7. Plural of the Imperative of Aller, Envoyer and Venir.

Allons, *let us go.*	Envoyons, *let us send.*	Venons, *let us come.*
Allez, *go.*	Envoyez, *send.*	Venez, *come.*

8. Tous, m. toutes, f. followed by the article les and a plural noun, are used in French in the same sense as the word *every* in English.

Votre frère vient tous les jours.	*Your brother comes every day.*
Vous allez à l'école tous les matins.	*You go to school every morning.*

9. Tout, m. toute, f. followed by le or la and the noun in the singular, are used for the English expression *the whole* coming before a noun.

Il reste ici toute la journée.	*He remains here the whole day.*

10. A day of the week or of the month, pointed out as the time of an appointment or of an occurrence, is not preceded by a proposition in French.

Venez lundi ou mardi.	*Come on Monday or Tuesday.*
Venez le quinze ou le seize avril.	*Come on the fifteenth or sixteenth April.*

11. When the occurrence is a periodical or customary one,

the article *le* is prefixed to the day of the week or the time of the day.

Il vient nous trouver le lundi	*He comes to us Mondays.*
Il va trouver votre père l'après-midi.	*He goes to your father in the afternoon.*

Résumé of Examples.

Je vais parler à M. votre père.	*I am going to speak to your father.*
Nous venons de recevoir de l'argent.	*We have just received money.*
Que venez vous de faire?	*What have you just done?*
Je viens de déchirer mon habit.	*I have just torn my coat.*
Votre frère va-t-il trouver son ami?	*Does your brother go to his friend?*
Il va le trouver tous les jours.	*He goes to him every day.*
Il vient me trouver tous les lundis.	*He comes to me every Monday.*
Allez vous chercher de l'argent?	*Do you go and fetch money?*
Je n'en vais pas chercher.	*I do not.* [Sect. 23. 12.]
Envoyez vous chercher des livres Arabes?	*Do you send for Arabic books?*
Allez vous chez cette dame lundi?	*Do you go to that lady's house on Monday?*
J'ai l'intention d'y aller mardi.	*I intend to go there on Tuesday.*
J'y vais ordinairement le mecredi.	*I generally go there on Wednesdays.*
Il va à l'église le dimanche.	*He goes to church on Sundays.*

Exercise 49.

Année, *f. year.*	Dimanche, *f. Sunday.*	Mardi, m. *Tuesday.*
Apprend-re, 4. ir. *to learn.*	Ecossais, e, *Scotch.*	Mercredi, m. *Wednesday.*
Après-midi, *f. afternoon.*	Ecri-re, 4. ir. *to write.*	Musique, *f. music.*
Commenc-er, 1. *to commence.*	Enseign-er, 1. *to teach.*	Prochain, e, *next.*
Compagne, *f. companion.*	Excepté. *except.*	Vendredi, m. *Friday.*
Connaissances, *f. acquaintances.*	Jeudi, m. *Thursday.*	Rest-er, 1. *to remain, to live.*
Demain, *to-morrow.*	Journée, *f. day.*	Samedi, m. *Saturday.*
	Irlandais, e, *Irish.*	Teinturier, m. *dyer.*
	Lundi, m. *Monday.*	
	Malade, *sick.*	

1. Qu'allez vous faire? 2. Je vais apprendre mes leçons. 3. N'allez vous pas écrire à vos connaissances? 4. Je ne vais écrire à personne. 5. Qui vient de vous parler? 6. L'Irlandais vient de nous parler. 7. Quand l'Ecossaise va-t-elle vous enseigner la musique? 8. Elle va me l'enseigner l'année prochaine. 9. Va-t-elle commencer mardi ou mercredi? 10. Elle ne va commencer ni mardi ni mercredi, elle a l'intention de commencer jeudi, si elle a le temps. 11. Votre compagne va-t-elle à l'église tous les dimanches? 12. Elle y va tous les dimanches et tous les mercredis. 13. Qui allez vous trouver? 14. Je ne vais trouver personne. 15. N'avez vous pas l'intention de venir me trouver demain? 16. J'ai l'intention d'aller trouver votre teinturier. 17. Envoyez vous chercher le médecin? 18. Quand je suis malade, je l'envoie chercher. 19. Reste-t-il avec vous toute la journée? 20. Il ne reste chez moi que quelques minutes. 21. Allez vous à l'école le matin? 22. J'y vais le matin et l'après-midi. 23. Y allez vous tous les jours? 24. J'y vais tous les jours excepté le lundi et le dimanche. 25. Le samedi je reste chez nous, et le dimanche je vais à l'église.

Exercise 50.

1. What is the Irishman going to do? 2. He is going to teach music. 3. Has he just commenced his work? 4. He has just commenced it. 5. Who has just written to you? 6. The dyer has just written to me. 7. Does your little boy go to church every day? 8. No, Sir, he goes to church Sundays and he goes to school every day. 9. Do you go for the physician? 10. I send for him because (*parceque*) my sister is sick. 11. Do you go to my physician or to yours? 12. I go to mine, yours is not at home. 12. Where is he? 14. He is at your father's or at your brother's. 15. Do you intend to send for the physician? 16. I intend to send for him. 17. Am I right to send for the Scotchman? 18. You are wrong to send for him. 19. Do you go to your father in the afternoon? 20. I go to him in the morning. 21. Does your brother go to your uncle's every Monday? 22. He goes there every Sunday. 23. Are you going to learn music? 24. My niece is going to learn it, if she has time. 25. Am I going to read or to write? 26. You are going to read to-morrow. 27. Does he go to your house every day? 28. He comes to us every Wednesday. 29. At what hour? 30. At a quarter before nine. 31. Does he come early or late? 32. He comes at a quarter after nine. 33. What do you send for? 34. We send for wine, bread, butter, and cheese. 35. What do you go for? 36. We go for vegetables, meat and sugar. 37. We want sugar every morning.

LESSONS IN NATURAL HISTORY.—No. IV.

THE WILD DOG.

[*Order* CARNIVORA, *genus* CANIS, *the dog tribe.*]

The genus *canis* includes the dog, the wolf, the jackal, and the fox, closely assimilated as these animals are, both in anatomical structure and external character. They have the same kinds of teeth; the canine teeth being strong, conical, pointed, and curved slightly backwards; the incisors, or cutting teeth, are six above and below. There are five toes on the fore-feet, and four on the posterior, to which is sometimes added a small rudimentary claw.

The appetite of these animals is decidedly carnivorous; yet, in some instances, they are partial to vegetables: thus dogs will feed freely on them, and the old fable, in which Reynard is represented as saying "the grapes are sour," when they were out of his reach, was founded on an acquaintance with this fact. The chief dependence of this tribe of animals is, however, the produce of the chase, or the carrion which is thrown in their way, for the discovery of which their acute sense of smell is specially adapted. The strength of their jaws is very great; their appetite is ravenous, but they can well endure hunger and fatigue. When plenty is before them they gorge to repletion, and hide or bury the remainder for a future time. The habits of all, excepting the dog, are nocturnal: in the fox alone the pupil of the eye contracts in a linear manner; in the rest it is circular.

The Esquimaux dog so closely resembles the wolf of its native wilds, that when seen at a little distance it is not easy to distinguish between them. In both the fur is deep and thick, both have the same erect ears, the same breadth of skull between them, and the same sharpness of muzzle; while, in its native wilds, the voice of the Esquimaux dog is not a bark, but a long melancholy howl. It has been sometimes supposed that the one is a domestic variety of the other; but this is an error. The Esquimaux dog hates and fears the wolf, and will only attack that animal when impelled by necessity, though it will rush on the bear with undaunted energy.

The striking resemblance that subsists between the Esquimaux dog and the wolf is, however, not more remarkable than that which subsists between other varieties of the dog and some wild species of the same genus. To take an instance: the Hare-Indian's dog has a long, narrow, and pointed muzzle, erect sharp ears, and a bushy tail, only slightly curved upwards. The hair is fine and silky; in summer it is marked with patches of greyish black or slate-grey, intermingled with shades of brown; but it thickens in winter and becomes white, or nearly so. It is found on the banks of the Mackenzie river and of the Great Bear Lake, and so nearly does it resemble the arctic fox of its native regions, that the one has been supposed to be of the wild, and the other of the domesticated race. The Hare-Indian's dog is never known to bark in its native country, nor did the pair of these animals brought to England by Sir John Franklin and Dr. Richardson, and placed in the gardens of the Zoological Society; but one born there barked as loudly as any European dog of his size and age. A specimen of this dog, which had been allowed comparative liberty in the gardens, set off one day, and was not retaken until he had given his pursuers as much trouble as a fox would have done. The Hare-Indian's dog is of great value to the bleak and dreary regions where the elk and reindeer are objects of the chase. It has not, indeed, sufficient power to pull down such game, but its light make and broad feet enable it to run over the snow without sinking, if the slightest crust be formed upon it, and thus easily to overtake the moose or rein deer, and keep them at bay until the hunters come up.

A wild dog, called the Dhole, is found chiefly or wholly in one part of India (and even there only occasionally), of the size of a small greyhound; it has unusually brilliant eyes; its body, which is slender and deep-chested, is thinly covered with a coat of hair of a reddish brown or bay colour; its limbs are light, compact, strong, and equally calculated for speed and power; and its tail is dark towards the extremity. These dogs are said to be perfectly harmless, if unmolested. They do not willingly approach persons; but if they chance to meet any one in their course, they discover no particular anxiety to escape. They view the human race rather as ob-

jects of curiosity than of either apprehension or enmity. The natives who reside near the passes where they are seen, describe them as confining their attacks entirely to wild animals, and assert that they will not prey on sheep and goats; but others affirm that cattle are frequently lost by their depredations. "I am induced to believe," says Captain Williamson, "that the dhole is not particularly ceremonious, but will, when opportunity offers, and a meal is wanting, obtain it at the expense of the neighbouring village."

THE ESQUIMAUX DOG.

The peasants state likewise that the Dhole is eager in proportion to the size and power of the animals he hunts, preferring the elk to any other kind of deer, and particularly seeking the royal tiger. It is probable that the dhole is the principal check on the multiplication of the tiger; and although incapable individually, or perhaps in small numbers, to effect the destruction of so large and ferocious an animal, these dogs may, from their custom of hunting in packs, easily overcome any smaller beast found in the wilds of India.

They run mute, except that they sometimes utter a whimpering kind of note similar to that sometimes expressed by dogs, when approaching their prey. This may be expressive of their own gratification or anxiety, or may serve as a guide to other dholes to join in the chase. The speed of the dhole is so strongly marked in its form as to render it probable that no animal in the catalogue of game could escape him for any distance. Many of the dholes are destroyed in these contests; for the tiger, the elk, and the boar, and even many of the smaller classes of game, are capable of making a most obstinate defence. Hence the breed of the dhole is much circumscribed.

The Thibet dog is bred in the table-land of the Himalaya mountains, bordering on the country from which it takes its name. The colour is of a deep black, slightly clouded on the sides, its feet alone and a spot over each

THE MARE-INDIAN'S DOG.

THE THIBET DOG.

eye being of a full tawny or bright brown hue. It has the broad short muzzle of the mastiff, and a singular looseness of the skin on every part. Many of these dogs are reared by the Bhoteas, and when they come down from the Himalaya mountains to the low countries at certain seasons of the year, to sell their borax and their musk, these animals remain at home and vigilantly guard the women and the flocks. They are also the defenders of almost every considerable mansion in Thibet. All who describe them speak of their noble size, their ferocity, and their antipathy to strangers.

The wild dog of Nepál prevails through the whole of northern India, and even southward on the coast of Coromandel. It hunts its prey by night as well as by day, in packs of from six to ten individuals, maintaining the chase more by the scent than by the eye, and generally succeeding by dint of strength and perseverance. While hunting, it barks like the hound, yet the bark is peculiar and equally unlike that of the cultivated breed of dogs, and the cries of the jackal and the fox. In its form and its fur it resembles the latter animal, but it is larger and stronger. The packs of these dogs make tremendous havoc among the game of the hills, but this mischief they are said amply to repay by destroying wild beasts, and even tigers.

A dog found wild in New South Wales, is called by the natives the Dingo. It resembles a large shepherd's dog, but the neck is thicker, and the whole body more strongly made. It has reddish shaggy hair, a bushy tail, and erect ears. It

does not bark, but utters a melancholy howl. When it bites, whether in fighting or attacking its prey, it does not seize and keep hold, but snaps like a poodle. It is very destructive when among a flock of sheep, as it snaps at all in its way, and its bite is so severe, that the wounded almost invariably die. If these dogs be taken young, they may be trained to the chase of emus and kangaroos; but when domesticated, they remain addicted to destroying sheep and poultry. If some of these dogs, when living in the gardens of the Zoological society, have lost a portion of their native ferocity, it has been retained in its utmost force by others. One that was brought hither broke its chain at night, scoured the surrounding country, and before dawn, had destroyed several sheep.

A disposition is sometimes displayed by the dog, as also by the cat, to abandon the domestic, and to return to the savage state. Of this, the following is one of many instances. A dog was left by a smuggling vessel on the coast of Northumberland. Finding himself deserted, he began to worry sheep, and did so much mischief as to create considerable alarm in the surrounding country. Several of the sheep which he mangled were found alive by the shepherds; and, by proper attention, some not only recovered, but had lambs. He was frequently pursued by hounds and greyhounds, but when the dogs came up with him, he lay down on his back, as if asking for mercy, and in that position they never hurt him; he therefore continued to lie quietly till the hunters approached, when he made off without being followed by the hounds, till they were again excited to the pursuit, which always terminated unsuccessfully. He was one day pursued from Howick to a distance of more than thirty miles, but returned thither, and killed a sheep the same evening. His general residence was upon the Heugh-hill, near Howick, where he had a view of four roads that approached it; and where, after many fruitless attempts, he was at last shot.

Happily, however, in numerous instances, man maintains the power which he has acquired over the creatures of this large tribe, and renders them subservient to different purposes. When our traveller Burchell was in Africa, a pack of dogs of various descriptions formed a part of his caravan, to provide him occasionally with food, but more frequently to defend him from robbers and wild beasts. With great force he remarks:—"While almost every other quadruped fears man as his most formidable enemy, there is one who regards him as his companion, and follows him as his friend. We must not mistake the nature of the case. It is not because we train him to our use, and have made choice of him in preference to other animals, but because this particular species of animal feels a natural desire to be useful to man, and from spontaneous impulse attaches himself to him. Were it not so, we should see in various countries an equal familiarity with other quadrupeds, according to their habits, and the taste or caprices of different nations; but everywhere it is the dog only that takes delight in associating with us, and in sharing our abode. It is he who knows us personally, watches over us, and warns us of danger. It is impossible not for the naturalist to feel a conviction that this friendship between creatures so different from each other must be the result of the laws of nature; nor can the humane and feeling mind avoid the belief that kindness to these animals, from which he derives continued and essential assistance, is part of the moral duty of man.

"Often in the silence of the night, when all my people have been fast asleep around the fire, have I stood to contemplate these faithful animals watching by their side, and have learned to esteem them for their social inclination towards mankind. When wandering over pathless deserts, oppressed with vexation and distress at the conduct of my own men, I have turned to these as my only friends, and felt how much inferior to them was man when actuated only by selfish views."

And so he is, it may be added, in other circumstances. It has been justly observed by Sir Walter Scott:—"The Almighty, who gave the dog to be the companion of our pleasures and our trials, hath invested him with a nature noble and incapable of deceit. He forgets neither friend nor foe—remembers, and with accuracy, both benefit and injury. He hath a share of man's intelligence, but no share of man's falsehood. You may bribe a soldier to slay a man with his sword, or a witness to take away life by false accusation, but you cannot make a hound tear his benefactor. He is the friend of man, save when man justly incurs his enmity."

LESSONS IN BOTANY.—No. VI.

CLASS IV.—TETRANDIA.

Plants bearing flowers with *Four* Stamens.

ORDER I. MONOGYNIA. *One Pistil.*

THE teazle is a plant which is probably not a native of this country, but like canary-grass, woad, and some others, was originally introduced by some of the numerous foreign artisans who have at various times found an asylum or been encouraged to settle in England. It has been essential, and still is, to our woollen manufactures. The teazle is cultivated in some of the strong clay lands of Wilts, Essex, Gloucester, and Somerset.

The Teazle.

It throws up its buds in July and August, and these are cut from the plant by hand, and then fastened to poles for drying. When dry they are picked and sorted into bundles for sale.

The teazle affords a striking and rare instance of a natural production being applied to mechanical purposes in the actual state in which it is produced. It is used to draw out the ends of the wool from the manufactured cloth, so as to bring a regular pile or nap upon the surface, free from twistings and knottings, and to comb off the coarse and loose parts of the wool. The head of the true teazle is composed of incorporated flowers, each separated by a long, rigid, chaffy substance, the terminating point of which is furnished with a fine hook. Many of these heads are fixed in a frame; and with this the surface of the cloth is teased or brushed, until all the ends are drawn out, the loose parts combed off, and the cloth ceases to impede the free passage of the wheel, or frame, of teazles. Should the hook of the chaff, when in use, become fixed in a knot, or find sufficient resistance, it breaks, without injuring or contending with the cloth, and care is taken by successive applications to draw the impediment out. In this consists its manifest superiority. All mechanical inventions, previously employed, offered resistance to the knot; and, instead of yielding or breaking, as the teazle does, resisted and tore out the knot, making a hole, or injuring the surface. The plant, thus employed, is called the "fuller's teazle," and is distinguished from the "small," and the "wild teazle."

In the month of July the several kinds of scabious are pretty and common flowers. The field scabious is very frequent on dry fields, and has large convex heads of flowers, of a beautiful purplish-lilac. The devil's-bit scabious grows in meadow lands, and is remarkable for its abrupt root, which seems as if it had been bitten off. "Old fantastic charmers report," says Gerard, "that the devil did bite it for envy, because it is an herb which hath so many good virtues, and is so beneficial to mankind." It is a curious fact, and one not yet explained,

that the top of the root actually dies away, and then a horizontal root is formed. No virtues can be now found in the remainder of the root or herb.

The sweet woodruff, with its clear white cluster of small flowers, and its rings of green leaves, blooms in May, around the roots of trees. Its fresh leaves are almost scentless, but

Sweet Woodruff.

we have no native flower which so long retains its odour when dried. Its strongly aromatic flowers infused in water make a beverage which is agreeable to many palates.

The Cultivated Madder: its flower and seed.

Of the madder there are several varieties. The field madder has a small root, numerous spreading stems, leaves six and eight in a whorl, and pale purplish-blue flowers. It is common in corn and fallow fields, flowering from May to July. The prepared root of the cultivated plant is extensively used as a red dye stuff. It yields colours of the greatest permanence, and is employed for dying linen and cotton red. It is also employed in calico printing, and in making madder lakes.

We have five wild species of plantain; one of the most common is the broad-leaved kind, the greater plantain, the seeds of which are so frequently given to cage-birds. The leaves of this species are often applied to wounds. The Highlanders call it the healing plant. The ribwort plantain frequently appears in our meadows and pastures, flowering, like the former, during June and July, and indicating wherever it abounds, a dry soil. When it grows among grass, its leaves rise to a considerable height, but they are shorter, broader, more spreading, and sometimes of a silvery hue, on barren soils. The Welsh call another species, common on our sea-coasts, the "Suet-producing," from its being much relished by sheep. This plant flowers at the time already mentioned.

TETRAGYNIA.

The holly—the pond-weeds—the tassel-grass—the pear-worts—and a few other species of plants, are found in this order.

CLASS V.—PENTANDRIA.

Plants bearing flowers with *Five* Stamens.

ORDER I. MONOGYNIA. *One Pistil.*

There are four kinds of gromwell. The corn gromwell, a plant about a foot high, with narrow-pointed leaves, covered with white hairs and very hard seeds, is, in the month of June, very general in the corn fields and waste places. The creeping or purple gromwell is rare, growing in mountainous and wild pastures in Wales and the south of England, and flowering in April and May. The common gromwell grows in dry gravelly places, and flowers in May; but is not common, as its name denotes. The sea gromwell flowers in July and August, grows on gravelly beaches on the sea-shore in the north of England, in Ireland, and in Scotland.

The comfrey, a very rough-leaved plant, blossoms in May, chiefly on the banks of rivers or other moist grounds. It bears clusters of yellowish-white drooping bells. A variety has purple flowers. The rough foliage is spotted like the lungs of animals, and hence it was supposed that it was intended to heal pulmonary complaints. The roots are glutinous and mucilaginous, and are frequently used by villagers for coughs. The tuberous comfrey, rare in England but common in Scotland, grows on the banks of rivers and ditches, and flowers in July. The flowers are drooping, of a yellowish white, and tinged with green.

In May, the small bugloss, with its bright blue flowers, is not uncommon on hedge-banks and in corn fields. It is one of several rough-leaved plants, which bloom at the same time. The hairs on its leaves are very strong and sharp, and each is seated on a white tubercle. Its flowers are especially attractive to bees. The roots contain a great quantity of mucilage; we use them but little; but in China, where the plant is abundant, they form an important medicine.

The viper's bugloss grows on the chalky hill, the barren wall, the heap of rubbish, and too frequently on the cornlands. Alluding to its being found in barren places near the sea, Crabbe says,—

> "Here poppies, nodding, mock the hopes of toil—
> Here the blue bugloss paints the sterile soil."

It flowers in June, and then appears in singular beauty. So thickly, however, is its foliage beset with prickles, that even the donkey, accustomed to browse on the thistle tops, shrinks from its spiny leaves and stems; and when the bees pause in their flight, to suck the honey from its rich blue bells, their delicate wings are torn before they can escape from the plant. The agriculturists of Cambridge have remarked that it appears most beautiful every third year, when the fields are quite blue with its flowers. It is singular that the Spaniard and the Frenchman, as well as ourselves, connect with this plant the name of the viper. The spotted stem, however, resembles the skin of a snake, and the seeds are each like a viper's head, and

to this the fancy must be traced, as well as that which led to the notion that the plant was designed to heal the bite of that reptile.

The borage grows in waste ground, near houses, and flowers in June and July. Its flowers are of a beautiful blue. The whole plant is covered with very pungent bristles. Some singular facts have been discovered in reference to this plant. Thus, if a decoction of its leaves be evaporated to a syrup, and kept for some days, it yields salt crystals, partly in the forms of needles, and partly cubical; the needles are proved to be perfect nitre, and the cubical ones sea-salt. If, too, a dried piece of this plant be held in a flame, it emits, from the nitre it contains, a kind of coruscation, attended by a slight noise. It is, in consequence, sometimes an ingredient of match-paper.

The primrose varies in colour, from the common pale sulphur-yellow to white, on the one hand, and to bright yellow and purple on the other. Clare exclaimed, as he gazed upon it,—

> "How much thy presence beautifies the ground:
> How sweet thy modest unaffected pride
> Glows on the sunny bank and wood's warm side!
> And when thy fairy flowers, in groups, are found,
> The school boy roams enchantingly along,
> Plucking the fairest with a rude delight;
> While the meek shepherd stops his simple song,
> To gaze a moment on the pleasing sight,
> O'erjoyed to see the flowers that truly bring
> The welcome news of sweet returning spring!"

The primrose is in its greatest beauty in May, but occasional plants may be found in flower from Michaelmas, and even throughout the winter. But the number of plants in this order are far too numerous to be now described; including, as it does, the forget-me-not, the pimpernel, known as the poor man's weather-glass, the wild convolvuluses, the bell flowers, the violets, the nightshades, the honeysuckles, the currants, the ivy, and the large class of umbelliferous plants, of which the cowparsley and hemlock are examples; and therefore we must content ourselves with the specimens already given. Very numerous, too, are the plants which are ranged under the five following *orders* of the same class; but for these the reader must be referred to works on botany, particularly that of Withering, condensed by Macgillivray.

LESSONS IN ENGLISH.—No. III.

By John R. Beard, D.D.

SIMPLE PROPOSITIONS.

Alfred reads.

These two words form what is called a proposition; they form a simple proposition. Proposition is a word of Latin origin, signifying something that is put before you. As being something that is put before you, it is a statement; it is a statement of a fact or a thought; a statement of something in the mind, or something out of the mind. Here the statement is that *Alfred reads*. Such a statement is also termed a sentence. Sentence is also from the Latin, and signifies a form of words comprising a thought or sentiment. These words, then,—namely, sentence, proposition, and statement, have the same signification; and they each denote an utterance, the utterance of a fact, an idea, an emotion. Observe that both words are essential to the proposition. Take away *Alfred*, you then have *reads*, but *reads* is no proposition; for nothing is stated. Take away *reads*, you leave *Alfred*; but *Alfred* by itself says nothing, makes no statement, and therefore forms no proposition or sentence. The two words must concur to make a proposition. If so, less than two words do not make a proposition; and a proposition or sentence may consist of not more than two words.

In these simple statements you have in the germ the substance of the doctrine of sentences. If you understand what I have now said, you have laid the foundation for a thorough acquaintance with language in general, and with the English language in particular; for to a form of words similar in simplicity to that which stands at the head of this lesson, is all speech reducible; and that model presents the germ out of which are evolved the long and involved sentences of our old English divines, and the full and lofty eloquence of Milton's immortal essay on behalf of the liberty of the press.

The sentence, as it stands, is what is called an affirmative proposition; that is, it affirms or declares something; it affirms or declares that *Alfred reads*. The term affirmative is used in opposition to the term negative. Negative propositions are those in which something is denied. An affirmative may become a negative proposition by the introduction of the adverb *not*; thus, Alfred reads *not*. In English it is more common to employ also the emphatic *does*, as Alfred *does not* read. You thus see that the words *does* (*do*, or *dost*, as may be required) and *not* convert an affirmative into a negative proposition. Sentences in which a question is asked we term interrogative; as, *does Alfred read?* Here by the help of the emphatic form *does*, and the inversion of the terms *does* and *Alfred*, we make an affirmative into an interrogative sentence. If into this last sentence we introduce the negative *not*, we have an interrogative negative sentence, as *does not Alfred read?* We put these four forms of a proposition together.

Forms of a Proposition.

1. *Affirmative*	Alfred reads.
2. *Negative*	Alfred does not read.
3. *Interrogative*	Does Alfred read?
4. *Interrogative Negative*	Does Alfred not read?

You thus see an example of the ease and extent with which the original form may be changed and multiplied. The proposition, *Alfred reads*, is a simple proposition. Propositions are either simple or compound. Compound propositions are made up of two or more simple propositions. Of compound propositions I shall speak in detail hereafter. Here only a few words may be allowed in order to illustrate what is meant by a simple proposition. If I were to say, *When Alfred reads, he is listened to*, I should employ a compound proposition. In these words there are two statements, and consequently two sentences. These two statements are, *Alfred reads*, and *Alfred is listened to*. The two statements, united by the term *when*, constitute a compound sentence. In one form, at least, a compound proposition may easily be mistaken for a simple proposition; namely, in this—*Alfred reads and writes*. Here, in reality, we have a compound sentence, for when analysed, these words are equivalent to these two statements, *Alfred reads*, and *Alfred writes*. There being in the sentence these two statements, the proposition is compound.

Let us now consider the two words in their own individual character—*Alfred reads*. The first obviously represents a person, the second as clearly represents an act. Now, in grammar, words which represent persons and things, are called *nouns*; and words which represent acts, are called *verbs*. Noun is a Latin term, and signifies name; hence you see the noun is the name of any person or thing; and were we as wise as were the Latins, we should not employ a foreign word, but call nouns simply *names*. Thus Alfred is the name of a person. Book, also, is a name; so is house; so is pen; so is paper; these are each the name or vocal sign by which Englishmen distinguish and agree to call these objects severally. Nor is there any mystery in the term vocal. Here, too, we have a Latin term which signifies simply *word*. With the Latins the verb was the word; that is, the chief word in a sentence. By us the verb might be termed *the word*. Had English grammarians employed as their scientific terms, words of Saxon origin, the study of English grammar would have been very easy. We shall endeavour to simplify it, by translating the Latin terms, unhappily now become indispensable, into their English equivalents. That the verb is the word, the chief word of a sentence, you may learn by reflecting on the proposition, *Alfred reads*. It is *reads*, you see, that forms the very essence of the statement *Reads*, too, distinguishes this statement from other statements, as *Alfred runs*, *Alfred sings*. Look back on the several instances of propositions I have given, and endeavour to ascertain what is the quality in which they all agree. They have a common quality. That quality is averment. They all aver or declare something. This they do by means of their verbs. Accordingly, averment is the essential quality of the verb. Every verb is a word which makes an averment. Here, then, we learn that the noun *names*, and the verb *avers*. By these tokens may all nouns and all verbs be known. Whatever *names* is a noun; whatever *avers* is a verb. *Chair* is a noun, because it is the

name of an object; *stands* is a verb, because it avers or declares something of chair; and the union of the two, as *chair stands*, forms a proposition.

Sentences, then, in their simplest form, consist of a noun and a verb. A noun and a verb are indispensable. Whatever more you may have, you cannot have anything less than a noun and a verb in a sentence or proposition. As a substitute for the noun, you may have a pronoun. Pronoun, again, is a word of Latin origin, signifying a word which stands *instead of a noun*. Thus we may put the pronoun *he* instead of *Alfred*; e.g. (Latin, exempli gratiâ; that is, *for example*):

Alfred reads
He reads

where *he* holds the place of *Alfred*. We must accordingly qualify our statement, and say that sentences, in their simplest form, consist of a verb and a noun or pronoun. One or two other qualifications might be stated; but here, at least, instead of entering into them, it will be better to put the statement in its most general form, a form in which it will embrace all particular cases, and render qualification unnecessary. I say, then, that in every sentence there must be a subject and a verb. I have thus set before you a new term. That term I must explain. *Subject* is a Latin word, and denotes that which receives, *that which lies under*, is liable or exposed to; from sub, *under*, and jacio, *I throw*, *I place*; in the passive, *I lie*. Accordingly, the subject of a proposition is that to which the action declared in the verb, is ascribed. Hence, the subject of a propositien is the agent, the actor, the doer. The subject of a proposition answers to the question who? or what? as, who reads? Answer; *Alfred* reads. The term subject is used with special reference to the corresponding term, predicate. The *predicate* of a proposition is *that which is attributed* to the subject. What is attributed in our model sentence? This, namely, that Alfred *reads*. "Reads," then, is here the predicate, or that which is ascribed to, or asserted of Alfred. Hence you see the propriety of the term subject, since Alfred is subject to the averment that he reads. Now, in the grammatical construction of the sentence, it matters not whether you say, *Alfred reads*, or *he reads*. In both cases you have a subject and verb, or predicate; and consequently you have a complete enunciation of thought, or a perfect sentence.

The sentence thus analysed and explained may be set forth in this form:—

Subject.	*Predicate.*
Alfred	reads.
He	reads.

As the subject undergoes a change by passing, when necessary, into *he*, so may the predicate be modified. Instead of a predicate in one word, you may have a predicate in two words, by substituting a verb and an adjective; as,

Alfred *is good.*

Another new term demands another explanation. What is the meaning of adjective? *Adjective* in Latin signifies *that which is added to*, or thrown to (ad, *to*; and jacio, *I throw*). To what are adjectives thrown or added? To nouns, as in this instance. Adjectives, therefore, in their very nature, cannot stand alone. They perform their office in being added to or connected with nouns. They are connected with nouns in order to qualify the meaning of those nouns, and to answer to the question of what kind? What kind of a boy is Alfred? Answer, "he is a *good* boy." An adjective, then, is an *epithet*, (a Greek word, which denotes that which is attributed to a noun or a person); e.g., *green* fields, *tall* men, *hard* rocks, where *green*, *tall*, and *hard* are *epithets*, or *adjectives*, inasmuch as they assign the quality of their several subjects. Now, what we call qualities, we call also attributes. The *attributes* of a body are its qualities. Attribute is a word from the Latin, denoting that which is *attributed* or ascribed to an object. Adjectives, therefore, describe the qualities or attributes of the persons or things they are connected with. In the instance given above, *good* is the attribute of the proposition; thus,

Subject.		*Attribute.*
Alfred	is	good.

But this explanation leaves *is* unexplained. The word *is* on reflection you will recognise as a verb, seeing that it avers; for it avers or declares that Alfred *is* good. By comparing together the two forms—

Subject.	*Predicate.*
Alfred	reads.
Alfred	is good.

You observe that *reads* and *is good* hold the same place and perform the same function in the two propositions. They in each case form the predicate of the sentence. The *predicate* is that which is predicated, declared, or averred of the *subject* of a proposition. In the former instance, *reads* is that which is averred; in the latter, *is good* is that which is averred. Mark, that neither *is* nor *good* alone forms the predicate, for what is asserted is not that Alfred *is*,—that is, *exists*, but that he *is good*. Accordingly, the predicate here consists of two words,—namely, *is good*; but in the former example, it consists of merely one word,—that is, *reads*. Of these two words, *good* we have seen is the attribute. It remains to state that the word *is* forms what is called the *copula*, a Latin term which may here be rendered *link*. The term describes its office. The word *is* in the sentence *links* the subject with the predicate. The whole may be exhibited thus:—

Subject.	*Predicate.*	
Alfred	reads	
	Copula.	*Attribute.*
Alfred	is	good

By ordinary grammarians what we have termed the subject, is called the *nominative* case. The employment of such a term is objectionable, for it is incorrect by not being sufficiently comprehensive. Take, for instance, the proposition, *to ride is healthful*. *To ride* is the subject of the proposition, and the subject, therefore, to the verb *is*. But is *to ride* a nominative case? Ask the grammarians, and they will tell you that it is the infinitive mood of the verb *ride*. If an infinitive mood, it is not a nominative case. Cases pertain to nouns, moods to verbs.

But here, we meet with an instance of the complexity and obscurity that have been brought into English grammar by attachment to Latin forms. Our nouns in their actual condition have but one case, the *genitive*; or, if the nominative be allowed to be a case, then two cases are the utmost that our nouns can be said to have. Why should more be assigned to them? It may be doubted, indeed, whether what is called the nominative can be properly termed a case, for it differs from the Latin nominative, which is formed from a *stem* common to all the cases through which the noun passes; whereas in English, the nominative is the stem itself. However this may be, in English, nouns now possess no more than two cases. This fact is in no way affected by the allegation that the Anglo-Saxon, the mother of the English, has several cases. It is with the daughter, not with the mother that we are here concerned.

LESSONS IN LATIN.—No. XI.

By JOHN R. BEARD, D.D.

RELATIVE AND INTERROGATIVE PRONOUNS.

Relative—Qui, quæ, quod, *who* or *which*. Interrogative—Quis, quæ, quid? *who* or *which?*

RELATIVE.

Singular.

Cases.	M.	F.	N.
Nom.	quī, *who*	quæ, *who*	quŏd, *which*
Gen.	cujus, *whose*	cujus, *whose*	cujus, *of which*
Dat.	cui, *to whom*	cui, *to whom*	cui, *to which*
Acc.	quem, *whom*	quam, *whom*	quod, *which*
Abl.	quō, *by whom*	quā, *by whom*	quō, *by which*

Plural.

Nom.	qui, *who*	quæ, *who*	quæ, *which*
Gen.	quorum, *whose*	quarum, *whose*	quorum, *of which*
Dat.	quibus, *to whom*	quibus, *to whom*	quibus, *to which*
Acc.	quos, *whom*	quas, *whom*	quæ, *which*
Abl.	quibus, *by whom*	quibus, *by whom*	quibus, *by which*

INTERROGATIVE.

Singular.

Nom.	quis?	quis? before a noun, quæ?	quid? before a noun, quod?
Gen.	cujus?	cujus?	cujus?
Dat.	cui?	cui?	cui?
Acc.	quem?	quam?	quid?
Abl.	quo?	quā?	quo?

Plural.

Nom.	qui?	quae?	quae?
Gen.	quorum?	quarum?	quorum?
Dat.	quibus?	quibus?	quibus?
Acc.	quos?	quas?	quae?
Abl.	quibus?	quibus?	quibus?

The preposition cum is sometimes set after the pronoun; as, quocum, quacum, quibuscum, *with whom, with which.*

Quis is repeated so as to form the compound pronoun quisquis, *whosoever.* In this case, both parts are declined thus, quisquis, m.; quaequae, f.; quicquid, n. When the neuter is used as a substantive it is generally written quidquid. Take as instances: quoquo modo res habet, *in whatever way the thing is:* quicquid id est, *whatever that is.* In quicunque, *whosoever*, the qui is declined, and to its parts cunque is added, as cujuscunque, quodcunque, &c.*

VOCABULARY.

Civitas, átis, f. *the state;* lex, legis, f. *a law* (E. R. *legal*); mors, mortis, f. *death* (E. R. *mortal*); justus, a, um, *just;* maleficus, a, um, *wicked*, as a noun, *an evil-doer;* probus, a, um, *good, kind* (E. R. *probity*); sanctus, a, um, *holy* (E. R. *sanctity*); mitis, e, *mild* (E. R. *mitigate*); curo 1, *I care for, take care of* (E. R. *a cure*); devasto 1, *I lay waste, devastate*; guberno 1, *I govern;* honóro 1, *I honour;* gero 2, *I carry* (E. R. *gestation*); succurro 3, *I hasten to aid, I succour;* exaudio 4, *I hear the request of:* ardenter, adv. *ardently, glowingly* (E. R. ardent); tibi placet, *thou art pleased.*

EXERCISES.—LATIN-ENGLISH.

Rex qui civitatem gubernat, civium salutem, curare debet; regi cujus imperium mite et justum est, omnes cives libenter parent; regem cui leges sunt sanctae, cives colunt; felix est rex quem omnes cives amant; O rex qui civitatem nostram gubernas, tibi placet honorare bonos cives, terrere maleficos, succurrere miseris, exaudire probos.

ENGLISH-LATIN.

Kings who govern states must care for the safety of all the citizens; good men willingly obey kings whose government is mild and just; kings whose laws are holy are willingly obeyed by good citizens; the kings are happy who are dear to their citizens; O kings who rule our states, ye ought to honour a good and great man; O God, we worship thee who art pleased to succour the wretched; the enemies with whom you contend lay waste your country.

VOCABULARY.

Luscinia, ae, f. *a nightingale;* peccatum, i, n. *a sin;* opinio, ónis, f. *an opinion*; Veritas, átis, f. *truth* (E. R. *verity*); honestus, a, um, *honourable* (E. R. *honesty*); falsus, a, um, *false;* ingratus, a, um, *unthankful* (E. R. *ingratitude*); utilis, e, *useful* (E. R. *utility*); ambulo 1, *I walk abroad;* cogito 1, *I think;* excrucio 1, *I torture* (E. R. *excruciate*, from crux, *a cross*); repugno 1, *I fight against*; (E. R. *repugnance, pugilist*); habeo 2, *I have*; me habeo, *I have myself* (that is, *in a certain condition*) *I am*; ago 3, *I drive, I do*; quaero 3, *I seek*; curro 3, *I run, pass away*; indulgeo 2, *I am lenient to* (E. R. *indulge*).

EXERCISES.—LATIN-ENGLISH.

Quis me vocat? quid agis, mi amice? quis scribit has litteras? quid cogitas? quid ago? cur me excrucio? quæ amicitia est inter ingratos? quod carmen legis? quis homo venit? quis poeta dulcior est quam Homerus? cujus vox suavior est quam vox lusciniæ? quibus peccatis facillime indulgemus? quicquid est honestum, idem est utile; quicquid vides, currit cum tempore; quoquo modo res sese habet, ego sententiam meam defendo; quaecunque opinio veritati repugnat, falsa est.

ENGLISH-LATIN.

What dost thou say? who is that man? who is that woman? with whom does thy friend walk? whom seekest thou? what book dost thou read? to whom dost thou write this letter? however the things are (*habere*, &c. &c.) we praise your view (*sententia*).

INDEFINITE PRONOUNS.

Quis in a dependent form undergoes slight changes in declination: thus, quis, qua or quae, quid; pl. qui, quae, quae. When it is used as an adjective pronoun, then quis may become qui, qua becomes quae, and quid becomes quod. The same is the case with aliquis, *some one;* thus, sub. aliquis, aliqua, aliquid; adj. aliqui, aliqua, aliquod. So alicujus, alicui, &c. In the plural, quis, &c., become qui, quae, quae, or qua, aliqui, aliquae, aliqua.

Quis united with piam, becoming quispiam, acquires an indefinite import, *any one soever*; and runs thus: quispiam, quaepiam, quidpiam; adj. quodpiam.

Another form is quisquam (quis and quam), *every one*, which is declined, nom. quisquam, quicquam; gen. cujusquam; dat. cuiquam; quidam, *a certain one*, stands thus: nom. quidam, quaedam, quiddam; adj. quoddam; gen. cujusdam, and so on. Quisque answers to our *each one*; nom. quisque, quaeque, quidque (quodque); gen. cujusque; dat. cuique; acc. quemque, &c.

Unusquisque, *every one*, brings the idea of individuality into greater prominence, and is formed thus, unusquisque, unaquaeque, unumquidque; adj. unumquodque; the pronoun is made up of que, *and*, quis, *who* or *which*, and unus, *one.*

In quivis, quaevis, quidvis (quodvis), the termination vis, *thou wilt*, increases the indefiniteness, so that quivis is, *who* or *what you will*, cujusvis; acc. quemvis, quamvis, &c. A similar import is found in quilibet (libet, *it pleases*), quaelibet, quidlibet (quodlibet), *who* or *what you please*; so, gen. cujuslibet.

Alius, *another*; alter, *the other, the second of a pair;* the *latter*, corresponding to the *former*; ullus, *any*; nullus (non ullus), *no one*; uter, *which (of the two)*; neuter (non uter), *neither, neither the one nor the other*; take the genitive singular in ius, and the dative in i, like unus. See the next chapter on numbers.

VOCABULARY.

Graecia, f. *Greece*; pecunia, ae, f. *money*; locus, i, m. *a place* (E. R. *local, locality*); augurium, i, n. *augury*; seculum, i, n. *an age* (E. R. *secular*); terror, óris, m. *terror*; dignitas, átis, f. *dignity*; mens, mentis, f. *a mind* (E. R. *mental*); jus, juris, n. *right, law* (E. R. *jury, jurisdiction*); justitia, ae, f. *justice*; futúrus, a, um. *future*; insitus, a, um, *inborn*; impendeo 2, *I hang over* (E. R. *impend*); inhaereo 2, *I stick to*; adimo 3, *I take away*; idcirco, *therefore*; quasi, *as if*; tribuo 3, *I assign, allot.*

EXERCISES.—LATIN-ENGLISH.

Si mortem timemus semper aliqui terror nobis impendet; si cuipiam pecuniam fortuna adimit idcirco miser non est; Graecia parvum quendam (quemdam) locum Europae tenet; inhaeret in mentibus nostris quasi quoddam augurium futurorum saeculorum; in unoquoque virorum bonorum habitat deus; justitia jus unicuique tribuit pro dignitate cujusque; cuique nostrum amor vitae est insitus.

ENGLISH-LATIN.

Some terror always hangs over the bad; what terror (*quid terróris*, literally, what of terror?) hangs over thee? if thou takest fortune from any one thou art blamed; they hold a certain small part of Greece; in every bad man evil (*malum*) dwells; justice allots to every one his merits (*merita*); certain ones have money.

CORRELATIVE PRONOUNS.

Correlative is a term denoting mutual relation, in such a way, that of two or more things, as is the one, so is the other. Take, as an instance, the pair of correlative pronouns, qualis and talis; meaning *as* and *as;* thus qualis sum ego, talis es tu, *such as I am, such art thou.*

These correlative pronouns are various, and are exhibited in this table of

CORRELATIVE PRONOUNS.

Interrogative.	*Demonstrative.*	*Indefinite.*
Qualis, *of what kind?*	talis, *of such kind*	
Quantus, *how great?*	tantus, *so great*	aliquantus, *of some size*
Quot, *how many?*	tot, *so many*	aliquot, *some number*

Relative.	*Relative Indefinite.*
Qualis, *of what kind*	qualiscunque, *of what kind soever*
Quantus, *of what size*	quantuscunque, *how great soever*
Quot, *of what number?*	quotcunque, quotquot, *of whatever number*

Quot, tot, aliquot; quot, quotcunque, and quotquot, are indeclinable, and are used only in the plural number; as, quot homines sunt? *how many men are there?* aliquot homines, *some men;* tot homines quot video, *as many men as I see;* quotcunque homines video omnes boni sunt, *all the men I see are good.*

VOCABULARY.

Bonum, i, n. *good, the good;* Aristides, is, m. *the name of a celebrated Athenian;* grex, gregis, m. *a flock;* imitator, óris, m. *an imitator;* oratio, ónis, f. *speech;* respublica (res and publica, both parts are declined; thus, rei publicae, rem publicam), *the state, the republic, the common wealth;* permultus, a, um, *very much;* pastor, óris, n. *a shepherd* (E. R. *a pastor*); fragilis, e, *easily*

* See more on these and other compounds in the author's "Latin made Easy." Price 3s. 6d. Fourth Edition, p. 137.

broken, fragile (from frango, *I break*); pecco, *I sin, fail, err*; soleo 2, *I am accustomed*; contemno 3, *I despise*; existo 3, *I stand out, become, exist*; quod, conj. *that*; praedico 1, *I speak before, declare* (E. R. *preach*).

EXERCISES.—LATIN-ENGLISH.

Quot sunt homines, tot sunt sententiae; tantum malum est hoc, quod peccant principes, quantum illud quod permulti imitatores principum existunt; quot genera orationum sunt, totidem oratorum genera reperiuntur; quales sunt duces, tales sunt milites; qualis est rex, talis est grex; quales in republica sunt principes, tales solent esse cives; vir bonus non contemnit homines miseros, qualescunque sunt; corporis et fortunae bona, quantacunque sunt, sunt incerta et fragilia; quotquot homines sunt, omnes vitam amant; quotcunque sunt scriptores, omnes Aristidis justitiam praedicant.

ENGLISH-LATIN.

As many men so many minds (the minds are as numerous as the men); as many boys so many girls; as many fathers so many mothers; as great as is thy grief so great is my joy; such as are parents such are children (*liberi*); as is the shepherd so is the flock; I do not despise the things whatever they are; Aristides is declared just by all writers how many soever they are.

LESSONS IN GEOGRAPHY.—No. III.

NOTIONS OF THE GREEKS AND ROMANS.

THE desire for nautical expeditions, which, under the excitement of commercial enterprise, had begun to spread among the nations, was restrained by the conquests of the Romans. These conquests, however, if they did not extend the boundaries of the known world, at least enriched the domain of geographical knowledge with new facts, and more exact than those which had been collected and taken for granted by the writers of former ages. The three Punic (Carthaginian) wars, the Illyrian war, the contests with the Gauls, the expeditions against Spain, and those of Aelius Gallus into Arabia and Ethiopia, all contributed, in their turn, to give to this science a more positive character and more varied details. Polybius, about 150 years before the age of Hipparchus, gave a description of the world which, notwithstanding his numerous errors, evinced remarkable progress in the knowledge of the globe. The new acquisitions of the Romans, and of Mithridates Eupator, the campaigns of Julius Cesar in Gaul and in Britain, rendered accessible the knowledge of countries hitherto but partially explored, or altogether unknown. Thus, for example, it was discovered that Ireland was not a fabulous country, as geographers had formerly asserted. Posidonius, a Syrian, resident at Rhodes, endeavoured to correct the measurement of the earth's circumference formerly made by Eratosthenes. He observed that when the star Canopus, in the constellation Argo, became visible in the horizon of Rhodes, it was elevated seven degrees and a half above the horizon of Alexandria. He supposed these places to be under the same meridian, and, from the reckoning of navigators, he found the distance between these two places to be 5,000 stadia. Now, seven degrees and a half being the forty-eighth part of a great circle of the sphere, this gives the circumference of the earth equal to 240,000 stadia. This was a nearer approximation to the truth than that of Eratosthenes, and, according to the length of the stadium given by some authors, was pretty nearly correct. But it was founded on erroneous data; for the arc of the great circle between the two places above mentioned was only about five degrees and a quarter, and the difference between their two meridians was rather more than two degrees.

Strabo, who flourished under the reign of Augustus Cesar, was the next geographer who corrected many preceding errors, and made some of his own. The limits of his knowledge of the world, were on the north, Ierne or Ireland, and the mouth of the Elbe. He denied the existence of *Thule*, and asserted that the earth was not habitable at the distance of 4,000 stadia north of Britain. On the east, he considered Ceylon or Taprobane and Thinæ the borders of the world, and it is doubtful whether his knowledge of it extended as far as the mouths of the Ganges. He knew the western coast of Africa as far as Cape Nun. But he partook of the error of those who represented the Caspian Sea as united to the Northern Ocean; and he rejected the positive information of Herodotus on this point. He acknowledged little regard for the authority of this ancient historian, and his doubt on the subject of the voyages of Pytheas, Hanno, and Eudoxus, showed his ignorance of many important geographical questions.

Strabo adopted the division of the earth into climates recognised by Greek and Roman authors previous to his time. Long after him, indeed, as well as before him, the globe was divided into *five* zones, of which *two* were the *frigid* or *frozen* zones near the poles, one scorched by the sun and extending along the equatorial line on each side of it, called the *torrid* zone; and two others called the *temperate* zones, occupying the rest of the world. The latter were considered to be the only habitable portions of the globe; and as to the torrid zone, it was supposed to be condemned, on account of its fiery climate, not only to eternal solitude, but to present an invincible obstacle to the exploration of the countries situated beyond the equator. It will afford an illustration of the force of those ideas which prevailed on the subject of the zones of the globe, and on the relative position of the great divisions of the earth, when we reflect on the fact that they maintained their ground in the minds of men for a period of no less than twelve centuries of the history of the world.

When we consider the advanced state of the arts and sciences in the age of Augustus Cesar, at least compared with those which preceded it, we cannot but wonder at the imperfect state of geographical knowledge which existed in the Roman world at this period. Horace considered Great Britain and the Thames as the confines of the earth; and Virgil, as we have already remarked, placed the source of the Nile in India. The geographical productions of Dionysius Periegetes and of Pomponius Mela, written within a period of fifty years after the Christian era, contain nothing worthy of notice, being mere compilations of what was then known, and by no means improved.

When the legions of the Emperor Claudius Cesar, A.D. 44, marched to the conquest of Britain, this country was a new world to the Romans. The fleet of Agricola, thirty-five years afterwards, circumnavigated Scotland, explored the surrounding seas, and rediscovered the famous *Thule*. But even at this epoch Great Britain was still a mysterious country; Tacitus says it was bounded on the east by Germany, on the south by Gaul, and on the west by Spain. As to Ireland, he places it midway between Spain and Great Britain. The interior of Germany became known to the Romans in consequence of their active commerce with certain northern parts of Europe, which arose from the passion of the Roman ladies for succinum or yellow amber. In the east a discovery of very great importance advanced the progress of navigation and geography. Hippalus, about the middle of the first century, established the fact of the periodicity of the *monsoons*, or trade-winds, in the Indian ocean, which from that period has regulated the motions of the western navigators to India and the Asiatic Archipelago.

On the south, the expedition of the Consul Suetonius Paulinus into the country of Sejelmissa, on the borders of Sahara or the great Desert of Africa, disclosed the zone of the continent which extends from the southern side of Mount Atlas to the south of Mauritania Tingitana, or part of modern Barbary. The campaign of Cornelius Balbus in a neighbouring and parallel region, was accompanied with still more interesting results. The Roman army set out from Tripoli, traversed the desert, penetrated into Fezzan, and advanced even into the country recently visited by Messrs. Denham and Clapperton; that is, to the vicinity of Bornou. Of the scientific information gained by these enterprises, the celebrated Caius Secundus Pliny availed himself, in his Natural History. He also knew how to dip with considerable discernment into the writings of the Greeks; but he appears not to have considered it necessary to consult the work of Strabo. From the inquiries and information he had obtained in this way, he assigned to the different quarters of the world then known, the following magnitudes:—To Europe one-third, to Asia one-fourth, and to Africa one-fifth of the whole.

Marinus of Tyre, who preceded Ptolemy, was distinguished for his geographical knowledge. He took advantage of all ancient and contemporary writers, to compose a complete treatise on the subject of geography and maps; and he even prepared new editions of his books, corrected and improved in

proportion as he obtained more exact information; but it is to be regretted that these have not reached us. At last appeared, about the middle of the second century, the famous Ptolemy, who lived at Alexandria in Egypt, and taught astronomy there. His system of astronomy and geography which stood unimpeached for about twelve centuries, and received the name of the Ptolemaic system from its author, was not superseded till Copernicus appeared; and notwithstanding his errors, due more to the ignorance of mankind, than to himself, his name is still revered as a geographer and astronomical observer. His work entitled the "*Megale Syntaxis*, or Great Construction," is a monument of his labour and his learning. He examined the ratio of the length of the gnomon or style of the sun-dial to its shadow at the equinoxes and the solstices; he calculated eclipses; he investigated the calculations founded on the difference of climate, and carefully consulted the reports of travellers and navigators. He reduced his information and observations into a regular system, and expressed the positions of places by longitude and latitude, after the manner of Hipparchus. His great work consists nearly of an elementary picture of the earth, in which its figure and size and the positions of places on its surface, are determined. It contains only a very short outline of the division of countries, with scarcely any historical notice. It is supposed that a detailed account was added to this outline, but it has not reached us. His geography is contained in eight books, and is certainly more scientific than any previous work on the subject. He calculated the circumference of the earth at 180,000 stadia; but the value of this calculation depends entirely on the assumed length of the stadium, which, according to some estimates of that length, brings his calculation very near the truth. He taught how to determine the longitude by lunar eclipses, and by this method ascertained that of many places with tolerable accuracy.

LESSONS IN ARITHMETIC.—No. XI.

SIMPLE DIVISION—*Continued.*

When the divisor is a number consisting both of significant and insignificant figures, and the dividend a number consisting of figures either wholly significant, or like the divisor, proceed according to the following rule:—

Rule 4.—From the right of the divisor mark off all the insignificant figures or ciphers; then, from the right of the dividend, mark off the same number of figures or ciphers as were marked off in the divisor. Perform the division with the remaining figures of the divisor and dividend, according to the preceding Rule. If there be a remainder when this process has been performed, annex to it the figures or ciphers which were marked off from the dividend, in order to form the complete remainder answering to the complete divisor. If there be no remainder, after the process has been performed, then the figures, or figures and ciphers marked off, form the complete remainder as before; but, if ciphers only were marked off from the dividend, then in this case, there will be no remainder, as ciphers alone have no value.

Example 1.—Divide 1251577696700 by 397000.

Divisor. Dividend. Quotient.
397(000) 1251577696(700 (3152588
1191
606
397
2087
1985
1027
794
2336
1985
3519
3176
3436
3176
260 partial remainder.
260700 complete remainder.

Multiples of the Divisor.	
397	1
794	2
1191	3
1588	4
1985	5
2382	6
2779	7
3176	8
3573	9

Mode of Operation.

Here you mark off three ciphers (000) from the divisor, and three figures (700) from the dividend. You then perform the division by Rule 3, and obtain the quotient 3152588. The remainder after this division is performed is 260; to this number annex 700, the figures marked off from the dividend, and you have 260700 for the complete remainder, answering to the complete divisor 397000. The result of the process may now be represented as usual, thus:

$$\frac{1251577696700}{397000} = 3152588\ \frac{260700}{397000}$$

On the principle formerly explained, this fractional remainder might be expressed more briefly, thus: $\frac{2607}{3970}$.

Example 2.—Divide 15875494569000 by 67680000.

Divisor. Dividend. Quotient.
6768(0000) 1587549456(9000 (234667
13536
23394
20304
30909
27072
38374
33840
45345
40608
47376
47376
9000 complete remainder.

Multiples of the Divisor.	
6768	1
13536	2
20304	3
27072	4
33840	5
40608	6
47376	7
54144	8
60912	9

In this example, which is worked exactly like the preceding, there is no remainder after the process of division is performed; therefore, 9000, the figures marked off from the right of the dividend, form the complete remainder. The result may now be represented thus:—

$$\frac{15875494569000}{67680000} = 234567\ \frac{9}{67680}$$

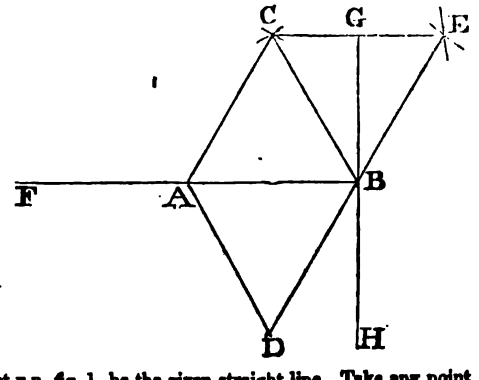
The preceding rules will, it is hoped, render the process of simple division in any case easier to our readers, than those which are usually given.

SOLUTIONS OF PROBLEMS AND QUERIES.

(*From No. 7, page* 111.)

1. Draw a straight line at right angles to a given straight line from one of its extremities, without producing it; and give a demonstration with as few propositions from Euclid as possible, but still geometrically correct.

Fig. 1.



Let F B, fig. 1, be the given straight line. Take any point A in F B; and upon A B, describe the equilateral triangles, A B C, A B D (I. 1); and upon B C the equilateral triangle B C E. Bisect (I. 9) the angle C B E by the straight line B G; B G is drawn at right angles to A B.

Produce G B to H. Then, because every equilateral triangle is also

equiangular, the three angles of the triangle A B C are equal to one another; and also the three angles of the triangle A B D. And because the three sides of A B C are equal to those of A B D, their angles also are equal (I. 8); therefore, the angle A B C is equal to the angle A B D. But because the angle C B E is bisected by B G, the angle C B G is equal to the angle G B E; and the angle G B E is equal to the angle D B H (I. 15); therefore the angle C B G is equal to the angle D B H. But the angle A B C was proved equal to the angle A B D; therefore the whole angle A B G is equal to the whole A B H. And because the adjacent angles A B G, A B H, are equal to one another, therefore each of them is a right angle (Def. 10), and G B is perpendicular to A B.

JAMES VEECOCK.

2. If sound travels at the rate of 1,142 feet per second, and a stone falls through 16 feet 1 inch in a second; from what height would a stone fall, which would occupy the same time in falling through it, that sound would occupy in ascending it?

Let t = the time of falling, and s the space fallen through;

Then, $s = 1142t$, by the law of uniform motion.

Also, $s = 16\frac{1}{12}t^2$, by the law of gravity.

Whence, $16\frac{1}{12}t^2 = 1142t$, by axiom 1, Euc. Book I.

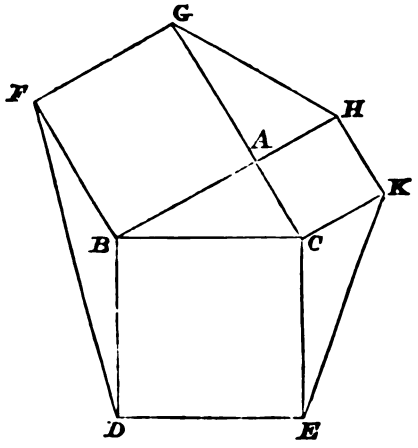
but, $193t = 13704$, by division and clearing of fractions.

Therefore, $t = \frac{13704}{193} = 71\frac{1}{193}$ seconds.

Whence the space may be easily found.

3. In the fig. of the 47th proposition, Book I., Euclid, to prove that if F D, G H, and K E, fig. 2, be joined, the three triangles F B D, G A H, and K C E, are all equal.

Fig. 2.



Because G A is equal to B A, H A equal to A C, and the angle G A H equal to the angle B A C; therefore the triangle G A H is equal to the triangle B A C, the angle A B C is equal to the angle H G A, and the angle A H G to A C B; wherefore the two triangles are equal in every respect (Euc. I. 4).

Again (Euc. I., cor. to 15), all the angles at the point B are together equal to 4 right angles; but because F B A and D C B *are* two right angles, therefore the remaining two angles A B C and F B D are together equal to two right angles; that is, they are supplements of one another. Then, because in the two triangles A B C, F B D, the two sides A B, B C, are equal to the two sides F B, B D, each to each; and their contained angles A B C, F B D, are supplemental to each other (Euc. I. 38, cor. 2), the triangle F B D is equal (in area) to the triangle A B C; and it has been shown that the triangle G A H is equal to A B C.

In a similar way, it may be shown that the triangle C K E is equal to the triangle A B C,—wherefore the three triangles G A H, F B D, and K C K are each equal to the triangle A B C; they are therefore all equal to one another.

R. JOPE, Horncastle.

[We have received several other solutions exactly similar to the above. The demonstration may, without much difficulty, be adapted to the other five modes of constructing the figure of the 47th.]

ANSWERS TO CORRESPONDENTS.

E. INGHAM (Oldham): We have received his kind letter, informing us of the establishment of an Educational Society in Oldham. God and prosper. We will communicate with him by letter on the subjects mentioned in his epistle.

A. B. C. (Pembroke Dock): His remarks on the six cases of the Pythagorean Theorem, are new to us, and very ingenious. We do not see the necessity, however, of reconstructing the right angled triangle on the other side of its base; this originates a number of new lines of which it is necessary to give some account. Neither do we think Prop. 4, exactly a parallel case as regards the coincidence of the angles. If the addition of angles be taken negatively as in algebra, as some of our correspondents have justly remarked, one demonstration might serve all the six diagrams.—J. SOWDEN (Devonport): His solutions of the Problems and Queries in No. 7, p. 111, are complete and ingenious. We regret the difficulty of reading the penmanship, as we would otherwise have made some immediate use of them.—J. L. (Dublin): His solutions also good and ingenious.—JAMES VEECOCK (London): His answers are all correct.

A TYRO's complaints shall receive our careful supervision.

LATIN.—GUERNSEY is right. Our readers will please to make the following correction: page 115, col. 1, line 44, for *singular* read *plural*. This lesson has been inaccurately printed in other respects. Dr. Beard, in accordance with the latest philological researches, had made the genitive of neuter nouns of the fourth declension in *u*, the same as that of masculine and feminine nouns in *us*. Keeping to the opinions of the older grammarians, from whose works we learned Latin, we took the liberty of restoring the neuter nouns to their indeclinable state in the singular number, under the impression that the change made by Dr. Beard was a slip of the pen; and we were confirmed in this impression by the *second edition* of his own book, entitled "Latin Made Easy," which was lying before us. At Dr. Beard's request, we make the following corrections in the Lesson referred to:—

Page 115, line 24, col. 1, erase the words *and are indeclinable*.
" " " 39, " 1, for *a* read *ds*.
" " " 55, " 1, for *cornū* read *cornūs*.
" 133, " 8, " 1, for *u* read *ūs*.

LITERARY NOTICES.

LIVES AND WORKS OF THE PAINTERS OF ALL NATIONS.—On July the 1st, JOHN CASSELL will publish the first part of a magnificent work, in imperial quarto, under the above title, containing a portrait of Murillo, and seven specimens of his choicest works including the "Conception of the Virgin," lately in the collection of Marshal Soult, and recently purchased by the French Government for the Gallery of the Louvre, for the sum of £23,440. The parts will appear on the 1st of every month, at 2s. each, and will be supplied through every bookseller in town or country.

CASSELL'S SHILLING EDITION OF EUCLID.—In consequence of the interest excited among all classes of the readers of the POPULAR EDUCATOR, since the publication of our Lessons in Geometry in that work, John Cassell has determined to issue a Popular Edition of the ELEMENTS OF GEOMETRY, to contain the First Six, and the Eleventh and Twelfth Books of Euclid, from the text of Robert Simson, M.D., Emeritus Professor of Mathematics in the University of Glasgow, with corrections, Annotations, and Exercises, by Robert Wallace, A.M., of the same university, and Collegiate Tutor of the University of London. This work will be ready the first week in July, price 1s. in stiff covers, or 1s. 6d. neat cloth.

SCRIPTURE LIBRARY FOR THE YOUNG, in Shilling Volumes.—The first two volumes of this instructive series of works, "The Life of Joseph," illustrated with sixteen choice engravings and maps, and "The TABERNACLE, its PRIESTS, and SERVICES," with twelve engravings, are now ready. The "LIFE OF MOSES" is in the press.

THE ILLUSTRATED EXHIBITOR AND MAGAZINE OF ART.—The First Volume of this splendidly embellished work, handsomely bound, price 6s. 6d., or extra cloth gilt edges, 7s. 6d., will be ready July 1st, and will contain upwards of Two Hundred Principal Engravings, and an equal number of Minor Engravings, Diagrams, &c.

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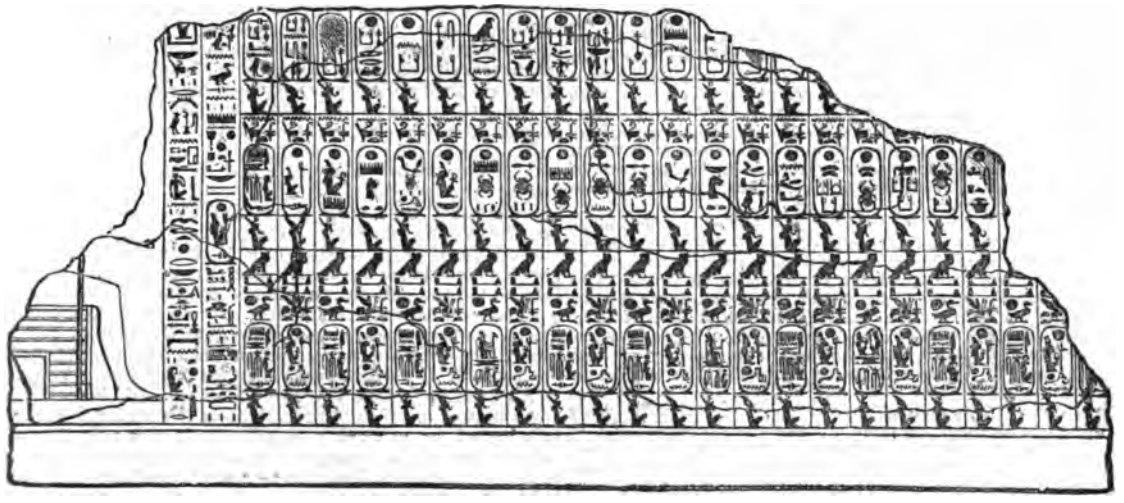
LESSONS IN ANCIENT HISTORY.—No. VI.

By Robert Ferguson, LL.D.

The Egyptians strove to throw off the Persian yoke; but when Alexander the Great became King of Macedon, they submitted without opposition. Nearly two centuries had been spent under the yoke of a foreign power; and the reign of Alexander lasted but thirteen years. When he marched into Thrace, in order to bring into subjection those Grecian states which sought to free themselves from the Macedonian usurpation, it is said that Thebes took advantage of his absence and entered into a revolt; that on his return, Alexander took that city by storm, made a fearful slaughter of the inhabitants, and destroyed all their buildings. His own sudden death prevented him from making arrangements for the succession to the throne, and the kingdom became distracted by internal quarrels. The widow of Alexander gave birth to a posthumous son and heir. Perdiccas, a Macedonian nobleman, the confidant of Alexander, to whom he gave his ring, was appointed regent. He was far from being popular, and a league was secretly formed against him. To reduce the northern provinces of Asia Minor, he equipped a considerable army, and sent orders to Antigonus and Leonatus, the governors of Western Asia, to join the expedition with all their forces. Having disobeyed these commands, they were summoned to the tribunal of the regent. Antigonus, seeing his danger, entered into an alliance with Ptolemy, the satrap of Egypt, with Antipater, the governor of Macedon, and with several other noblemen, to overthrow the regency. At first, Antigonus was foiled in his attempt, and death soon removed Perdiccas beyond his reach. Through the influence of Antigonus and Seleucus, the regency was assumed by Antipater, whose possession of the supreme power was limited to three years. After a few more changes and struggles, Antigonus began openly to aim at the sovereignty of the Macedonian empire. His arms struck terror into all his enemies. He sent his son Demetrius against the Egyptian Ptolemy; but Ptolemy overthrew Demetrius near Gaza. The triumph of the Egyptians was short-lived; for at the commencement of the next campaign they were defeated, and but for the fact of Demetrius having at that moment been engaged in a war with the Arabs, Egypt would have been invaded. About four years afterwards, he gained a decisive victory over the Egyptian fleet that came to protect the island of Cyprus; but neither he nor his father Antigonus succeeded in the reduction of Egypt.

Antigonus having been slain in the battle at Ipsus in Phrygia, more than twenty years after the death of Alexander, the kingdom of Egypt passed into the hands of Ptolemy Lagus, its former governor, and one of the wisest of statesmen. His entire reign extended over a period of 39 years; he was devoted to the interests of his people. He aimed at the regeneration of their social system. He revived their ancient religious and political constitution; restored the priestly caste to many of its former privileges, renewed the division of the country into separate districts; constituted Memphis the capital of the kingdom, and made the temple of Phtha the national sanctuary, in which alone the kings could be anointed and crowned. He paid great attention to trade and navigation. Under his administration, colonists from every quarter of the globe settled in Alexandria; and to escape the persecution of their Syrian masters, the Jews came thither in great and increasing numbers. By the conquest of the Syrian frontiers, of the ancient kingdom of Cyrene, of part of Ethiopia, and of the island of Cyprus, he rendered Egypt comparatively safe from foreign invasion, and added greatly to its external security. He was the liberal patron of literature and science. Philosophers and men of letters found in Egypt a quiet retreat from the storms and the conflicts which threatened every other part of the world.



THE TABLE OF ABYDOS IN UPPER EGYPT:
A Bas-Relief, from the Hall of the Temple of Osiris

The city of Alexandria, which was founded by Alexander the Great, owed much of its increase and magnificence to Ptolemy Lagus. According to Strabo, the celebrated Greek historian, Alexandria was four miles and a half in length, and one mile in breadth, which made the circumference of its walls nearly twelve miles. These walls, part of which are still standing, having great square towers, two hundred paces distant, with gates of Thebaic and granite marble, were washed on the south by the lake Marcotis, and on the north by the Mediterranean Sea. The city was intersected lengthwise by straight parallel streets; and one street of two thousand feet width, which began at the gate of the sea, and terminated at the gate of Campus, was adorned with the most elegant buildings, houses, temples, and obelisks;

and was deemed the most magnificent street in the world. The palace occupied more than one-fourth of the city, and included within itself the Museum or College of Philosophy, a common rendezvous or place of meeting for the learned; academic groves, royal buildings, and a temple in which the body of Alexander was deposited in a golden coffin. In the eastern part of the city was the Gymnasium, with its splendid porticoes of more than six hundred feet in length, supported by several rows of marble pillars. It became the centre of science and civilisation —the rival of Rome in magnitude and grandeur—and the first commercial city of the world. A mole or mound, of a mile in length, divided its great harbour into two, at the entrance of which was erected the celebrated PHAROS, or lighthouse. In the height of its prosperity, it had a free population of more than 300,000 souls, and nearly an equal number of slaves. It was a place of great magnificence; it became the regal capital of Egypt, and for two centuries was the residence of the Ptolemies.

The death of Ptolemy Lagus, B.C. 284, filled his subjects, who revered and honoured him as a father, with deep and universal grief. Before his decease, his son PHILADELPHUS was associated with him in the government of the kingdom. Though he possessed neither the wisdom nor the enterprise of his father, yet the empire was essentially benefited under his peaceful administration. Commerce was extended; ports were constructed for the Indian and Arabian trade; caravan roads were made to the Upper Nile, and the lower river was united to the Red Sea by a canal which communicated with the lesser harbour on the Lake Moeris; the trade with Ethiopia was revived, and even the remoter countries of Central and Southern Africa were thrown open to the enterprise of the Alexandrian merchants.

The rebellion of Magus, the governor of Libya and Cyrene, was encouraged by Antiochus Theos, king of Syria. The utmost efforts of Philadelphus failed to reduce the rebel, and the affair was compromised by a marriage between the only daughter of Magus and Ptolemy's eldest son. An alliance was formed with the Roman republic, and to the Roman ambassadors who visited Egypt, the sovereign not only showed every possible mark of kindness, but explained to them those Grecian arts with which they were till then unacquainted. It was in consequence of this visit and this alliance, that a silver coinage was afterwards introduced into Rome.

Such was the number of Jews that had settled in Alexandria, that a temple was erected in Egypt similar to that in Jerusalem, and during the preceding and present reigns a Greek version of the Hebrew Scriptures was made expressly for their use. This version is known by the name of THE SEPTUAGINT, or translation of the SEVENTY. The tradition of one Aristeas, who related that it was executed in seventy-two days by seventy-two learned Jews, who had been sent for the purpose by the high priest Eleazar to Alexandria at the request of Ptolemy Philadelphus, is a mixture of truth and fiction. This version was made about B.C. 280, and acquired the highest authority among the Jews of Palestine. In proof of this it may be observed that it was quoted in the New Testament instead of the original. Though the introduction of Coptic or pure Egyptian words, and the rendering of Hebrew ideas in the Egyptian manner, prove beyond all doubt that the translators were natives of Egypt; and though the difference of style evinces that the work could not be the production of one individual, but of several writers, yet it is of great importance, not only for correcting the Hebrew text, but also for ascertaining the meaning of particular modes of thought and expression which we find in the New Testament.

It was during the preceding reign that the ALEXANDRIAN LIBRARY was founded for the use of those who were devoted to letters and to science. All the Ptolemies continued to enrich and enlarge this library, till it numbered upwards of 700,000 volumes. This immense collection was secured by seizing all the books which were brought into Egypt by the Greeks or other foreigners, transcribing their contents, delivering the copies, and retaining the originals. This splendid library was *burned* by order of the Caliph Omar in the beginning of the seventh century, on the usual bigoted principle, that if they agreed with the KORAN they were useless, and if they differed they were worse than useless.

As Egypt became wealthy and prosperous, she became luxurious and corrupt. Philadelphus fell into all the effeminate dissipation of eastern monarchs; he denied the sacredness of the marriage vow, became dissolute and profligate, and died after a reign of eight-and-thirty years, leaving an indelible spot upon his name and his memory.

His son ascended the throne B.C. 246, under the title of PTOLEMY III., surnamed EVERGETES, or THE BENEFACTOR. He was of an enterprising and warlike spirit, and carried his conquests into the remoter regions of the east and the south. He successfully extended his arms as far as Bactria; and though his Asiatic campaigns were more for plunder than territory, by his wars in the south he added a great part of Abyssinia and the Arabian peninsula to his Egyptian dominions, and he opened up new channels for trade and commerce through these more distant countries. It is said that Evergetes visited Jerusalem, there offered sacrifice to the true God, and ever afterwards showed great favour to the Jewish nation. His kingdom rapidly rose to the height of power, and promised again to take the first place among the nations. But after his death arose a succession of weak and irresolute princes, and Egypt declined to her fall. From this period she makes no figure in history.

Ptolemy Evergetes died B.C. 221, and was succeeded by his son Ptolemy Philopater, a prince who gave himself up to the influence of flatterers and favourites, and whose life was one of debauchery and crime. He began his reign with the murder of his brother Magus, and of Cleomenes, the exiled king of Sparta. Taking advantage of Philopater's weakness and incapacity, Antiochus the Great, king of Syria, waged war against Egypt, but he was defeated. Instead of taking advantage of this temporary success, he threw his own kingdom into confusion and ruin by his cruelty. It is said that he threatened to exterminate all the Jews in his dominion; that he caused the death of his own wife and sister; that he sunk into the most beastly dissipation, and died abhorred in the prime of life, leaving only one son about five years of age.

LESSONS IN GERMAN.—No. III.

We introduce our third lesson with a few remarks on German writing. It is plain that the students of this language will in general have neither the time nor the tact sufficient to enable them to write out their exercises in the *printed* letters of the language; they will, therefore, be under the usual necessity of writing them out in the *written* characters used by the Germans, of which we gave the alphabets, large and small, with specimens of their application, in our last number. In learning these written characters, it will be useful to observe that the leading letter of the small alphabet is *m*, which is written in the usual *angular style* adopted by most well-educated people in our own country, especially the ladies. Take the leg of the *m*, which we shall call the *elementary leg*, and which consists of a black middle stroke and two hair-strokes; add to the last hair-stroke, when you bring it up, a small loop, or loop, you have then made an *o*. If now, as soon as you have made the loop of the *o*, you draw downwards from the top short hair-stroke of the loop another black stroke, and then hair-stroke upwards, you have at last made an *a*. You may a *b*, by adding to the *o* a large top-loop, as we do in making our own written *b*. You have learned to make *e* already, as it the leg of the *m* already described. If you take this same elementary leg, and carry up its second hair-stroke, as we do in our written *d*, making this hair-stroke end in a loop with a clet at top, you have the letter *d* complete.

The letter *e* is peculiar; it is formed of the elementary without the second hair-stroke, to which is joined a short elementary leg by a hair-stroke drawn from the former near the top of the black stroke. The letter *f* is very like our own written *f*; you first make a long hair-stroke both and below the line, terminating at the top in a loop like letter *b*, and cross it in the middle by the elementary leg *m*, writing it from left to right, instead of from right to To make the letter *g*, first make an *o*, and then from the hair-stroke of the loop draw a hair-stroke downwards making it terminate below the line like our own written The letter *h* is exactly like the long *s* used in writing ourselves; it seems to have consisted of the elementary with a loop of hair-stroke above and another below. letter *i* consists of the elementary leg with a dot above if you forget the dot it will be taken for a *c*. The *j* is that part added to *o* which makes it a *g*, with a above it. The letter *k* is so like our own that it can hardly mistaken, but it has no loop at the top. The letter *l* is just letter *b* without the loop. The letter *m* has been described. The letter *n* consists of two legs of the letter *m*; and the *o* has been described.

The letter *p* is formed of the elementary leg by first round the second hair-stroke in a larger loop than usual terminating it below the line like a *j*; we have no letter it. The letter *q* is like *g* with this difference, that it is

below the line, and the hair-stroke is brought up from this point to the right instead of to the left. The letter *r* is very peculiar, and unlike any of ours. It consists first of an elementary leg; but the second hair-stroke, instead of being brought up, is looped at the bottom contrary to the usual way, and then brought up and made to terminate in an elementary leg to the right, of half the usual size. The letter *s* is like the letter *f*, with this difference, that the elementary leg instead of crossing it in the middle is placed entirely to the left at this point. Another *s* is made by forming a loop at bottom from right to left, and terminating in a hair-stroke above the line, with a hook from left to right, somewhat like our written figure 6 made from the bottom to the top, or contrary to the usual way. Make the letter *t* like our manuscript *t*, cross it with the elementary leg from left to right; or make it like *k* without the loop. The letter *u* is exactly like the letter *n*, with a circlet or curve over it for the sake of distinction.

The letter *v* is another peculiarly-formed letter. The first part of it is exactly like the letter *r*, but it terminates in a round black stroke curved towards the right, or hollow towards the first part of the letter and giving it somewhat of the appearance of an inverted *a*. Prefix to the letter *v* the elementary leg so often mentioned, and you have the letter *w*. The letter *x* is formed like the letter *p*, with this difference, that the part below the line is turned to the right instead of to the left, and terminates in a small scroll. The letter *y* is like the letter *v* with its curve to the right extended below the line, and its hair-stroke brought up like a *j*. The last letter *z* is very like our own manuscript *z*, and consists of the elementary leg rounded, and the second hair-stroke replaced by a curved part below the line, like the letter *j*. The double consonants being so manifestly formed of the simple letters which enter into their composition, it is unnecessary to make this lesson any longer by describing them. It may just be observed that double *s* is a combination of the two different forms of *s* above described; that the double *f* is like the double *s* without the elementary leg behind it, and with a dash or flourish across it; and that in combination *z* is written on the line, instead of below it, and in form resembling our manuscript *B*. We shall describe the written alphabet of capitals in our next lesson.

Section VII.

„Dieſer" is declined, in the masculine, precisely like the definite article; while, in the neuter, as will be seen in the following declension, all its endings, except the dative, are alike (§ 62. 2).

DECLENSION OF Dieſer MASCULINE AND NEUTER SINGULAR COMPARED WITH THE DEFINITE ARTICLE.

	Masculine.		*Neuter.*	
Nom.	(d-er)	dieſ-er, this;	(d-as)	dieſ-es, this.
Gen.	(d-es)	dieſ-es, of this;	(d-es)	dieſ-es, of this;
Dat.	(d-em)	dieſ-em, to, for this;	(d-em)	dieſ-em, to, for this;
Acc.	(d-en)	dieſ-en, this;	(d-as)	dieſ-es, this.

DECLENSION OF THE INTERROGATIVE Wer AND THE PERSONAL PRONOUN er AND es IN THE SINGULAR.

		Masculine.	*Neuter.*
Nom.	Wer? who?	er, he;	es, it;
Gen.	weſſen? whose?	ſeiner, of him;	ſeiner, of it;
Dat.	wem? to, for whom?	ihm, to, or for him?	ihm, to, or for it;
Acc.	wen? whom?	ihn, him;	es, it.

Exercise 7.

Apfel, *m.* apple;	Geld, *n.* gold;	Schneider, *m.* tailor;
Bürgermeiſter, *m.* mayor, burgomaster;	Haus, *n.* house;	Schuhmacher, *m.* shoemaker;
Dieſer, dieſes, this;	Hutmacher, *m.* hatter;	Silber, *n.* silver;
für, for (§ 113);	Kupfer, *n.* copper;	Sohn, *m.* son;
Garten, *m.* garden;	Leder, *n.* leather;	Von, from, of;
Geld, *n.* money;	Papier', *n.* paper;	Wem, from, of;
	Rock, *m.* coat;	

Dieſer Jüngling iſt arm. Dieſes Kind iſt ſchläfrig.	This youth is poor. This child is sleepy.
Dieſes Jünglings Hut iſt neu. Dieſes Mädchens Band iſt ſchön.	This youth's hat is new. This girl's ribbon is beautiful.
Geben Sie dieſem Bettler und dieſem Kinde Geld?	Do you give this beggar and this child money?
Lieben Sie dieſen Irländer? Loben Sie dieſes Mädchen?	Do you love this Irishman? Do you praise this girl?
Weſſen Federmeſſer hat dieſes Kind? Des Lehrers.	Whose penknife has this child? The teacher's.

1. Wer hat das Papier dieſes Mädchens? 2. Dieſes Kind hat es 3. Weſſen Buch hat dieſer Schüler? 4. Er hat das Buch des Lehrers 5. Von wem haben Sie dieſes Leder? 6. Ich habe es von dem Schuhmacher. 7. Für wen iſt dieſer Apfel? 8. Er (Sect. 18. III.) iſt für das Kind des Sattlers. 9. Weſſen Rock hat der Sohn des Schneiders? 10. Er hat den Rock dieſes Freundes. 11. Von wem hat der Sohn dieſes Hutmachers Geld? 12. Er hat Geld von dem Vater. 13. Wo iſt der Wagen des Bauers? 14. Der Freund des Lehrers hat ihn. 15. Weſſen Haus und Garten hat der Lehrer? 16. Er hat das Haus und den Garten des Bürgermeiſters. 17. Von wem haben Sie dieſen Hut? 18. Ich habe ihn (Sect. 18. III.) von dem Hutmacher. 19. Für wen iſt er? 20. Er iſt für den Sohn des Schneiders. 21. Haben Sie Geld, Silber oder Kupfer für den Lehrer? 22. Ich habe Silber für ihn. 23. Wen liebt das Kind? 24. Es liebt den Bruder des Lehrers.

Questions. 1. How do the endings of „Dieſer" differ from those of „Das"? 2. Do the endings of „Dieſer" differ from those of „Der"? 3. Which cases of the pronoun „es" are alike? 4. Which cases of „es" are like those of „er"?

Section VIII.

CONJUGATION OF THE PRESENT SINGULAR OF gehen AND geben.

Ich gehe, I go;	Ich gebe, I give;
Sie gehen, you go;	Sie geben, you give;
Er geht, he goes;	Er gibt (Sect. 19. I.), he gives.

Exercise 8.

Alt, old;	Heu, *n.* hay;	Schiff, *n.* ship;
Arm, poor;	Hungrig, hungry;	Sehr (with verb), very much;
Bei, with;	Jäger, *m.* hunter, ranger;	Sehr (with adj., or adv.), very;
Capitain', *m.* captain;	Knecht, *m.* servant;	Steu'ermann, *m.* mate;
Deutſchland, *n.* Germany;	Krank, sick;	Wald, *m.* forest;
Edelmann, *m.* nobleman;	Matro'ſe, *m.* sailor;	Wie, how, as;
Fröhlich, merry;	Nach, to (§ 112. 8 & 9);	Zollhaus, *n.* custom-house;
Geben, to give;	Nicht, not;	Zu, to (§ 112. 18).
Gehen, to go;	Noch, still, yet;	
	Reich, rich;	

Der Baum iſt ſehr groß.	The tree is very large.
Er liebt ihn ſehr.	He loves him very much.
Was ſagt dieſer Mann dem Lehrer?	What says this man to the teacher?
Er ſagt ihm nichts.	He says nothing to him.
Was geben Sie dem Capitain?	What do you give the captain?
Wer lobt den Knecht?	Who praises the servant?
Wen lobt der Knecht?	Whom does the servant praise?

1 Wo iſt der Bruder des Steuermanns? 2. Er iſt bei dem Capitain in dem Schiffe. 3. Iſt der Sohn des Edelmanns auch bei ihm? 4. Nein, er iſt in Deutſchland. 5. Wo iſt der Vater? 6. Er iſt bei dem Capitain in dem Zollhauſe. 7. Lobt der Capitain den Sohn des Edelmanns? 8. Ja, und er lobt auch den Vater. 9. Liebt der Edelmann den Capitain? 10. Ja, er liebt und lobt ihn ſehr. 11. Iſt dieſer Mann der Sohn des Capitains? 12. Nein, er iſt der Sohn des Steuermanns. 13. Iſt dieſer Matroſe reich? 14. Nein, er iſt arm und fröhlich. 15. Wie alt iſt dieſer Mann? 16. Er iſt nicht ſehr alt. 17. Iſt er krank? 18. Nein, er iſt hungrig. 19. Was giebt dieſes Mädchen dem Kinde? 20. Es (§ 134. 2.) giebt ihm nur Zucker. 21. Was geben Sie dem Knechte? 22. Ich gebe ihm Geld. 23. Was giebt der Knecht dem Pferde? 24 Er giebt ihm Heu. 25. Liebt dieſes Kind den Lehrer? 26. Ja, und der Lehrer lobt das Kind. 27. Iſt der Jäger noch in dem Walde? 28. Ja, und der Sohn des Edelmanns iſt bei ihm. 29. Der Jäger geht nach dem Walde zu dem Vater, und ich gehe zu dem Bruder.

QUESTION. What *irregularity* do you observe in the conjugation of geben?

SECTION IX.

INDEFINITE ARTICLE.

The *indefinite* article is less varied than the *definite*, having for the *masculine* and *neuter* nominative but *one* form. EX.:

Masculine: ein Mann, a man; *Neuter:* ein Glas, a glass.

DECLENSION OF THE INDEFINITE ARTICLE MASCULINE AND NEUTER WITH NOUNS.

	Masculine.	*Neuter.*
N.	Ein Mann, a man;	ein Kind, a child;
G.	Eines Mannes, of a man;	eines Kindes, of a child;
D.	Einem Manne, to, for a man;	einem Kinde, to, for a child;
A.	Einen Mann, a man;	ein Kind, a child.

OF THE COMPOUNDING OF NOUNS IN GERMAN.

1. Nouns are more frequently compounded in German than in English; and accordingly *one* word in German often requires for its full translation several in English. EX.:

Wirkungskreis, sphere of action (action sphere);
Schwimmvogel, web-footed bird (swimming fowl);
Lastthier, beast of burden (burden animal);
Zugthier, draught animal; (§ 2. 7.)
Hausthier, domestic animal (house animal).

EXERCISE 9.

Band, n. ribbon;	Kaufmann, m. merchant;	Schmied, m. blacksmith;
Ein, a, an;	Lastthier, n. beast of burden;	Schwert, n. sword;
Eisen, n. iron;	Oberhof'richter, m. judge of the superior court;	Stock, m. stick, cane;
Empfehlungsbrief, m. letter of recommendation;	Papier'händler, m. paper-dealer;	Tuch, n. cloth;
Feind, m. enemy;	Pflug, m. plow;	Tuch'händler, m. draper;
Gesetz'buch, n. law-book;		Wagner, m. carriage-maker;
Gewehr', n. gun;		Zugthier, n. draught-animal.
Kameel', n. camel;		

Der Wolf ist ein Raubthier.	The wolf is a beast of prey.
Der Zim'mermann ist ein Handwerker.	The carpenter is a mechanic.
Der Hammer ist ein Werkzeug.	The hammer is a tool (an instrument)
Das Bin'dewort ist ein Redetheil.	The conjunction is a part of speech.
Der Name eines Dinges ist ein Dingwort.	The name of a thing (substance) is a substantive.
Das Kind liebt den Gros'vater.	The child loves the grandfather.

1. Hat ein Mann, oder ein Kind den Stock dieses Freundes? 2. Dieser Mann hat ein Schwert eines Feindes, und dieses Kind hat den Stock eines Freundes. 3. Was hat der Jäger? 4. Er hat einen Hund und ein Gewehr. 5. Wer hat den Pflug des Bauers? 6. Der Vater dieses Kindes hat den Pflug. 7. Hat dieser Schmied das Geld des Kaufmanns? 8. Nein, er hat nur Eisen von einem Kaufmanne. 9. Haben Sie den Wagen des Bäckers? 10. Nein, ich habe diesen Wagen von einem Wagner. 11. Haben Sie das Band dieses Mädchens? 12. Nein, ich habe Tuch von einem Tuchhändler. 13. Haben Sie den Rock dieses Freundes? 14. Nein, ich habe diesen Rock von einem Schneider. 15. Haben Sie das Papier des Lehrers? 16. Nein, ich habe dieses Papier von einem Papierhändler und einen Empfehlungsbrief von dem Lehrer. 17. Ist das Pferd ein Zugthier? 18. Ja, und es ist auch ein Lastthier. 19. Ist das Kameel auch ein Zugthier? 20. Nein, es ist nur ein Lastthier? 21. Wessen Gesetzbuch hat der Sohn des Edelmanns? 22. Er hat das Gesetzbuch des Oberhofrichters.

QUESTIONS. 1. What is said of the *indefinite* article compared with the *definite*? 2. Can you give any examples? 3. Are nouns more frequently compounded in German than in English? 4. And how is it often necessary to translate them? 5. What are some examples?

LESSONS IN GEOLOGY.—No. II.

By THOS. W. JENKYN, D.D., F.G.S.

ON THE CRUST OF THE EARTH.

IN reading books on Geology you will often meet with the phrase "the crust of the earth," or "the earth's crust." The phrase involves in itself many important principles in theoretical geology. The very word "crust" implies a surface that has undergone some process of hardening, and that retains beneath it some materials in a condition different from itself.

You must not imagine that the hypothesis of a "crust of the earth" excludes the ideas of a Creation and a Creator. Suppose that Science could demonstrate to you that this great globe once existed in a gaseous form, and that, by the gases entering into combination and evolving heat, a glowing and fusing mass would whirl round in space, and that this was the first genesis by which our world was made visible and palpable. You would then ask, how came these gases to exist? And you would learn that they must have been *made* by a Creator. You would learn from chemistry that all gases combine according to regular and established laws. The gases did not make these laws, but received them from a living and intelligent Lawgiver.

The phrase "crust of the earth" may possibly recall to your mind the idea of either the crust of a loaf, or, perchance, that of a pie. Both these ideas will mislead you. In these cases the crust has been hardened, not by cooling, but by the influence of external heat upon the outward surface. In geology, on the contrary, the phrase implies that the body of the earth was once in a state of fusion,—that is, it was once all in a melted state, glowing, burning, and flaming; and that it gradually cooled until it became covered with a hardened surface.

If you have ever been in a large iron-foundry, where there are blast furnaces for melting ores, you will at once understand the geological meaning of the word "crust." Near the bottom of the blast furnace there is a flue, or tap, for allowing the fluid cinder, or scoria, which floats on the surface of the metal within, to flow out in burning streams. As this stream recedes from the flue, it becomes cooler; and a little lower down it is covered with a blackened surface which is so hard as that the workmen can safely walk upon it, though underneath it is still in a melted state. It is this kind of surface, hardened by cooling influence from above, but still kindling and burning beneath, that geologists call "crust."

You can, with a little effort, conceive of the propriety of applying the word "crust" in this sense to the surface of the globe. You have seen a red-hot coal, burning and flaming on all its sides, fall from the fire in your own grate. In a little time the outside of it became cooler and cooler, while the inside and centre, according to its size, were still red-hot. In this case, the outside, in cooling, became covered with irregular white flakes, or pellicles, called ashes.

You can also imagine a round mass of iron, say a small cannon-ball, heated in a blacksmith's furnace, and then thrown out suddenly and left to cool. As it cooled, all its surface would be covered with pellicles, or flakes of rust, which chemists call the oxide of iron; and which, if examined under a good microscope, would appear as if it had been put together by joints and angles.

Your conception will be assisted better still, if you imagine that, while you were at the blast furnace in the iron-foundry, a Herculean workman took up a large iron ladleful of the liquid cinder, and hurled his ladleful of the burning matter into the air; or you can suppose that mount Etna, or Vesuvius, were a Titanic workman, throwing out such a mass high up into some miles in the air, and, perhaps, beyond the circle of our atmosphere, or even of the attraction of our earth. If so, the mass would continue to whirl and roll round without falling again to our earth, it would take the form of our globe, which astronomers have demonstrated to be, necessarily, an ellipsoid, that is, orange-shape, or a round ball flattened at both ends.

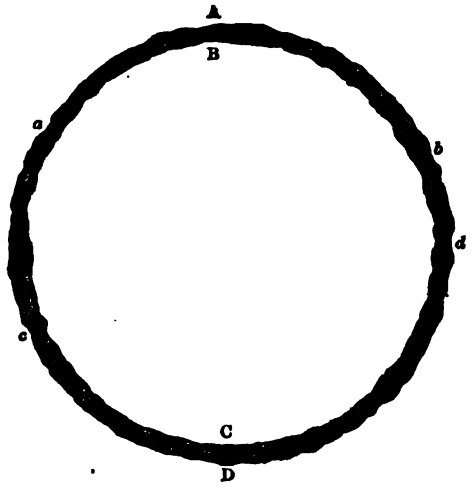
Whenever you break to pieces a large mass of cinder or scoria, that has cooled, you find that its inside has streaks and veins of different materials, and that it has many cavities or holes, called by the foundry-men "honeycombs." These cavities were in the cinder while yet in the red-hot state

and they were formed within it either by air or by gases. Imagine that, at the bottom of these cavities, there was once floating a diminutive drop of melted matter, moving whenever the mass was shaken. Now, OBSERVE, you have before you the cinder, the cavity, and the melted drop floating.

To these three facts, direct the magnifying-glass of your imagination, but let it be kept in the firm hand of your reason; and then apply your mind and your logic to "the great globe itself, and all that it inherits." Let the cool cinder be magnified into our planet; the cavities, into subterranean caverns of many hundred square miles; and the melted globule into an immense lake, or large sea, burning, boiling, heaving to the top of the cavity, melting parts of the crust nearest to it, or forcing the crust to swell upwards, or cracking it and forming crevices through which some of it comes up to the open air, and there hardens again to form an additional crust.

Fig. 1 will give you a rough idea of the formation of the earth's crust.

Fig. 1.



THE FIRST HARDENING OF THE CRUST OF THE EARTH.

I have said that the comparisons which I have introduced might probably assist your conceptions of the geological crust; but they, like most analogies, do not represent the whole case. In the examples mentioned, the process of cooling goes on from the surface to the centre, until the whole mass, *cinder*, *cavity*, and *drop*, are all perfectly cooled down. This is not the geological theory about the earth's crust; for, if the process of cooling continued, the earth would become refrigerated or cooled to its very centre: and then there would be no heat under its crust. This process of cooling to the centre would take myriads of ages. Some geological chemists have endeavoured to calculate that, from the known laws of radiation of heat, the complete cooling of the globe would take about two hundred millions of years.

Though the above instances of incrustations be imperfect, I want you to keep in mind the ideas of the *cinder*, the *cavity*, and the *molten globule*. Examine them; find any objections you can against them; but keep them in your mind. The principal difficulty in the above illustrations is that they will not account for the continuance of the heat under the crust. You must, therefore, try to imagine that the molten globule has some power of perpetuating its burning heat, though the crust above the cavity continues hard and cool. How can this be done? You must suppose that solid, fluid, or gaseous, elements form compound bodies, and that when these different elements pass into new combinations, the process is always accompanied with heat, and that the heat becomes intense, in proportion to the rapidity with which the combination is formed.

Take an instance. Chemists inform us that if you take clean iron filings, and mix them with a larger quantity of sulphur, and with as much water as will form the whole into a kind of paste; and then bury the paste in the earth, and press the earth firmly on it; in a few hours the whole mass will swell. In consequence of this swelling, the earth will be raised up into a hillock, sulphurous vapours will make their way through the cracks and crevices made by the force pushing upward, and sometimes flames will appear. Now, suppose that this mixture of sulphur and iron could be introduced into the cavity which we have imagined, and that the crust above it was so thick and hard and heavy, that the heat could not push it up. Still there would be heat in the cavity, or in the globule.

You see, then, that it is possible for elements or gases to exist in the cavity, which will continue the heat and keep the molten drop burning and floating. As it continues to burn, it will consume the sides of the cavity, and wear away the roof. It will, in time, enlarge the cavern, till the drop has become an immense molten lake. This molten lake or sea will, by growth of heat, acquire also intensity of power for action, until it crack the roof, and swell up the ground or crust till it burst asunder, and thus form fissures for the escape of smoke, flames, and melted matter. That there are such immense caverns in the crust of the earth, has been argued mathematically by appealing to the irregularities, which have been observed in the vibrations of the pendulum in different countries.

Your disciplined imagination must now be directed to the thickness of the crust of the earth. It is computed that our globe is in diameter—that is, from its upper surface to its lower one, or from A to D—in round numbers, about 8,000 miles. The crust of the earth from A to B, has been mathematically shown to be at least four hundred miles in thickness. Were it even twice this thickness, its thickness would be consistent with the actual phenomena observed, and with the theory of universal fluidity at one time. It is, therefore easy to imagine that, in a crust of four hundred miles thick, it would be very practicable for deep and immense lakes, or large seas, of melted matter to exist, and be widely distributed, in subterranean caverns, provided that they be so enclosed in the crust as to move with it in the daily rotation of the earth.

Mr. Hopkins, of Cambridge, the present President of the Geological Society, has endeavoured, by profound mathematical calculations on the nutation of the earth's axes, and on the precession of the equinoxes, to fix this thickness at 800 miles. This thickness may scarcely be admissible, since we do not know the condensing power of high pressure, and the expanding power of very intense heat. As this thickness is supposed to be extreme, geologists generally estimate the thickness of the crust, as inferred from experiments on the pendulum, &c., to be, in different countries, at from two to four hundred miles.

The argument of Mr. Hopkins, however, is only intended to show that, if the fusible nucleus, or kernel, of the earth be now in a state of fluidity, it must be at the depth of from 400 to 500 miles beneath the surface, and that, consequently, such a thickness is far too deep to account for volcanoes and earthquakes. Hence we are led to the inference, that the fluid matter which supplies actual volcanoes is not a molten ocean all round the centre of the earth, but large subterranean reservoirs, forming a kind of lakes or seas. This hypothesis has the double advantage of accounting chemically for the fluid supplies of volcanoes, and mechanically for the phenomena of the elevation of mountains in past geological time, and for the laws which such elevations follow.

From the appearance of the engraving, in fig. 1, you are not to imagine that the globe is hollow from B to C. Various observations, and various experiments with the pendulum, have proved that our planet is not an empty sphere; but that its interior, whether fluid or solid, has a higher specific gravity than the materials of the crust. From the same experiments, it has been inferred, that there is a gradual and regular increase in its density from the surface down to the centre.

You are now concerned to know whether it can be proved that there is any heat under the crust of the earth. You will learn, in the course of these lessons, that the action of volcanoes, and the rise of hot springs, or thermal springs, to the surface, prove that there are subterranean sources of heat active somewhere. I will now only notice that it is well known that the temperature of the crust of the earth increases the deeper you descend into it. In the Northumberland coalpits, the heat of the rocks increases by one degree of Fahrenheit's thermometer for every 44 feet in descent. In the lead-

mines of Saxony, the increase is one degree for every 65 feet. At Dolcoath mine, in Cornwall, it is one degree for every 75 feet. There is, therefore, great variety in the increase. A French geologist, M. Cordier, has paid much attention to this subject. His conclusions are,—1. That the heat increases rapidly the deeper you go. 2. That the increase is not equal at equal depths, but varies in different countries. 3. That the average increase, over the whole earth, is one degree for every 45 feet in descent.

In the profound depth of some mines, springs of fresh water bubble up, which are of high temperature. In the Cornish mines, there are considerable streams of water at the temperature of from 80 to 90 degrees, which is about 30 or 40 degrees warmer than the water on the surface. In one of these mines, the Poldice, nearly two millions of gallons of water are pumped up every day, from a depth of 352 yards, which is 90 or 100 degrees in temperature.

Some have conjectured that this increase of heat in the descent of mines is owing to the condensation of the air. But it is not so. A Cornish geologist, Mr. Fox, has shown that the mines are ventilated by numerous shafts from the surface of the earth, descending in some shafts and ascending in others. In all cases, the upward currents are warmer than the descending ones. This proves that the descending air, instead of imparting heat to the mine, actually cools it, by carrying off a large quantity of heat every hour.

These facts show not only that the earth has been for ages cooling down, but that even at this day it continues in the process of cooling. It cools not only by the general radiation of its heat into universal space, but especially, and more palpably, by the activity of volcanoes and its accompaniments. Every stream of lava that issues from volcanic depths carries away with it some small quantity of heat from the crust. Every hot well, or thermal spring, is continually bringing up with it, to the surface, some amount of heat from the deep. Also, as we have seen, ascending currents of air from mines must carry off portions of heat. These constant losses of heat can never be replaced from above; for the heat of the sun, according to the most accurate observations, never penetrates to the depths from which thermal springs flow. The immense ranges of extinct volcanoes, also, show that the power of gaseous elements to perpetuate and engender heat may be exhausted and spent.

I have now, for the present, done with the influence of heat in the formation of the crust of the globe. The earth's crust, as now found and examined by geology, has been formed, not by cooling, or the abstraction of heat, only; but also by the influence of the atmosphere and of water. When the process of cooling first commenced, there was not as yet, in theoretical geology, any water. According to chemical science, water could not be formed, until the cooling of the surface had so far advanced as to be below the boiling point, under the very great pressure of the atmosphere at that time. As soon, however, as it was practicable, according to laws fixed by the great Architect of the universe, for the gaseous elements of water to combine and to form this liquid, it also began immediately to act destructively upon the outward surface of the earth's crust. It began to wear away the rugged surface of the globe, either by dissolving it chemically, or by carrying it away mechanically, and depositing in one place what it brought from another.

When you look at fig. 1, you see that the outer lines of the earth's crust are not even, but rugged. The outer line of the circle is full of dents and hollows, and of swellings and points. You must imagine every one of these indentations, marked *a*, *b*, *c*, *d*, to be a deep hollow, or extensive valley some miles deep, and sufficient to form the bed of a gulf or inland sea. As the rain would wear away the upper parts of the curves, the water would run towards the bottom, and there settle and deposit the sand or mud which it had dislodged from the rocks of the crust above. With every shower there would be a fresh flood, which would carry down more sand, or pebbles, or silt. From the repetition of this process two results would follow: at first, the lake or sea thus formed in one hollow, would become deeper and deeper; and then, with every fresh stratum of sand deposited, the bottom would come up higher and higher.

In this manner a new covering would be made on the crust of the earth. These strata of sand would rise higher and higher, with every fresh layer deposited by the flood, until they would become visible, as dry land. In the process of growth they would elevate the water of the lake or sea, and eventually drive it off to other hollows or curves of lower level, until at last sea would join sea, and form an ocean.

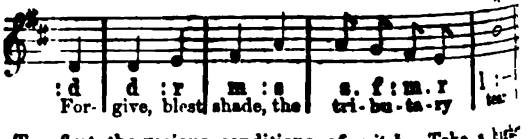
This, in geological theory, was the beginning of what are called sometimes sedimentary rocks, and sometimes stratified rocks. It is, therefore, no wonder that the most ancient of these rocks have much of a uniform composition, since, at this early epoch in geological time, the water had but one kind of material to work upon. It is necessary to mention the sedimentary rocks now, for you will find that these also have been acted upon by heat from under the earth's crust. According to Hutton's theory, different parts of the crust of the earth have been successively fused by heat in different epochs; and the progress of geology strengthens the evidence, that local variations in heat have melted one part of the crust after another, and have also much altered the superincumbent rocks, deposited upon it.

LESSONS IN MUSIC.—No. VI.

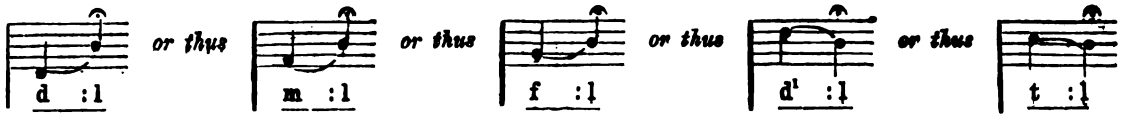
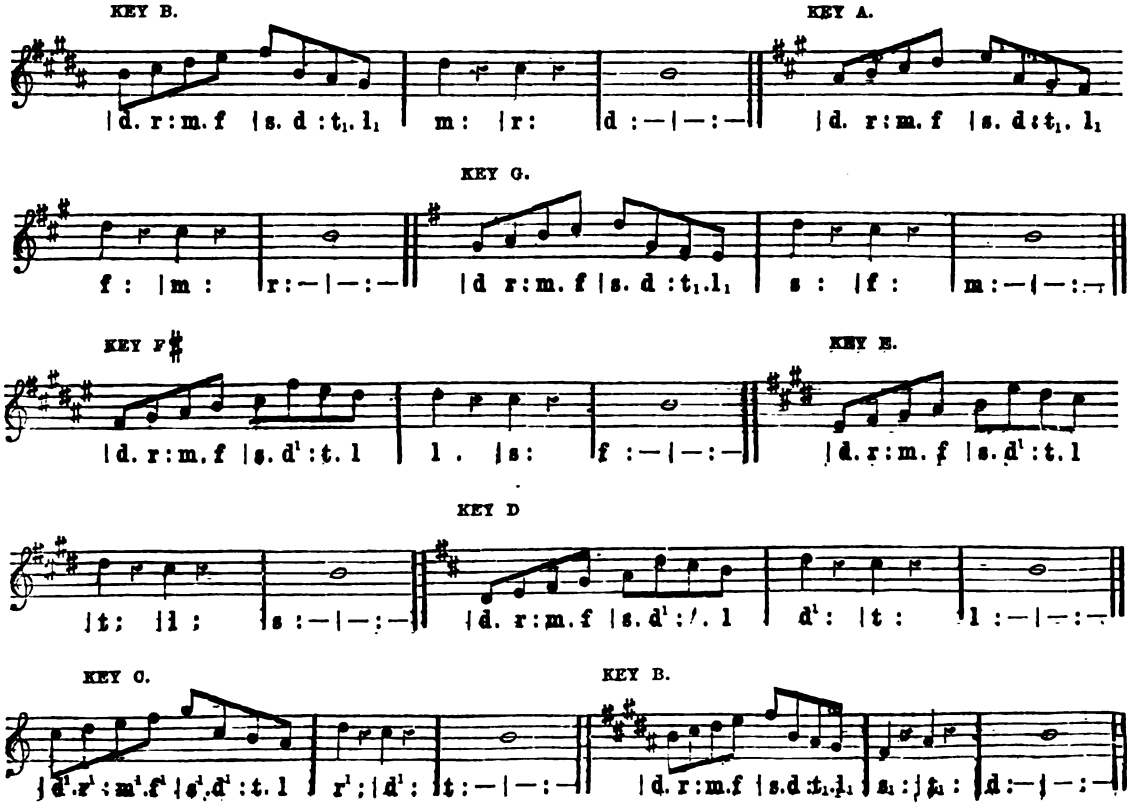
By John Curwen.

We have now to treat of a most important subject, and one which should be thoroughly well understood by every pupil. We refer to the MENTAL EFFECT OF NOTES. Let us put the topic in the form of a question. What is the *principal* source of a note's power to affect the mind? We observe, for instance, in one of Handel's songs, that a certain note produces a certain effect upon our minds. *Why* does it produce that effect? Is there any *law* by which such mental effects are chiefly regulated? To these questions we answer, that many circumstances may *modify* the mental effect of a note, but that it is mainly *produced* by the principle of *key-relationship*, in connexion with *rate of movement*. We believe that every note of *the scale* (whatever may be the pitch of the key-note) has a peculiar "mission" of its own to the human mind—a proper mental effect, which circumstances of *pitch*, *quality* of tone, *rhythmical arrangement*, peculiarities of *expression*, &c., may modify, but cannot efface. Let us take an example, and look at it in these various lights. It cannot be doubted that the last note in the following phrase, from Dr. Calcott's well-known glee, produces a mental effect peculiarly appropriate to the word to which it is set. That note we call LAH, and is the sixth above or the "minor third" below the key-note. The question is, How comes that note to produce a sorrowful impression on the mind? What is the *law*, if there is one, by virtue of which that note possesses its power? Let the pupil sing the phrase:—

KEY D



Try first the various conditions of *pitch*. Take a higher sound, say G, for your key-note or DOH, and sing the phrase again. You will notice that the mental effect is *modified*, but it remains *essentially the same*. Again, while in the key of G, sing the phrase, taking the *lower* LAH, instead of the upper. The effect on the mind is more gloomy, but it is still the same effect. It is not the mere *height in pitch*, then, that gives to the LAH its peculiar characteristic of sorrowfulness. The difference between the same tune set in a low and in a high key is undoubtedly great, but the special effect of each individual note remains of the same kind. Next try the effect of what is called in French "*timbre*," or different *quality* of sound, upon this note. Let the phrase be sung by a *soft* voice, a *clear* voice, a *hard* voice, a *mellow* voice, &c., or be played first on a *flute*, next on a *trumpet*, and again on a *violin*. Such changes will certainly *modify* the mental effect. One voice or instrument may be better than the other, but they will all agree in expressing, on the note LAH, the sorrow

ful sentiment, and, if they sound the note correctly, they cannot help doing so. This mental effect is, therefore, independent of the mere qualities of sound, and is governed by some other law. Let the next experiment be in relation to *interval*, for some persons *might* imagine that the "distance in pitch" between RAY and LAH, called a fifth, produces the mental effect. Therefore, sing the word "tear," when you come to the close, thus :—

You will find that every change produces a modification of the idea, but the idea itself, belonging to LAH, remains still the same. *Interval*, therefore, is not the law which governs mental effect. In a similar way you may try whether singing the same sound to different *words* or syllables, or with different modes of "expression" (as loud, soft, &c.), will produce any material changes. And when you have found that none of these various conditions of the note can rob it of its own peculiar emotional character, then try another and most important experiment. Vary the *rate of movement*. Instead of singing the phrase slowly, sing it as rapidly as though it were a jig. You will then understand why we said that key-relationship, *in connexion with rate of movement*, was the chief cause of mental effect. The note seems, now, to express an abandonment *to gaiety*, instead of *sorrow*. But notice that LAH, sung quickly, *always* produces this second mental effect, and that *no other note* produces the same effect, however you may quicken its rate of movement. There is still, therefore, a *law* presiding even in this "duplicity" of mental effect. This note LAH (sixth above or "minor third" below the key-note) is now proved to possess twin mental effects, the one showing the grave the other the gay side of a certain emotion. So is it with every note of the scale. "Key-relationship" gives it a certain acceptance with the mind, and "rate of movement" has a certain way of modifying that impression. To prove, however, that the key-relation into which a note is thrown, by the sounds which have been heard before it, is the principal producing cause of mental effect, we must try another experiment. Take the *same sound*, as to absolute pitch, and *vary its key-relationship*. Strike the "chord" and scale of F, for instance, and then the note B, at length, noticing its mental effect. Next strike the chord and scale of A, followed by the same note B (the same in pitch), as a long note. Notice, now, its effect on the mind! How changed! Try, next, the chord and scale of G, and observe the note, in the same way. How changed again! Try other keys, and you will find that every change of key-relationship makes a change in the reception which the mind gives to that particular sound of unaltered pitch. If you wish to prove this to an incredulous friend, tell him that you are about to play to him, on the flute or piano, a number of long notes, and that, without looking at your playing, he is to tell you, as well as he can, what notes they are, and describe their mental effect. Then play to him the following phrases, and ask him, at the close, whether the notes were the same, or, if not, how they differed. Unless he takes care to keep singing the note B all through (which would be a physical rather than a mental test) he is sure to suppose the notes different. Of course you must be acquainted with some instrument to perform this experiment. The violin will give it most accurately.

Why a note's standing at a particular interval from the key-note should give it a particular musical effect, we do not know. We can only notice the fact, and make use of it in teaching. There must come to us, along with the actual sound itself, some mental *association* of the relationship of interval (indicated by preceding notes) which has been thrown around it. The memory of notes just heard hovers around that which we now hear, and gives it its *character*. Quick succession approaches in effect to co-existence, as is familiarly shown in reference to the eye by the thaumatrope and other optical toys. Thus when once the key is established by the opening notes of the tune, it is still felt to be present, as a mental element, with every single note that follows. In a similar manner, the *effect* of a given *colour*—the artist will tell us—is modified by the surrounding ones, or those on which the eye has just rested. This is a deeply interesting subject, and deserves to be well studied and further explored, especially in connexion with harmonic combinations and effects.

These mental effects of notes in key have often been noticed in books of science. Dr. Calcott refers to them in his "Musical Grammar." M. Jeu de Berneval, Professor to the Royal Academy of Music, in his "Music Simplified," illustrates them very ingeniously and beautifully. Dr. Bryce introduces them into his "Rational Introduction." It would seem surprising (did we not know how the old notation, with its attempted, but inaccurate, scale of *fixed* sounds, takes up the learner's time, and distracts attention from the real beauties of musical science) that these interesting facts, so well calculated to aid the pupil, have been so little used in elementary instruction. It is obvious that the moment a pupil can *recognise* a certain musical property in any note, he will be able to *produce* the note with the greater accuracy and satisfaction. From extensive experience, we have found that infants and persons with untrained voices are able to appreciate these points, and derive constant pleasure and assistance from the knowledge of them. The teacher will find himself well repaid by a most careful attention to this subject.

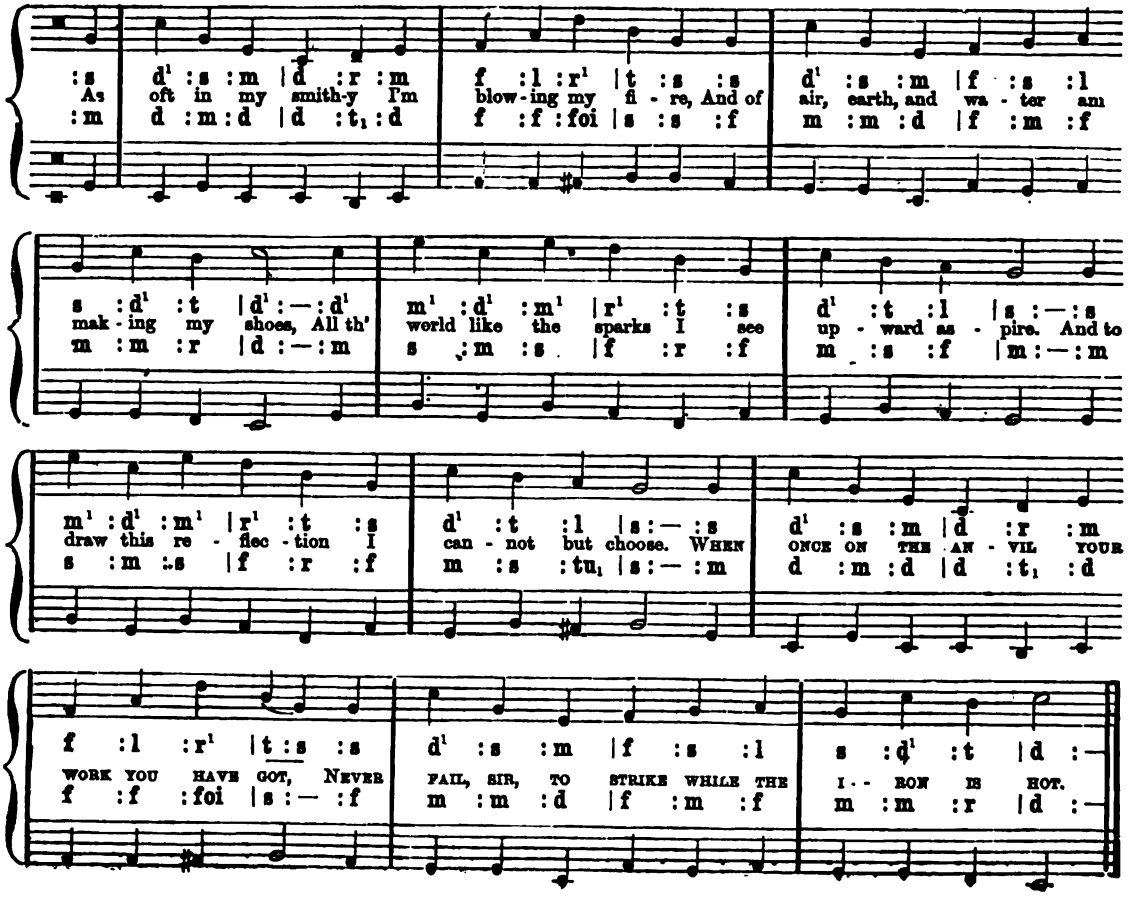
In the next lesson we shall commence an examination of the different notes, with this point in view, and furnish illustrations from the great masters. It is sufficient for us here to request the pupil to read with care, and put to the test, the following remarks:—

The notes DOH, SOH, and MR, give to the mind an idea of rest and power (in degrees corresponding with the order in which they are named), while TE, FAH, LAH, and RAY (in similar degrees), suggest the feeling of suspense and dependence. Thus, if after we have heard the principal notes of the key, the voice dwells on the sound TE, the mind is sensible of a desire for something more, but the moment TE is followed by DOH' a sense of satisfaction and repose is produced. In the same manner the mind is satisfied when FAH resolves itself into MR, and LAH (though not so decidedly) into SOH. RAY also excites a similar feeling of inconclusiveness and expectancy, which is resolved by ascending to MR, or, more perfectly, by falling to DOH.

Notice the *power* and *vigour* given to the tunes GRIFFIN, LEYBURN, and BLACKSMITH, by the notes DOH, SOH, and MR. Sing the tunes over for the purpose of forming an independent judgment on this point. Then, to show the effect of the "lesning" notes, sing slowly as follows:—

: d | m : s | f : — | m : d | m : s | t : — | d' : d' | s : m
| l : — | s : d' | s : m | r : — | m : d | m : s | r : — | d

EXERCISE 17. **BLACKSMITH.** KEY C. M. 138.

(The Tune Old English. The Words by the Rev. — PLUMPTRE.)

: s | d' : s : m | d : r : m | f : l : r' | t : s : s | d' : s : m | f : s : l
As oft in my smith-y I'm blow-ing my fi - re, And of air, earth, and wa - ter am
: m | d : m : d | d : t, : d | f : f : foi | s : s : f | m : m : d | f : m : f
s : d' : t | d' : — : d' | m' : d' : m' | r' : t : s | d' : t : l | s : — : s
mak - ing my shoes, All th' world like the sparks I see up - ward as - pire. And to
m : m : r | d : — : m | s : m : s | f : r : f | m : s : f | m : — : m
m' : d' : m' | r' : t : s | d' : t : l | s : — : s | d' : s : m | d : r : m
draw this re - flec - tion I can - not but choose. WHEN ONCE ON THE AN - VIL YOUR
s : m : s | f : r : f | m : s : tu, | s : — : m | d : m : d | d : t, : d
f : l : r' | t : s : s | d' : s : m | f : s : l | s : d' : t | d : —
WORK YOU HAVE GOT, NEVER FAIL, SIR, TO STRIKE WHILE THE I - RON IS HOT.
f : f : foi | s : — : f | m : m : d | f : m : f | m : m : r | d : —

2. *In searching your heart should you find you intend*
Some good to yourself or another to do,
To relieve the distress'd or yourself to amend,
Oh! watch the bright time when the purpose shall glow;
For happiness hangs on the moment I wot,
IF YOU FAIL NOT TO STRIKE WHEN THE IRON IS HOT.

3. Whene'er by a smithy you happen to pass,
And hear on the anvil the hammer's loud clang,
This truth in your mind do not fail to rehearse,
That you heard from a blacksmith as blithely he sang,—
"IF GOOD BE YOUR AIM, BE WHATEVER YOUR LOT,
NEVER FAIL, SIR, TO STRIKE WHILE THE IRON IS HOT."

NOTE.—In the "second part" of this tune notes FOI and TU occur. These notes will be more fully and clearly explained hereafter. FOI is a note a little less than half a tone *higher* than FAH. It always follows FAH, and seems to rise out of it. It is called a chromatic or *colouring* note. TU is nearly the same sound in pitch, being a little more than half a tone lower than SOH. It holds the same relation to SOH which TE holds to DOH. It is, in fact, the seventh note of a new key, but more of this hereafter. It is enough for you to notice, now, that it does *not* follow or rise out of FAH, and that it does *not* produce the same "colouring" effect with FOI. Observe that TU has the lower octave mark on it.

In singing the words, be careful to notice the *italics* and SMALL CAPITALS which indicate expression. [The little mark, like two interlacing crosses, is called a sharp. It raises the note, before which it stands, something less than half a tone. You will remark that there is nothing, in the old notation, to distinguish TU from FOI. Two *different* things are represented by the *same* signs.]

LESSONS IN FRENCH.—No. XII.

By Professor LOUIS FASQUELLE, LL.D.

SECTION XXVI.

PLACE OF THE PRONOUNS.

1. THE personal pronoun used as the direct [§ 2 (2), § 42 (4)] object of a verb,* is in French placed before the verb, except in the second person singular or in the first and second persons plural of the imperative used affirmatively.

Il me voit, il l'aime.	*He sees me, he loves him.*
Il nous aime, il vous aime.	*He loves us, he loves you.*

2. The personal pronoun representing the indirect object of the verb [§ 2 (3), § 42 (5)] answering to the dative of the Latin, and to the indirect object of the English with the preposition *to* expressed or understood, is also in French placed before the verb:—

Il me parle, il lui parle.	*He speaks to me, he speaks to him.*
Il nous donne une fleur.	*He gives us a flower.*†
Il vous parle, il leur parle.	*He speaks to you, he speaks to them.*

3. The personal pronoun is generally placed *after* the following verbs: aller, *to go;* accourir, *to run to;* courir, *to run;* venir, *to come;* penser à, songer à, *to think of*:—

Il vient à moi.	*He comes to me.*
Il pense à vous, à eux.	*He thinks of you, of them.*

4. In the imperative used affirmatively, the pronouns follow the verb:—

Aimez les, parlez leur.	*Love them, speak to them.*

5. The words *en* and *y* follow the above rules, except the 3rd.

J'en parle, j'y pense.	*I speak of it, I think of it.*

6. The pronoun used as the indirect object of a verb, answering to the genitive or ablative of the Latin, and to the indirect object which in English is separated from the verb by a preposition other than *to*, is in French always placed *after* the verb:—

Je parle de lui, d'elle, d'eux.	*I speak of him, of her, of them.*
Je reste avec vous et avec eux.	*I remain with you and with them.*

7. All pronouns used as objects of verbs, must be repeated:—

Je les aime, je les respecte, je les honore.	*I see them, respect and honour them.*

* The young student will easily distinguish the personal pronoun used as the direct object of a verb, by the fact that there is in English no preposition between the verb and this pronoun.

† The preposition *to* is understood. *He gives a flower to us.*

RÉSUMÉ OF EXAMPLES.

M'entendez vous?	*Do you hear* or *understand me?*
Je ne vous entends pas.	*I do not understand* or *hear you.*
Les entendez vous?	*Do you hear them?*
Je les vois et je les entends.	*I see them and understand them.*
Il nous aime et il nous honore.	*He loves and honours us.*
Me parlez vous de votre ami?	*Do you speak to me of your friend*
Je vous parle de lui [R. 6].	*I speak to you of him.*
Nous parlez vous de ces dames?	*Do you speak to us about those ladies?*
Je vous parle d'elles.	*I speak to you of them.*
Ne leur parlez vous pas?	*Do you not speak to them?*
Je n'ai pas envie de leur parler.	*I have no wish to speak to them.*
Parlez lui,—ne lui parlez pas.	*Speak to him* or *her—do not speak to him.*
Allez à lui, courez à lui.	*Go to him—run to him.*
Parlez leur,—ne leur parlez pas.	*Speak to them,—do not speak to them.*

EXERCISE 51.

Affaire, f. *affair.*	Compagnon, m. *companion.*	Nouvelle, f. *news.*
Arbre, m. *tree.*		Pens-er, 1. *to think.*
Avis, m. *advice.*	Déjà, *already.*	Poirier, m. *pear-tree.*
Cerisier, m. *cherry tree.*	Ecri-re, 4. ir. *to write.*	Pommier, m. *apple-tree.*
Communiqu-er, 1. *to communicate.*	Example, m. *example.*	Respect-er, 1. *to respect.*

1. Allez vous lui écrire? 2. Je vais lui écrire et lui communiquer cette nouvelle. 3. Allez vous lui parler de moi. 4. Je vais lui parler de vous et de votre compagnon? 5. Leur envoyez vous de beaux arbres? 6. Je leur envoi des pommiers, des poiriers, et des cerisiers? 7. Ne m'envoyez vous pas des cerisiers? 8. Je ne vous en envoie pas, vous en avez déjà. 9. Avez vous raison de leur parler de cette affaire? 10. Je n'ai pas tort de leur parler de cette affaire. 11. Venez à nous demain matin. 12. Venez nous trouver, cette après-midi. 13. Allez vous les trouver tous les jours? 14. Je vais les trouver tous les soirs. 15. Leur donnez vous de bons avis. 16. Je leur donne de bons avis et de bons exemples. 17. Nous parlez vous de vos sœurs? 18. Je vous parle d'elles. 19. Ne nous parlez vous pas de nos frères? 20. Je vous parle d'eux. 21. Ne les aimez vous pas? 22. Nous les aimons et nous les respectons. 23. Pensez vous à ce livre ou n'y pensez vous pas? 24. Nous y pensons et nous on parlons. 25. Nous n'y pensons pas.

EXERCISE 52.

1. When are you going to write to your brother? 2. I am going to write to him to-morrow morning. 3. Do you intend to write to him every Monday? 4. I intend to write to him every Tuesday. 5. Have you a wish to speak to him to-day? 6. I have a wish to speak to him, but he is not here. 7. Where is he? 8. He is at his house. 9. Do you speak to them? 10. Yes, Sir, I speak to them about (*de*) this affair. 11. Do they give you good advice? 12. They give me good advice and good examples. 13. Do you go to your sister every day? 14. I go to her every morning at a quarter before nine. 15. Does she like to see (*voir*) you? 16. She likes to see me and she receives me well. 17. Do you think of this affair? 18. I think of it the whole day. 19. Do you speak of it with (*avec*) your brother? 20. We speak of it often. 21. Do you send your companion to my house? 22. I send him every day. 23. Are you at home every day? 24. I am there every morning at ten o'clock. 25. Do you like to go to church? 26. I like to go there every Sunday with a companion. 27. Do you speak of your houses? 28. I speak of them (*en*). 29. Does your brother speak of his friends? 30. Yes, Sir, he speaks of them (*d'eux*). 31. Does he think of them? 32. Yes, Sir, he thinks of them (*d eux*). 33. Does he think of this news? 34. Yes, Sir, he thinks of it (*y*). 35. I love and honour them.

SECTION XXVII.

RESPECTIVE PLACE OF THE PRONOUNS. § 101.

1. When two pronouns occur, one used as a direct object of the verb (accusative), and the other as the indirect object (dative), the indirect object, if not in the third person singular or plural, must precede the direct object [§ 101 (1)].

Je vous le donne.	*I give it to you.*
Il me le donne.	*He gives it to me.*
Il nous le donne.	*He gives it to us.*

2. When the pronoun used as an indirect object [dative, Rule 2, Sect. 25], is in the third person singular or plural, it must be placed after the direct object [§ 101 (2)].

Nous le lui donnons.	*We give it to him.*
Nous le leur donnons.	*We give it to them.*

3. The above rules of precedence apply also to the imperative used negatively:—

Ne nous le donnez pas [R. 1].	*Do not give it to us.*
Ne le lui donnez pas [R. 2].	*Do not give it to him.*

4. With the imperative used affirmatively, the direct object precedes in all cases the indirect object [§ 101 (5)].

Donnez le nous.	*Give it to us.*
Montrez le leur.	*Show it to them.*

5. En and y always follow the pronouns:—

Je lui en donne.	*I give him some.*
Il nous y envoie.	*He sends us thither.*

6. PRESENT OF THE INDICATIVE OF THE IRREGULAR VERBS.

VOIR, *to see.*	VOULOIR, *to will, to be willing.*	POUVOIR, *to be able.*
Je vois, *I see, do see, or am seeing.*	Je veux, *I will or am willing.*	Je puis, *I can, I may, I am able.*
Tu vois.	Tu veux.	Tu peux.*
Il voit.	Il veut.	Il peut.
Nous voyons.	Nous voulons.	Nous pouvons.
Vous voyez.	Vous voulez.	Vous pouvez.
Ils voient.	Ils veulent.	Ils peuvent.

7. The above verbs take no preposition before another verb.

8. The preposition, pour, is used to render the preposition *to*, when the latter means *in order to*.

Je vais chez vous pour parler à votre frère et pour vous voir.	*I go to your house to speak to your brother and to see you.*
J'ai besoin d'argent pour acheter des marchandises.	*I want money to (in order to) buy goods.*

RÉSUMÉ OF EXAMPLES.

Voulez vous nous le donner?	*Will you give it to us?*
Je veux vous le prêter.	*I will lend it to you.*
Pouvez vous me les donner?	*Can you give them to me?*
Je ne puis vous les donner.	*I cannot give them to you.*
Votre frère peut il le lui envoyer.	*Can your brother send it to him?*
Il ne veut pas le lui envoyer.	*He will not send it to him.*
Qui veut le leur prêter?	*Who will lend it to them?*
Personne ne veut le leur prêter.	*No one will lend it to them.*
Envoyez les nous.	*Send them to us.*
Ne nous les envoyez pas.	*Do not send them to us.*
Donnez nous en.	*Give us some (of it).*
Ne leur en envoyez pas.	*Do not send them any.*
Envoyez le leur, pour les contenter.	*Send it to them (in order) to satisfy them.*
Je puis vous l'y envoyer.	*I can send it to you there.*

EXERCISE 53.

Commis, m. *clerk.*	Guère, *but little.*	Poisson, m. *fish.*
Connaissance, f. *acquaintance.*	Marchande de modes, f. *milliner.*	Pologne, f. *Poland.*
Croi-re, 4. ir. *to believe.*	Montr-er, 1. *to show.*	Prêter, 1. *to lend.*
Dette, f. *debt.*	Oubli-er, 1. *to forget.*	Semaine, f. *week.*
D-evoir, 3. *to owe.*	Pay-er, 1. *to pay.*	Souvent, *often.*
		Voyage, m. *journey.*

1. Voulez vous donner ce livre à mon frère? 2. Je puis le lui prêter, mais je ne puis le lui donner. 3. Voulez vous nous les envoyer? 4. La marchande de modes peut vous les envoyer. 5. Les lui montrez vous? 6. Je les vois et je les lui montre. 7. Avez vous peur de nous les prêter? 8. Je n'ai pas peur de vous les prêter. 9. Ne pouvez vous nous envoyer du poisson? 10. Je ne puis vous en envoyer, je n'en ai guère. 11. Voulez vous leur en parler? 12. Je veux leur en parler, si je ne l'oublie pas. 13. Venez vous souvent les voir? 14. Je viens les voir tous les matins, et tout les soirs. 15. Ne leur parlez vous point de votre voyage en Pologne? 16. Je leur en parle, mais ils ne veulent pas me croire. 17. Est-ce que je vois mes connaissances, le lundi. 18. Vous les voyez tous les jours de la semaine. 19. Vous envoient elles plus d'argent que le commis de notre marchand? 20. Elles m'en envoient plus que lui. 21. En envoyez vous au libraire? 22. Je lui en envoie quand je lui en dois. 23. N'avez vous pas tort de lui en envoyer? 24. Je ne puis avoir tort de payer mes dettes. 25. Ils vous en donnent, et ils vous en prêtent quand vous en avez besoin.

* After the verbs pouvoir, *to be able*; oser, *to dare*; savoir, *to know*; the negative pas may be omitted.

EXERCISE 54.

1. Will you send us that letter? 2. I will send it to you, if you will read it. 3. I will read it if (*si*) I can. 4. Can you lend me your pen? 5. I can lend it to you, if you will take care of it [Sect. 21 (3)]. 6. May I speak to your father? 7. You may speak to him, he is here. 8. Are you afraid of forgetting it? [Sect. 20 (4)]. 9. I am not afraid of forgetting it. 10. Will you send them to him? 11. I intend to send them to him, if I have time. 12. Do you speak to him of your journey? 13. I speak to him of my journey. 14. I speak to them of it. 15. Can you communicate it to him? 16. I have a wish to communicate it to him. 17. Do you see your acquaintances every Monday? 18. I see them every Monday and every Thursday. 19. Where do you intend to see them? 20. I intend to see them at your brother's and at your sister's. 21. Can you send him there every day? 22. I can send him there every Monday, if he wishes (*s'il le veut*). 23. Can you give them to me? 24. I can give them to you. 25. Who will lend them books? 26. No one will lend them any. 27. Your bookseller is willing to sell them good books and good paper. 28. Is he at home? 29. He is at his brother's. 30. Are you wrong to pay your debts? 31. I am right to pay them. 32. Will you send it to us? 33. I am willing to send it to you, if you want it. 34. Are you willing to give them to us? 35. We are willing to give them to your acquaintances.

LESSONS IN LATIN.—No. XII.

By JOHN R. BEARD, D.D.

THE NUMERALS.

As in English so in Latin the numerals have various forms. Thus we say, one, first, one each, once. One, and the corresponding two, three, &c., we call *cardinal* (from cardo, Inis, m. *a hinge*), because they are the chief numbers, those on which the others hinge. First, second, third, &c. we call *ordinal* (from ordo, Inis, m. *an order* or *series*), because they show the order or place in a series which a person or thing holds. One each, two each, three each, &c. may be called *distributives*, because they distribute the numbers severally to persons or things, declaring how many each possesses. Once, twice, thrice, &c. are called *adverbial* numerals, because they imply some verb and state how often the action of the verb takes place. You may see a full view of the Latin numerals in all their forms in the ensuing table, with the English figures on the left hand, and the corresponding Latin characters on the right hand.

TABLE OF NUMERALS.

	Cardinal. unus, a, um *one*	*Ordinal.* primus, a, um *first*	*Distributive.* singuli, æ, a *one each*	*Adverbial.* semel *once*	
1	unus, *one*	primus, *first*	singuli, *one each*	semel, *once*	I.
2	duo, *two*	secundus, *second*	bini, *two each*	bis, *twice*	II.
3	tres, *three*	tertius, *third*	terni, *three each*	ter, *thrice*	III.
4	quatuor, *four*	quartus, *fourth*	quaterni, *four each*	quater, *four times*	IV.
5	quinque, *five*	quintus, *fifth*	quini, *five each*	quinquies, *five times*	V.
6	sex, *six*	sextus, *sixth*	seni, *six each*	sexies, *six times*	VI.
7	septem, *seven*	septimus, *seventh*	septéni, *seven each*	septies, *seven times*	VII.
8	octo, *eight*	octávus, *eighth*	octóni, *eight each*	octies, *eight times*	VIII.
9	novem, *nine*	nonus, *ninth*	novéni, *nine each*	novies, *nine times*	IX.

The English of the numerals that follow can be easily supplied by the learner.

	Cardinal.	*Ordinal.*	*Distributive.*	*Adverbial.*	
10	decem	decimus	deni	decies	X.
11	undĕcim	undecimus	undeni	undecies	XI.
12	duodĕcim	duodecimus	duodeni	duodecies	XII.

	Cardinal.	*Ordinal.*	*Distributive.*	*Adverbial.*	
13	tredĕcim	tertius decimus	terni deni	terdecies	XIII.
14	quatuordĕcim	quartus decimus	quaterni deni	quaterdecies	XIV.
15	quindĕcim	quintus decimus	quini deni	quindecies	XV.
16	sedĕcim	sextus decimus	seni deni	sedecies	XVI.
17	septendĕcim	septimusdecimus	septeni deni	septiesdecies	XVII.
18	duodeviginti	duodevicesimus	duodeviceni	duodevicies	XVIII.
19	undeviginti	undevicesimus	undeviceni	undevicies	XIX.
20	viginti	vicesimus	viceni	vicies	XX.
21	unus et viginti	unus et vicesimus	viceni singuli	vicies semel	XXI.
22	duo et viginti	alter et vicesimus	viceni bini	vicies bis	XXII.
28	duodetriginta	duodetricesimus	duodetriceni	duodetricies	XXVIII.
29	undetriginta	undetricesimus	undetriceni	undetricies	XXIX.
30	triginta	tricesimus	triceni	tricies	XXX.
40	quadraginta	quadragesimus	quadrageni	quadragies	XL.
50	quinquaginta	quinquagesimus	quinquageni	quinquagies	L.
60	sexaginta	sexagesimus	sexageni	sexagies	LX.
70	septuaginta	septuagesimus	septuageni	septuagies	LXX.
80	octoginta	octogesimus	octogeni	octogies	LXXX.
90	nonaginta	nonagesimus	nonageni	nonagies	XC.
99	undecentum	undecentesimus	undecenteni	undecenties	XCIX.
100	centum	centesimus	centeni	centies	C.
101	centum et unus	centesimus et primus	centeni singuli	centies semel	CI.
102	centum et duo	centesimus et alter	centeni bini	centies bis	CII.
200	ducenti, æ, a	ducentesimus	duceni	ducenties	CC.
300	trecenti	trecentesimus	triceni	trecenties	CCC.
400	quadringenti	quadringentesimus	quadringeni	quadringenties	CD.
500	quingenti	quingentesimus	quingeni	quingenties	D.
600	sexcenti	sexcentesimus	sexceni	sexcenties	DC.
700	septingenti	septingentesimus	septingeni	septingenties	DCC.
800	octingenti	octingentesimus	octingeni	octingenties	DCCC.
900	nongenti	nongentesimus	nongeni	nongenties	CM.

1,000	mille	millesimus	singula milia	millies M.
2,000	duo milia	bis millesimus	bina milia	bis millies MM.
100,000	centum milia	centies millesimus	centena milia	centies millies CCCLOOO
1,000,000	decies centum milia	decies centies millesimus	decies milia	decies millies CCCCLOOOO
2,000,000	vicies centum milia	vicies centies millesimus	vicies milia	vicies millies

On this table, I submit to you the following remarks, unus, duo, and tres are declined, as follows:—

Nom.	unus	una	unum
Gen.	unius	unius	unius
Dat.	uni	uni	uni
Acc.	unum	unam	unum
Abl.	uno	unâ	uno

Where specially observe that the genitive ends in ius, and the dative in i. I put together in a form easy of remembrance the words declined like the preceding example:—

Pronouns that make ius in the genitive and i in the dative.

unus, ullus, nullus
solus, totus, alius
uter, alter, neuter

Observe that the ius and the i of the masculine gender remain in the feminine and the neuter. Uter forms its genders thus: uter, m. utra, f. utrum n. Alter, thus: alter, m. altera, f. alterum, n. But neuter, thus: neuter, m. neutra, f. neutrum, n. So in their compounds; by adding que, uter becomes uterque which signifies *both*, and is formed thus: nom. uterque, m. utrăque, f. utrumque, n.; gen. utriusque; dat. utrique; so, nom. unusquisque, m. unaquaeque, f. unumquodque, n.; gen. unIuscujusque; dat. unicuique. Alius in the neuter, has aliud; in the genitive singular, alius (contracted from alIius, and dative alIi). In alteruter, *one of two*, commonly uter alone is declined thus:

Nom.	alteruter, m.	alterutra, f.	alterutrum, n.
Gen.	alterutrius	alterutri	alterutrius

Declension of duo, duae, duo, *two*.

	M.	F.	N.
Nom. & Voc.	duo	duae	duo
Gen.	duórum	duárum	duorum
Dat. & Abl.	duobus	duabus	duobus
Acc.	duo *or* duos	duas	duo

Tres, m. tres, f. tria, n. *three*.

	M.	F.	N
Nom. & Voc.	tres	tres	tria
Gen.	trium	trium	trium
Dat. & Abl.	tribus	tribus	tribus
Acc.	tres	tres	tria

Milia is declined like tria, thus milia, milium, milibus, milia. Milia requires after it a genitive; for instead of saying, as we do, ten thousand men, the Latins said ten thousands of men, decem milia hostium; but mille considered as a whole, a thousand, is indeclinable: thus, dux cum mille militibus, *a general with a thousand soldiers*. The ordinals are declined like nouns of the first and the second declension. The distributives are also declined after the same manner. Mark that singuli is in the plural. The plural is necessitated by the meaning, inasmuch as the adjective is a distributive, for distribution implies more than one; thus the Latins said, inter singulos homines, *among the men severally*.

If now you carry your eye down the numbers, you will find that for every separate number from one to nine, there is a separate word. With ten (*decem*) a new series begins which goes on to nineteen, when again at twenty (*viginti*) a new word begins a new series. In centum and in mille, you also find new words and the commencements of new series. From eleven (*undecim*) to seventeen (*septendecim*) inclusive, each consecutive word is compounded of decem and a number taken from the first series. When they come to eighteen, instead of saying after their former manner, and as we say in English, eight, ten, the Romans said, *two from twenty*, duo de viginti. Having passed twenty, they made use of it to form the numbers between twenty and thirty, thus, unus et viginti, *one and twenty*; they also said, viginti unus, viginti duo, viginti tres, viginti quatuor, and so forth. In all cases, 8 and 9 are expressed by subtracting 2 and 1 from the next ensuing new term; thus 28 is duo de triginta, *two from thirty*; 39 is undequadraginta, *one from forty*; so in the ordinals duodequadragesimus, undesexagesimus, &c.

Vocabulary.

Hora, ae, *f. an hour*; summa, ae, *f. a sum total*; annus, i, m. *a year* (E. R. *annual*); calculus, i, m. *a little stone* (E. R. *calculation*, which was originally performed with *little stones*); Carolus, i, m. *Charles*; codicilli, orum, m. *a writing-table*, or *wax-tablet for writing on, a slate or note book* (E. R. *codicil*); cerăsum, i. n. *a cherry*; malum, i. n. *an apple*; pirum, i, n. *a pear*; prunum, i, n. *a plum*; mensis, is, m. *a month*; hebdŏmas, ădis, *f. a week*; nux, nucis, *f. a nut*; in promptu esse, *to be ready*; respondeo 2, *I answer* (with dative); responsio, ónis, *f. an answer* (E. R. *response*); addo 3, *I give to, add*; attendo 3, *I pay attention*; pono 3, *I put* or *set*; sepōno 3, *I put apart, lay down*; jam, adv. *already, now*; memŏriter, adv. *by memory*, "*by heart*"; paulisper, adv. *a little*; recte, adv. *rightly*; deinde, *then, thereupon, next, in the second place*; denique, adv. *finally*; porro, adv. *further, moreover*; tum, adv. *then*; in, with acc. *upon*.

Exercises.—Latin-English.

A dialogue between a father and his son Charles.

Pater: Attende, mi fili! Scribe in codicillos tuos hoc exemplum; si habes decem mala, tria pruna, unum pirum, sex cerasa; et hi: adduntur duo mala, quatuor pruna, septem pira, octo cerasa; deinde quinque mala, novem pruna, sedecim pira, undecim cerasa; tum duodecim mala, quindecim pruna, tredecim pira, quatuordecim cerasa; porro viginti mala, undeviginti pruna, duodeviginti pira, septendecim cerasa; denique quatuor et viginti mala, unum et viginti pruna, duo et viginti pira, tria et viginti cerasa? quot sunt mala? quot pruna? quot pira? quot cerasa?

Carolus: Expecta paulisper, mi pater! jam responsio est in

prompta; sunt tria et septuaginta mala; unum et septuaginta pruna; septem et septuaginta pira; novem et septuaginta cerasa.

P. Recte, mi Carole! jam sepone codicillos, et memoriter mihi responde: quot menses habet unus annus? *C.* Duodecim. *P.* Quot hebdomadas habet unus mensis? *C.* Quatuor. *P.* Quot dies habet unus annus? *C.* Trecentos sexaginta quinque. *P.* Quot horas habet unus dies? *C.* Quatuor et viginti. *P.* Quot dies habent tres anni? *C.* Mille nonaginta quinque. *P.* Quot horas habet unus annus? Octo milia septingentas sexaginta. *P.* Si tres nuces quater ponis, quanta summa existit? *C.* Duodecim. *P.* Si quinque calculos ter millies sexcenties quinquagies septies ponis? *C.* Duodeviginti milia ducenti octoginta quinque.

English-Latin.

The Father: Charles, what is the Latin for eight? for eighteen? for twenty-eight? for thirty-nine? for five hundred? for two hundred and fifty? Write this example on your slate. If thou hast 20 apples, 6 plums, 2 pears, 12 cherries; and add to them 4 apples, 8 plums, 14 pears, 16 cherries; also 10 apples, 18 plums, 32 pears, 22 cherries; again, 24 apples, 30 plums, 26 pears, 28 cherries; further, 40 apples, 38 plums, 36 pears, 34 cherries: finally, 48 apples, 42 plums, 44 pears, and 46 cherries: how many apples are there? how many plums? how many pears? how many cherries? *Charles:* Wait a little, father! The answer is now ready. There are 146 apples, 142 plums, 154 pears, and 168 cherries. *Father:* Right, my Charles.

Vocabulary.

Incŏla, æ, m. *an inhabitant;* victoria, *f. victory;* vitium, n. *vice;* pretium, n. *a price, worth,* (E. R. *precious*); assentātor, ōris, m *a flatterer;* moderator, ōris, m. *a governor;* eques, equĭtis, m. *a horseman;* pedes, pedĭtis, m. *a footman, an infantry soldier;* pars, partis, *f. a part* (E. R. *partial*); societas, atis, *f. connexion, society;* exercitus, ūs, m. *an army;* natus, ūs, m. *birth,* major natu, *greater by birth,* that is, *older;* so, minor natu, *younger;* fides, ei, *f. fidelity, trust;* fidem habeo, *I repose confidence;* cognitus, a, um, *known;* infidus, a, um, *unfaithful;* natus, a, um, *born;* post Christum natum, *since Christ born;* that is, *since the birth of Christ;* quotus, a, um, *how much? what?* ago 3. *I drive, I do;* annum ago, *I am in the — year;* irrumpo, 3. *I break in;* nunc, *now, denoting a point of time,* whereas jam denotes *the present in relation to the past;* vix, adv. *scarcely;* de, prep. *of, concerning;* ex, prep. *out of, from;* post, prep. *after;* et — et, *and — and, both;* neque conj. *neither, nor;* neque — neque, *neither — nor;* alius is used with alius in a peculiar manner, nearly equal to our *one another, the one, the other, differently, in different ways,* &c.; as

alius alium occidit
the one slays the other.

alii alio currunt
they run in different directions.

ambo, *both,* declined like duo.

Exercises.—Latin-English.

Quota hora est? decima; est ne sexta hora? quinta est hora; annus quo nunc vivimus, est millesimus octingesimus quinquagesimus et alter post Christum natum; pater meus agit (*is in his*) annum quartum et sexagesimum; soror tua agit annum sexagesimum tertium; mater mea agit annum octavum et quinquagesimum; pater tuus agit quinquagesimum octavum annum; frater major natu agit annum tertium et tricesimum; frater minor natu agit annum alterum et vicesimum; soror major natu agit annum duodetricesimum; soror minor natu agit annum vicesimum; in urbe sunt mille milites; duo milia hostium urbem obsident; ăliud alii placet; aliud alii displicet; milites utriusque exercitûs sunt fortissimi; utrumque est vitium et omnibus credere, et nulli; perfidus homo vix ulli fidem habet; unius fidi hominis amicitia habet plus pretii quam multorum infidorum societas; soli sapienti vera vis virtutis est cognita; incolae totius urbis de victoriâ exercitûs laeti sunt; nullius hominis vita ex omni parte (*in every respect*) beata est; habeo duo amicos, ambo valde diligo; amicus meus habet duo filios et duas filias.

English-Latin.

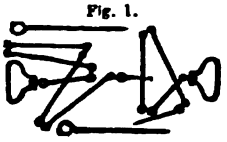
The enemy breaks into our country with 10,000 soldiers; a thousand soldiers defend the city; the city is defended by 2,500 soldiers; 28,000 cavalry and 13,500 infantry defend the country; my father is in his 75th year; my mother in her 63rd year; my elder brother is in his 37th year; my younger brother in his 30th year; my elder sister in her 34th year, and my younger sister in her 18th year. What o'clock is it? (what is the hour?) it is eleven o'clock; how old art thou? (in Latin, what year dost thou lead? ago) I am 52; we repose confidence in neither of the two, neither the faithless nor the flatterer; the life of no one is happier than (the life) of the sage; the father takes a walk (*ambulo*) with his two sons and two daughters; two faithful friends are one soul in two bodies; some things please some (persons), some others; this displeases some one, that another; God is the governor of the whole of life (in Latin, the whole life).

LESSONS IN GEOMETRY.—No. VI.

SURVEYING.

The operation of surveying land is performed by the use of various instruments, of which we proceed to give some account. The instrument most commonly used for measuring straight lines on the ground is the *Surveying-chain,* or as it is sometimes called *Gunter's-chain,* from the name of the inventor. This chain, which is made of iron, consists of *a hundred links,* each link measuring about 8 inches; or exactly 7·92 inches, a quantity which wants about a twelfth part of an inch more, in order to make 8 inches. The chain is, therefore, 66 feet, or 22 yards, *long*; for 7·92×100=792 inches, and 792 inches=66 feet=22 yards. This chain is remarkably convenient for the use of land-surveyors, inasmuch as a *square* chain is 484 *square* yards; for 22×22=484. Now this number of square yards is exactly the *tenth* part of an *acre,* we mean an *Imperial acre* of land. For, in the late acts of parliament relating to weights and measures, it was enacted that the *Imperial acre* shall contain 4,840 *square yards.* Accordingly 10 *square chains* are equal to *one Imperial acre,* and although the chain itself is not mentioned in the act of parliament, yet its great value and utility as an instrument for measuring land is undeniable; and so long as the acre shall continue to be what it is, it can never be superseded by any instrument more valuable or more convenient. One form in which the instrument is constructed, is represented in fig. 1, where the handles at each end of the chain are seen, and the iron pins used for stretching the chain out to its full length, when measuring the distance between any two points. Whatever process may be employed, however, in measuring land, the figures which are traced on the ground relate either to triangles or trapezoids, as explained in our last lesson, and from the measurements so taken sufficient *data* (things given) are obtained to enable the surveyor to complete his calculation.

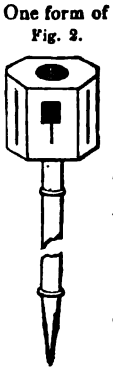
Fig. 1.



Of the pins, or arrows as they are called, shown in fig. 1, *ten* usually accompany a chain, a new one being employed at the end of every chain-length; the whole number used denoting the number of chains in any length, and the number of links over, being marked as decimal parts of a chain. Thus 7 chains, and 53 links in length, are denoted by 7·53. Pickets, or staves with flags, are set up as marks or objects of direction, in measuring and taking sights. An *offset staff* is also used for measuring short distances called *offsets;* it is usually 10 links in length, and is divided and marked at each link.

Along with the chain, is commonly used the *surveying cross,* for the purpose of determining straight lines at right angles to each other. It generally consists of two pair of sights set at right angles, and mounted on a staff of a convenient height for use. The sights may be arranged on two cross-pieces of metal, or enclosed in a hollow prism or cylinder of brass, carrying four sights or openings in its sides, at right angles to each other, the planes of which pass through the axis. The method of using it is to get visibly in a line with one pair of sights, the marks set up at the extremities of the base line, or that from which the perpendicular is to be measured, and through the other pair of sights to observe the mark or object to which the perpendicular is to be measured. One form of this instrument is represented at fig. 2. To get the three marks just mentioned, visible through the sights, may require several trials by setting the cross up at different points in the base line, before the exact point from which the perpendicular is to be measured can be determined. When it has been ascertained, then the distance from it to the mark at the extremity of the perpendicular can be measured at once by the chain.

Fig. 2.



The *graphometer* is an instrument employed in surveying, for the purpose of measuring angles on the ground,—namely, those which are formed between the sides of triangular fields, or those which form irregular polygons. This instrument is only a large protractor or semicircle divided into degrees, and mounted on a staff for convenience to the observer. It is furnished with two pair of sights, of which one or both are moveable round the centre of the semicircle. By

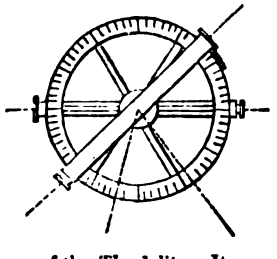
placing this instrument at the vertex of the angle to be measured; that is, at the place in the ground where the two sides of the field, or space to be measured, meet; and directing one pair of sights along the one side to a mark placed at its extremity, and the other pair of sights along the other side to a mark placed at its extremity, the angle between them is measured on the semicircle; for it is ascertained at once by the number of degrees on the arc between the two limbs or moveable arms on which the sights are placed. The form of this instrument without the staff is represented in fig. 3.

Fig 3.

In using this instrument care must be taken that the marks set up at the extremities of the two sides are visible through the sights at the same instant; otherwise the angle will not be correctly ascertained. The sights in this instrument may be advantageously replaced by telescopes mounted on the centre, where very great accuracy is required. Also, in the use both of the *graphometer* and the *surveying-cross* it is necessary that the staff which supports them be placed vertically, and the instruments themselves horizontally; these positions are ascertained by the use of the plumb-line and level.

An instrument preferable to the graphometer is constructed of the entire circle completely graduated, and receiving different names according to the manner in which it is mounted and arranged. If it be furnished with two telescopes placed across its centre, one fixed and the other moveable, or with one fixed to a circle which is moveable over a fixed circle on the same centre, it is called a *repeating circle*. With this instrument, properly adjusted, angles can be measured, and the measurement repeated two, three, four, and even ten times. By this means errors of observation and graduation, and in reading off the angles, can be so compensated as to obtain the greatest possible approximation to accuracy. For as ten times an angle is thus obtained with as great an approximation to truth as the angle itself, the tenth part of this angle is likely to have an error of only the tenth part of that which would arise from the observation of the single angle. The invention of the repeating circle is due to the French mathematician *Borda*, who employed it in the Trigonometrical survey instituted for the measurement of an arc of the meridian between Barcelona and Dunkirk, in 1792. The principle of the repetition of angles in the construction of the *reflecting circle* had been previously proposed by the astronomer Tobias Mayer, of Gottingen. A sketch of this instrument is represented in fig. 4; it is capable of being used with great facility, and is sure to correct errors of graduation by the repetition of the measurement of angles; but it possesses some disadvantages which render it of less value in the ordinary practice of surveying, than some other instruments. Angles taken by this instrument require to be reduced to the plane of the horizon, and involve a calculation for this purpose which may be avoided by the use of the *Theodolite*. It possesses also certain other defects, notwithstanding its simplicity and portability which have rendered its use unadvisable in practice.

Fig. 4.



Reserving the description of the *Theodolite* for another lesson, on account of its importance, we proceed to explain the nature of a useful and simple instrument for surveying, called the *Plane-Table*. This instrument was invented towards the end of the 16th century, by Praetorius, a German mathematician, and is used for drawing at once a plan of the ground to be measured, upon paper. It is usually made of a square or rectangular form, and is supported on a three-legged stand, which is made to move every way by means of a ball and socket, or other moveable joint. The table has a moveable frame which is used to hold the paper fast on which the plan is to be drawn; and the sides of the frame facing the paper are divided into equal parts every way, for the convenience of drawing parallel or perpendicular lines. It is furnished with a magnetic needle and compass, to point out the directions of the lines drawn on the plan, and to be a check on the sights; and an index with sights, or a telescope to determine their directions, and to draw them on the paper at the same time. These sights, or this telescope, and one edge of the index, called the graduated or fiducial edge, are in the same plane. On the edge of the frame are also marked, degrees and minutes.

To use this instrument, which is represented in fig. 5, you take a sheet of paper sufficient to cover it, and wet it to make it expand; then spread it flat on the table, pressing down the frame on the edges to stretch it, and keep it fixed in its position; so that when the paper becomes dry, it will by contracting again, stretch itself smooth and flat, from any cramps and unevenness; as on this paper is to be drawn the plan or form of the ground to be measured. You then begin at any suitable spot on this ground, and having properly adjusted and fixed the table, by fastening the legs of the stand in the earth, mark a point on a convenient part of the paper to represent that spot on the ground. You then fix in that point, one leg of the compasses, or a fine steel pin, and apply to it the fiducial edge of the index, moving it round until through the sights you observe some suitable object, as the corner of a field, &c.; from the station point, you then draw a line with the point of the compasses along the fiducial edge of the index—a process which is called *setting* or taking the object. Next, *set* another object or corner, and draw its line; do the same by another, and so on, till as many objects are taken as may be deemed necessary. Then measure with the chain from the station in a straight line towards the objects, taking offsets to corners or crooks in the fences or hedges, and laying down their measurements on their respective lines in the table. Then, at any other convenient spot to which a measurement has been taken, fix the table in the same manner as before, and set the same objects again as they appear from this new station. Continue this operation until all the necessary work is finished, measuring only such lines as are known to be indispensable for the calculation, and determining as many as possible by the intersection of the lines of direction, drawn from the different stations in order to complete the plan. This being done, the area of the field may be determined by the rules given in our last lesson, and the plan of the whole exhibited, as nearly as possible, just as it appears on the ground. In fig. 6 is represented a sketch of an index furnished with its sights, and its fiducial edge; and in fig. 7 one of an index mounted with a telescope. The latter index affords a more exact and a more extended line of sight than the former.

Fig. 5.

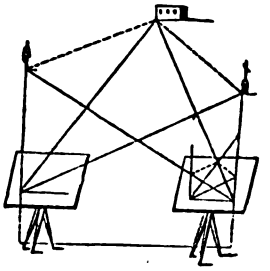


Fig. 6.

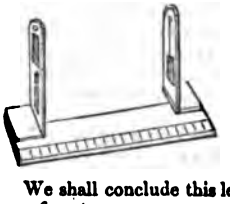
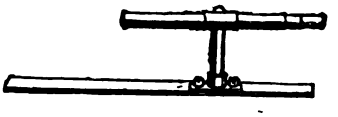


Fig. 7.



We shall conclude this lesson by giving an account of the *circumferentor*, or *common theodolite*, used by surveyors for the purpose of taking horizontal angles. It is founded on the property which the magnetic needle possesses, when suspended freely, of taking always the same direction in the same place, at least within a given small period. This instrument consists of a brass circle and index in one piece, commonly about seven inches in diameter, with an index about fourteen inches long, and one inch and a half broad. On the circle is a card or compass divided into 360 degrees; of which the meridian line (that is, from north to south) answers to the middle of the breadth of the index. There is soldered on the circumference a brass ring, on which screws another ring with a flat glass in it, so as to form a sort of box for the needle, which is suspended on a pin in the centre of the circle. There are also two sights to screw on, and slide up and down the index; as also a ball and socket screwed on the under side of the circle, to receive the head of the three-legged staff on which it is placed when in operation. This is the simplest form of the circumferentor; but improved instruments of this kind are made in London, which answer in some measure the

ANSWERS TO CORRESPONDENTS.

GEOGRAPHY.—Many inquiries having been made about maps, we inform our correspondents and the public, that a series of maps are preparing, at a very great expense,—say from twenty to thirty pounds each, in order to illustrate our lessons on this subject; and we hope that our subscribers, taking this into consideration, will do their best endeavours to enlarge the circulation of the POPULAR EDUCATOR.

EDUCATION CLASSES.—Our proposal on this subject has been well received. Still, owing to the bustle created by the prospect of a general election, we fear that our wealthy and liberal friends in the great cause of Popular Education, have their attention too much distracted to make a public move at present.

J. M. H.—The term "rock" is, in Geology, applied to all the mineral masses which compose the crust of the earth, whether they be clay or sand, soft or hard,—e. g., any soft clay is a rock. A book lying on the table has all its leaves horizontal and parallel; but if it be partly opened, and put to rest on the table with its back upwards, the leaves will *dip*, some to the right and the others to the left. The two downward strokes in the letter A *dip* in different directions. Fossil wood and vegetables are not reckoned "beings" in the science of Palæontology.

FRENCH.—J. W. (York), and R. MELLORS (Nottingham): The French grammarians say, "We have only one article in French, which *a*, *le* for the masculine singular, *la* for the feminine singular, and *les* for the plural of both genders; as, LE *mérite*, LA *vertu*, LES *talents ont droit à nos hommages*;" that is, *merit, virtue, talents, have a right to our respect*. They also say, "Gender is the property which substantives possess of representing the distinction of the sexes. There are consequently two genders, the *masculine* for the names of male beings, as *man, lion*; and the *feminine* for the names of female beings, as *woman, lioness*. Substantives representing inanimate beings ought to have no gender; yet custom has assigned to them, but arbitrarily, both genders. Thus, *soleil, château, pays*, have been made of the masculine gender, and *lune, maison, ville*, of the feminine gender."

TROIS ECOLIERS ATTENTIFS (Liverpool): The imperfect past tense *j'avais* is employed to signify *I was having*, or *I used to have*; it leaves the beginning, middle, and end of the action undetermined. The definite past tense *j'eus*, is employed to signify *I had*, or *did have*; it denotes an action completed and entirely past.—EDITH M—IE, (Oxfordshire): *Du, des, de la*, are used before substantives in a *partitive* sense, that is, to denote a part or a portion of the persons or things spoken of: thus, *il a du papier*,—that is, *quelque papier; vous avez de la fortune*,—that is, *quelque fortune; nous possédons des amis*,—that is, *quelque amis*. The article is omitted and *de* alone is used when the substantive taken in a *partitive* sense is preceded by an adjective; thus, *donnez moi de bon pain; je bois d'excellente bière; il possède de belles maisons*. But in the *second part* of the French lessons more specific rules will be given.—J. W. S. (Glasgow): The French exercises are so constructed that with a very little perseverance, it will be seen that the *English* exercises form a sort of key to the *French*, and the *French* to the *English*.—P. M. K. (Greenock): There are three kinds of negation in French: *ne, ne pas*, and *ne point*; thus, *je n'ose, je n'ose pas*, and *je n'ose point*; all signify *I dare not*; but *ne* is the feeblest negation, *ne point* the strongest, and *ne pas* the medium state. The words *pas* and *point* are omitted when there is in the sentence any expression or word having a negative meaning; as, *guère, jamais, nul, nullement, aucun, rien, personne*, and *ni* repeated; also *ne .. que*, signifying *only*.

R. B. (Glasgow) should take up the two studies he likes best, one in the morning, and another in the evening. Let them be as different as possible, and take the hardest in the morning.—AN IGNORANT YOUTH (Rochdale) will find an index on the cover of each monthly part of the POPULAR EDUCATOR. His age is a very good time for learning, but all ages are good when a learner is determined to go on.—H. G. (High Burton) should study English grammar, spelling, and writing instead of phrenotypics.—A correspondent who signs himself AMICUS VERITAS instead of AMICUS VERITATIS wishes us to give lessons on the theory and practice of logarithms. Now this we *intend to do* when the proper time arrives. But the mistakes in his letter convince us that we are taking the right method by earnestly insisting on the study of language first, as the proper medium for communicating thought and ideas accurately to the mind. As to the reason why two-thirds of the perpendicular height of the triangle is the centre or point directly over which the fourth tree must stand, we say that if a circle be described about an equilateral triangle, he will find this point the centre of the circle.—A SCHOOL ASSISTANT (Reigate) has proposed a good plan of study for himself, Botany, Natural History, and German—a good interchange. Ornithology shall find its place and time. A CONSTANT READER shall have drawing.—W. L. (Somerset-place) should get an admission ticket to the British Museum, where he might read all day, and be sure to find Horne Tooke's "Diversions of Purley." The study of two languages such as the Italian and Spanish might facilitate each other, but we think a language and a science are better companions.—The plan of T. B. K. (Macclesfield) would defeat the purpose of making good scholars; answering questions would then become mere school *routine*.—LUCIAS is perhaps rather hypercritical; the *a* and the *an* escaped our observation; yet these are evidently employed by the writer to remove the harshness of the double aspirate of *h*, for one of them is removed by the use of *an*.—The question of DISCIPULUS (Wandsworth) is one in Inverse Proportion; for if you have to pay £600 in 105 days, and having paid down £250 now, you are to pay £350 in a certain time, this must be *greater* than 105 days; therefore, say as £350 : £600 :: 105 days : [illegible] days, answer.—LLEWELLYNN LLOYD (Norwich): 8451776000 cubic yards make a cubic mile; in a cubic yard there are 168 imperial gallons, and nearly a quarter of a gallon more; or, more accurately, this fraction is about four-fifteenths of a gallon.

DEXTER (York): 26 numbers will form a volume, with which a title-page and index will be given.—E. G. (Loughborough): We would advise him not to take too much in hand at once. Certainly it is very tempting to find a new and interesting subject brought on the carpet; but let him remember that it will keep till he has mastered the old. CYNFELYN (Bala): The diameters of the orbits of Jupiter's satellites or moons are in round numbers as follows:—the first 261 miles, the second 418,000 miles, the third 666,000 miles, and the fourth 1175,000 miles.—ZAMPA (Manchester): We do not believe that the earth has increased one atom since it was created; but we believe that it has undergone many wonderful changes in form; and that such changes are still going on. Still not a single particle of matter is lost, it has only assumed another form, under the action of the powers, and according to the laws of the material world. This consideration renders the sublime tenet of the resurrection possible, even to the uninstructed mind.—A Golfdram Weaver (Dunfermline): Lessons will be given in modern as well as ancient history.

GEOMETRY.—AN ANXIOUS INQUIRER (Newcastle-on-Tyne), is informed that "Cassell's Edition of Euclid," now in the press will supply all the information he requires on the subject of this study. He is right as to the misprint of + for × in page 121, col. 2, line 23 from the bottom. His answers to the queries are not exactly to the point, we shall take an opportunity of explaining the subject more fully.

UN JEUNE COMMIS has been received. In answer to some correspondents, the FRENCH LESSONS may be had by post on receipt of 7 penny stamps.

LITERARY NOTICES.

HISTORY OF THE PAINTERS OF ALL NATIONS.—The first part of this magnificent work, in imperial quarto, containing a portrait of Murillo, and seven specimens of his choicest works, including the "Conception of the Virgin," lately in the collection of Marshal Soult, and recently purchased by the French Government for the Gallery of the Louvre, for the sum of £23,440, is now ready. The successive parts will appear on the first of every month, at 2s. each, and will be supplied through every bookseller in town or country.

CASSELL'S SHILLING EDITION OF EUCLID.—THE ELEMENTS OF GEOMETRY, containing the First Six, and the Eleventh and Twelfth Books of Euclid, from the text of Robert Simson, M.D., Emeritus Professor of Mathematics in the University of Glasgow; with corrections, Annotations, and Exercises, by Robert Wallace, A.M., of the same university, and Collegiate Tutor of the University of London, will be ready early in July, price 1s. in stiff covers, or 1s. 6d. neat cloth.

SCRIPTURE LIBRARY FOR THE YOUNG, in Shilling Volumes.—The first two volumes of this instructive series of works, "The Life of Joseph," illustrated with sixteen choice engravings and maps, and "The Tabernacle, its Priests, and Services," with twelve engravings, are now ready. The "Life of Moses" is in the press.

THE ILLUSTRATED EXHIBITOR AND MAGAZINE OF ART.—The First Volume of this splendidly embellished work, handsomely bound, price 6s. 6d., or extra cloth gilt edges, 7s. 6d., is now ready, and contains upwards of Two Hundred principal Engravings and an equal number of minor Engravings, Diagrams, &c.

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The EMIGRANT'S HANDBOOK, a Guide to the Various Fields of Emigration in all Parts of the Globe, is now ready, price 6d.

THE PATHWAY, a Monthly Religious Magazine, is published on the 1st of every month, price twopence—32 pages enclosed in a neat wrapper. Vols. I. and II., neatly bound in cloth and lettered, price 2s. 3d. each, are now ready.

*** PORTFOLIOS for enclosing 26 numbers of THE POPULAR EDUCATOR, price 1s. 6d., may be procured at our office. These Portfolios are so constructed as to form, upon the completion of each volume, a neat Case for binding the same, which will be done at a trifling expense by any bookbinder.

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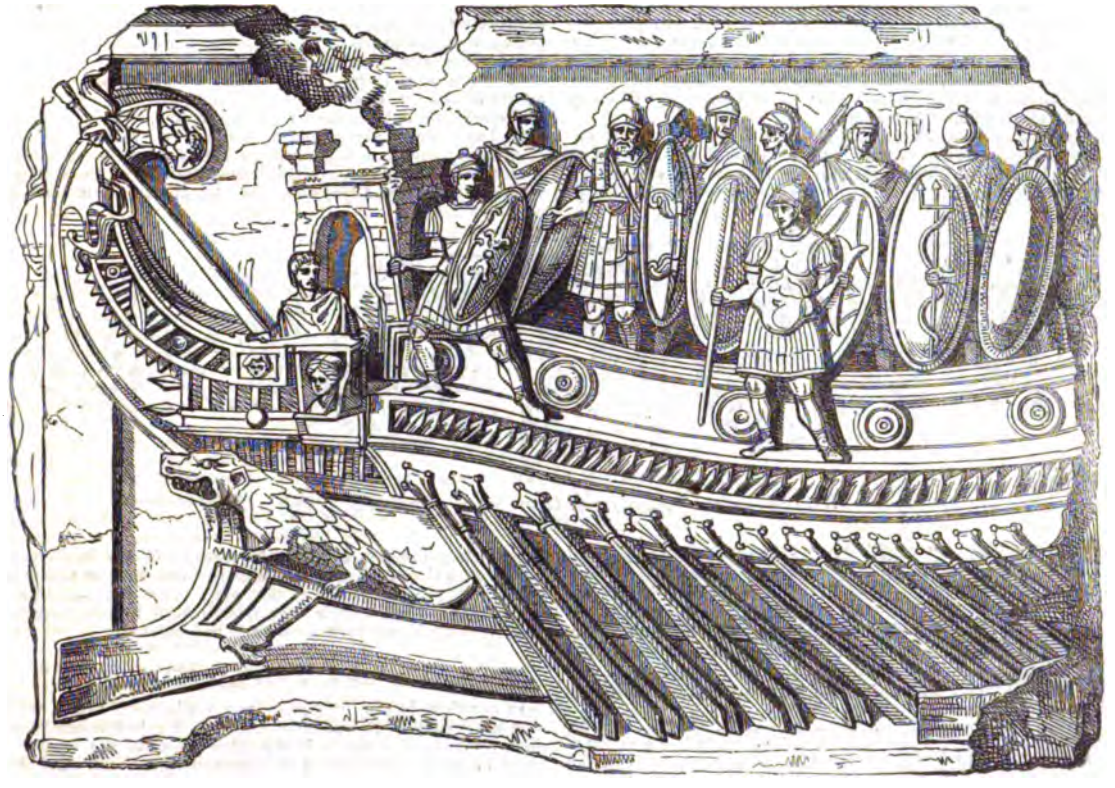
LESSONS IN ANCIENT HISTORY.—No. VII.

By Robert Ferguson, LL.D.

The sun of Egypt was now fast setting. Ptolemy Epiphanes, the son of Philopater, ascended the throne B.C. 204, imitated his father in dissipation and debauchery, and at the age of 30, fell a victim to vice or poison. During his minority the regency was transferred to the Roman senate, which saved Egypt from being involved in the Macedonian or Syrian war. Ptolemy Philometor, son of the preceding, came to the throne B.C. 181. During his minority, a war commenced with Antiochus, the king of Syria. Philometor was taken prisoner; and the Alexandrians despairing of his release, raised his brother Physcon to the throne, under the title of Evergetes II. Scarcely had he seized the reins of government, when he was deposed by Antiochus, who restored the whole kingdom, except Pelusium, to Philometor. The two brothers agreed to reign jointly, and to make common cause against the common enemy. But no sooner did they feel themselves secure against foreign power than they quarrelled. Their differences came to such a height that Philometor was a second time driven from the throne. He appealed to the Roman senate, who divided the Egyptian dominions between the two brothers. Though the treaty was confirmed with oaths and accompanying sacrifices, it was not kept inviolate. Physcon was dissatisfied, and tried every possible expedient to wrest the island of Cyprus from his brother. His unjust procedure awakened the opposition of his own subjects, who laid in wait for his life. This opposition he ascribed to his brother, and he took the field against him. Philometor came off victorious, but treated Physcon with the utmost leniency, reinstated him in his dominions, and added to his territorial possession.

Philometor having thus asserted his right to the island of Cyprus, invested one Archias with the office of governor. He proved a traitor. He agreed with Demetrius, king of Syria, to give up the island to him for five hundred talents. His treason was discovered, and to escape the punishment due to his crime he put an end to his life. Philometor now sought to avenge himself on Demetrius, and set up in the person of Alexander Balas, a pretender to the crown of Syria. But though Philometor faithfully maintained the pretensions of the usurper, and even gave him his own daughter in marriage, Balas dared soon afterwards to enter into a conspiracy against his benefactor. This roused the wrath of Philometor so much that he marched against Balas. In an engagement which followed, he came off victorious; the wounds, however, which he received caused his death after a reign of thirty-six years.

By the death of his brother, and his marriage with Cleopatra, his brother's widow, Physcon came to the throne of Egypt. On the day of his marriage with Cleopatra, he caused her infant son, his own nephew, and heir to the throne, to be murdered. This was followed by cruelties towards his subjects. He put to death all who showed the least pity for the death of the young



BAS-RELIEF FROM THE TEMPLE OF FORTUNE AT PRÆNESTE:

Part of the Flag-ship, "The Alexander," Marc Antony's vessel at the battle of Actium.

prince; and treated the Jews, who took the side of Cleopatra, as slaves. He punished small crimes as capital offences, and endeavoured to crush the spirit of his people. He divorced his queen, to marry her daughter, his niece; but the violence and wickedness of his conduct made him so obnoxious to his subjects, that he was compelled to abandon the throne. He fled to the island of Cyprus, taking with him the unhappy victim of his passion, and his son Memphitis, her mother's child.

On his flight, the Alexandrians gave the crown to the divorced but rightful queen. It sat not with ease upon her brow. In Cyprus, Physcon still held the idea of regaining the throne of Egypt. He sent for a son he had left in Alexandria, and fearing his accession to the throne, caused him to be put to death. His next step was to cause the lifeless, mangled corpse of his son Memphitis, to be sent as a present to the mother on her birthday. The horror and detestation awakened by these unparalleled cruelties, raised the spirit of vengeance among his people. An army was raised, and war was proclaimed. Physcon hired a numerous body of mercenaries, and sent them, under able command, against the Egyptians. A bloody contest ensued on the frontiers of Egypt, when victory declared in favour of this inhuman tyrant. Cleopatra, the divorced but reigning queen, appealed to Demetrius, king of Syria, for succour and support; but, after an unsuccessful struggle, Cleopatra was forced to flee to Ptolemais, and take up her abode with her own daughter, the queen of Syria. Physcon was restored to the throne of Egypt, and held the sceptre till the day of his death, which took place at Alexandria, in the 47th year of his age, and 29th of his reign. He left behind him two sons by his niece Cleopatra, Ptolemy Lathyrus, and Ptolemy Alexander.

Lathyrus ascended the throne about B.C. 116. Cleopatra endeavoured to secure the crown for her younger son Alexander, but without success. The Alexandrians favoured Lathyrus, but he was afterwards compelled to give up the government of Egypt for that of Cyprus. Cleopatra then sought to associate her son Alexander with herself in the sovereignty of the kingdom. But he caused her to be murdered, and lost his throne. His subjects revolted and restored Lathyrus. On his restoration, Lathyrus turned his arms against Thebes. After a siege of three years, he reduced that city and stripped it of its glory. He passed the rest of his reign in comparative peace and tranquillity, and died, B.C. 81, leaving one daughter, and two illegitimate sons, Ptolemy of Cyprus, and Ptolemy Auletes.

After the death of Lathyrus, the son of his brother Alexander ascended the throne. He proved himself scarcely less a monster than his father. Having murdered his queen, and provoked the revolt of his subjects, he fled to Pompey the Great, who was then carrying on the war against Mithridates, king of Pontus, and shut himself up in the city of Tyre. On his death-bed, he bequeathed his kingdom to the Roman senate. Meanwhile, the Egyptians made AULETES king. In virtue of Alexander's will, the Romans contested with him the right of possession. The dispute ended in favour of Auletes, who surpassed all his predecessors in the weakness of his character, and in the effeminacy of his manners. Conscious of this, he sought an alliance with Rome. As this could only be purchased at an immense cost, Auletes imposed new and heavy taxes on his people, in order to raise the necessary sum. Against this imposition they rebelled, and the king had to make his escape. Leaving Alexandria, he set sail for Rome, and landed on the island of Rhodes. Here it is said that he had an interview with Cato, who advised him to return to his kingdom. Auletes not being in a position to take this counsel, left Rhodes for Rome. On his arrival, he found that Cæsar was in Gaul. He occupied his time in going from house to house, and soliciting the votes of the senators. While he was thus engaged, an embassy from Alexandria, consisting of a thousand citizens, came to acquaint the senate with the grounds of their revolt. Berenice, the daughter of Auletes, occupied the throne of Egypt, by the consent of the people. The accession and subsequent marriage of this daughter, increased the fears of Auletes. Through great influence, he contrived to get several of the more distinguished members of the embassy put to death; to procure an acquittal for those who did the deed, and to enlist the sympathies and the arms of the Romans on his behalf. After a series of low intrigues with the senate, Auletes regained his throne. He reigned only about three years, and died, leaving two sons and two daughters to the guardianship and tuition of the Roman people.

His daughter Cleopatra, having won the heart of Julius Cæsar by her charms, contrived, through him, to set aside the claims of her brothers and sister, and was proclaimed queen of Egypt. For a time she exercised the most powerful influence over the Roman warrior. After his death, she tried her consummate arts on Marc Antony, and overcame him as she had done Cæsar, by the force of her charms. In the battle of Actium, which decided the contest for power between her new lover and the heir of Cæsar, Antony was defeated. Soon afterwards he put an end to his existence. In the ruin which he thus brought upon himself, Cleopatra is considered to have been deeply involved. In the year following his defeat and death, she was taken prisoner by Augustus Cæsar. In order to avoid the disgrace of being yoked to his triumphal car, she poisoned herself, and died the victim of her own pride and passion, even before her charms had begun to fade. This event took place about 30 years before the Christian era; and from that day, Egypt, the land which had formed the cradle of the arts and sciences, and the birthplace of letters and philosophy, dwindled into a Roman province. For a considerable period afterwards Egypt maintained its pre-eminence, as the seat of wealth; and, in a commercial point of view, Alexandria continued to be the most busy and influential city of the world. But with the death of Cleopatra, the last of the Ptolemies, closes

FAC-SIMILE OF COINS STRUCK AT ALEXANDRIA,
With Portraits of Antony and Cleopatra taken from the Temple.

the ancient history of a people whose life has impressed the world with the profoundest wonder and the deepest spirit of inquiry. The hieroglyphics of that people may yet be deciphered, their language read, their mysteries unveiled, and their whole historical life better understood and appreciated.

RUINS OF ANCIENT EGYPT.

In our first lesson, reference was made to THEBES with its sublime greatness of dimensions, and its finished magnificence of decorations, which made it the admiration of the world. We think of the hundred-gated city, occupying a site of one hundred and forty furlongs in circumference, and sending forth its twice ten thousand armed chariots. We think of its temples, and statues, and columns, and obelisks. We enter the temple of Luxor, through a magnificent gateway, which is two hundred feet in width, and fifty-seven above the present level of the soil; and as we enter we find the vestibule of this noble edifice filled with sculptures representing the triumphs of some of the Egyptian kings, while the walls of the building exhibit in beautiful relief, battles, hunting-scenes, and other kindred subjects. But all this must give place to the grandeur in which the temple of Carnac rises before us. Its chief or western front is towards the Nile, from whose banks it stands at the distance of two thousand five hundred feet, with a splendid avenue leading down to the river. We walk slowly along between the majestic and calmly-reposing sphinxes up to the still more magnificent vestibule of the building. Passing through this colossal entrance, which is about three hundred feet long, and one hundred and ninety-eight feet high, we come into a large court full of lofty and imposing pillars, find ourselves in the presence of colossal statues, pass on and go through a second entrance, and after ascending a flight of seven-and-twenty steps, enter that gorgeous hall, whose area

measures 57,629 square feet, and at the foot of whose one hundred and forty-four columns, the imagination sinks abashed.

At the Persian conquest, Thebes was in great part destroyed by fire. Little was done under the Ptolemies to restore or embellish it;—her people lost all courage and soul; having rebelled in the reign of Lathyrus, the city, after a three years' siege, was taken and pillaged, and gradually declined, till under the Romans it lost the last semblance of wealth or power. And what is her present condition? "The whole of this great extent is more or less strewed with ruins, broken columns, and avenues of sphinxes, colossal figures, obelisks, pyramidal gateways, porticoes, blocks of polished granite, and stones of extraordinary magnitude:—while above them, in all the nakedness of desolation, the colossal skeletons of giants' temples are standing in the unwatered sands, in solitude and silence. They are neither gray, nor blackened:—there is no lichen, no moss, no rank grass, or mantling ivy to robe them, and conceal their deformities. Like the bones of man, they seem to whiten under the sun of the desert. The sand of Africa has been their most fearful enemy:—blown upon them for more than three thousand years, it has buried the largest monuments, and, in some instances, almost entire temples."

The rival of Thebes was Memphis, both as a regal residence and the seat of commerce. This magnificent city, whose foundation and erection have been ascribed to Menes, extended half a day's journey in every direction, and, with its splendid temple, is declared by no mean authority to offer to the spectator, even now in its ruins, "a union of things which confound him, and which the most eloquent man in vain would attempt to describe. As to the figures of idols found among these ruins, whether we consider their numbers or their prodigious size, the thing is beyond description. But the accuracy of their forms, the justness of their proportions, and their resemblance to nature, are most worthy of admiration." One which was measured by this traveller was, without its pedestal, "more than thirty cubits; its breadth from right to left was about ten cubits; and from front to back it was thick in proportion. This statue was formed of a single piece of red granite, and was covered with a red varnish, to which its antiquity seemed to give only a new freshness." Memphis was the centre of Egyptian idolatry. There the bull Apis was bred, nurtured, enshrined, and worshipped.

Of Heliopolis, or the City of the Sun, but little remains to awaken the impression of its former magnificence. It is situated north-east of Cairo, and is famous for the celebrated fountain of the sun, to which, if we may trust tradition, the Holy Family came on their flight from Herod. Near this is the pillar of On, or obelisk of Heliopolis, which is sixty-seven feet high and six feet square at the base, and which is formed of one entire block of reddish granite. This obelisk is one of the most ancient existing monuments of Egyptian art, and from the execution and arrangement of its hieroglyphics, which are the same on all sides, it may be inferred that Heliopolis had at an early period reached a high degree of social refinement and artistic skill. It is the same with the On or Aven of Scripture: and since we read that Joseph married a daughter of the priest or prince of On, it thus becomes associated with one of the most touching and life-like histories that the world has ever produced. Some have conjectured that it was here the deeply-moving interview took place between Joseph and his brethren. Be that as it may, nothing remains but the solitary obelisk, which we have just described, and a few broken fragments of the temple in which the bull Mnevis was worshipped, to attest its previous existence. As in the case of Memphis, "the dream of idolatry has passed away; the grand, all-inwrapping mists of ungodliness have melted into air before the Sun of Truth, and the Christian traveller mingles pity with his wonder as he looks upon these splendid baubles of the old world—these playthings which Time and Truth have united in breaking."

The subject of Egypt's overthrow and ruin enters largely into the predictions of the inspired volume. With great elegance and force does Ezekiel describe the fall of that ancient kingdom and of all the allied powers. Under the image of a fair cedar of Lebanon, once tall, flourishing, and majestic, but now cut down and withered, with its broken branches strewed, he represents the fall of the king of Nineveh; applies the same to the monarch of Babylon, as a true picture of his impending fate; while the head of Egypt, like a beast of prey, is caught, slain, and his carcass left to be devoured by the beasts of the forest or the fowls of heaven.

Questions for Examination.

By what means did Physcon lift himself into the seat of supreme power?—Describe the character of this prince.—After his flight to Cyprus, how did he recover the crown from his divorced queen?—Relate the chief events which marked the reign of Lathyrus.—Who succeeded Lathyrus on the throne, and what was his character?—To whom, on his deathbed, did he make over the kingdom and all his own rights?—How, and through what agency, did Auletes secure an alliance with the Roman senate?—How long, after his restoration, did he enjoy the sovereignty of Egypt?—Were the claims of Auletes' sons justly set aside by his daughter Cleopatra?—Can you relate the conduct of Cleopatra, and what was her end?—At what point does the ancient history of Egypt close?—What are the chief ruins of that celebrated nation?—What happened to Thebes at the time of the Persian conquest?—Was anything done by the Ptolemies to restore it; and what is its present condition?—What city was the rival of Thebes, and in what did it seek to rival that first capital?—Describe its size and its ruins.—What converted Memphis into the centre of Egyptian idolatry?—Are there any remains to attest the former magnificence of Heliopolis, or City of the Sun?—With what portion of Sacred History is Heliopolis associated?—Does the fall of Egypt enter into any of the predictions of the inspired volume?—Under what figures does Ezekiel foretel the overthrow of the kings of Nineveh, Babylon, and Egypt?

[The ancient history of Egypt being concluded, we deem it advisable, in the present state of our progress, to postpone the Lessons in Ancient History, until we shall have finished some of the more important lessons now going on, especially those that are in the greatest demand among our subscribers and the public in general. These lessons will of course be resumed at the earliest possible period, in order to render our work a complete encyclopædia of instruction. We say this in the most decided manner, in order that no one may feel the slightest disappointment at their discontinuance. We find, indeed, from our numerous correspondents, that the present lessons in the languages and in the elementary sciences, are deemed by them of so much importance, that we cannot do our subscribers a greater service than to continue them regularly and fully as we have hitherto done. As to relief from the harder studies in the Popular Educator, we can most properly recommend the study of Geology, which is in fact a species of ancient history, older than that of the Antediluvians themselves, not to mention Egypt or Assyria, and one which is sure to interest the majority of our readers, and prove an excellent succedaneum (that which succeeds) for the present, to the lessons whose place they have now taken.]

LESSONS IN GEOLOGY.—No. III.

By Thomas W. Jenkyn, D.D., F.G.S.

You will now refresh your recollections of what has been said, in the second lesson, about the cooling cinder, the cavity inside of it, and the melted globule floating at the bottom of it.

This melted globule is supposed to have in it, or about it, the means of perpetuating, and even of increasing its burning heat. You can imagine that the materials of which the cinder is composed, and which lie nearest the bottom, or the sides, or the roof of the cavity, are more fusible, or more easily melted, than other component parts of it. The consequence of this easier fusibility, will be that the dimensions of the cavity will widen and deepen, and that the quantity of the melted matter will become greatly increased. With the enlargement of the cavity, and with the accumulation of the melted mass, the intensity of the heat will also be greatly increased.

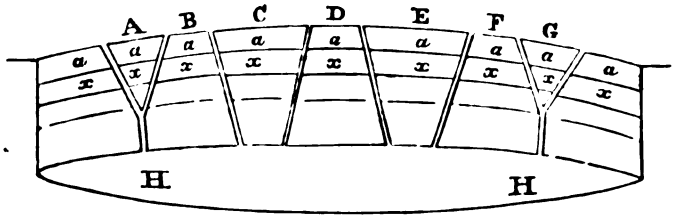
It would depend on the intensity of the heat, and the thickness of the crust, whether the roof above would be worn down by melting, would become swelled out on the surface, or whether the entire crust would be cracked through by fissures. All melted matter has a tendency to expand and to rise; and, accordingly, it acquires an elevating force, which will cause the mass that may lie on its surface to swell out in the form of a curve. In this process of elevation the heat will produce, in the superincumbent matter, many cracks and fissures. These cracks are never likely to be in right lines, or in perpendicular lines parallel to each other; but they will be rather in directions which, if continued, would join in points or angles.

Imagine that the crust of the earth were cut through, so that you could see the face of it, just as you can see the lines in a section of a divided lemon. You could then mark the cracks which were made by the intense heat in the first instance, before the fused matter had acted on the fissures themselves. The fissures would appear like those represented in fig. 2; and the body of the crust would appear, between the different

fissures, something like wedges whose sharp points had been cut off.

The burning heat which has produced these fissures will now apply its elevating force to the different wedge-shaped masses. The wedges B, D, F, present larger surfaces to the fire than the wedges A, C, E, do. The consequence is, that the elevating force of the heat below will have greater power upon B, D, F, and will therefore push them up.

Fig. 2.



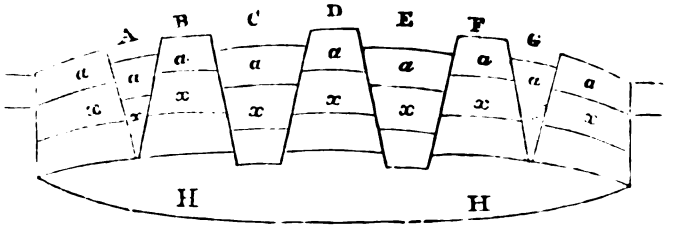
THE FIRST CRACKING OF THE EARTH'S CRUST.

As these are pushed up, it may be that the wedges A, C, E, which have their smaller end downwards, will also sink a little, until they become jammed between the others; and that they would become so, before they would descend low enough for the heat to act on them to keep them up.

The consequence of such a process will be, that the wedge-shaped masses, whose broader sides are downwards, will be elevated above the other wedges A, C, E. The heaved-up surface will then appear uneven and rugged; that is, the crust of the earth will put on the appearance of mountains, table-lands, and valleys, as represented in fig. 3.

On the supposition that, by some means, the elevating power of heat be either withdrawn, or somewhat suspended, your eye, on looking at fig. 2, will tell you at once that the masses thus heaved up and cracked, will never again fall into their first position in reference to the fissures. The roof of the cavity will now be formed into a compact arch capable of supporting itself, if the abutments of the cavern be strong enough. As soon as the arch would be thus formed, the heat at H would begin to melt the wedges C and E, which would supply the melted lake with additional bulk of matter, while all the interior mass would be still maintained in a state of fusion or fluidity.

Fig. 3.



THE ELEVATION AND SUBSIDENCE OF DIFFERENT MASSES IN THE CRUST OF THE EARTH.

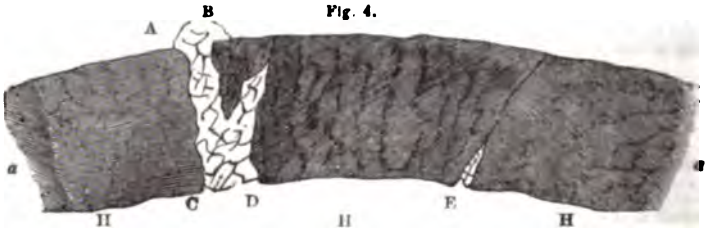
When you make further progress in the knowledge of geological phenomena, you will learn that our imaginary arch has not, in many instances, been able to support itself. It is possible that the body of the arch was so near the lake of fused matter as even to lie on its surface, to float on it, and to be kept up by it; or it is possible that certain parts of the arch as C or E, or even D or F, may sink down to the very bottom of H, H, and there form new support for it. The consequence of this breaking down of certain masses will be that, instead of one large lake, we shall now have a number of lakes formed, which will be connected with each other by narrow channels running between the masses that have fallen down. The facts represented in fig. 3 are important, as they will materially assist you when you come to examine what geologists call "faults" in the strata, or to account for the displacement of beds on the opposite sides of a fault. The beds, or strata, *a*, *a*, and *x*, *x*, which are seen to be parallel to each other in fig. 2, are found at unequal depths in fig. 3.

Let us once more suppose that the heat under the crust of the earth becomes more intense; that, consequently, the quantity of melted matter becomes greatly increased, and that the expansive power of heat seeks a vent. It will either avail itself of one of the fissures already made, though now partly closed, or it will form a fresh one. By means of this vent, formed through the entire crust, the expanding force will throw up the melted matter to the surface, where, upon cooling, it will form a hill or mountain. By the same elevating power it will also fill up any of the crevices or fissures which the previous action of heat may have left in the crust. Fig. 4, will assist your conception of this eruptive process.

Here, in one case the vent A C is open from the matter in fusion at H, through the entire crust *a*, *a*, up to the surface at A, and the melted rock is thrown up into a mountain at B. In the two other cases, at D and E, the fused matter is injected into fissures, and form what miners and geologists call "dikes."

As the melted matter was heaved up to the arched roof of the cavity, and as the roof above was cooler than the fused mass below, the fluid when it came into contact with the roof would, while partly altering it, become, in the process of cooling, crystallised, or, perhaps, vitrified into a hardened rock, and would thus gradually form a new roof over the matter in fusion. It is probable that at this day there may be masses of fused matter in the process of cooling, at the depth of several miles, in some immense cavities around the vents of volcanoes, and that they are forming beds below beds which increase downwards as they cool and crystallise. The deep formations will remain invisible and unknown till either some mighty changes in the earth's crust, or elevating power from below shall snap the crust, and throw up the rocks into the open air as represented in fig. 5.

Fig. 4.



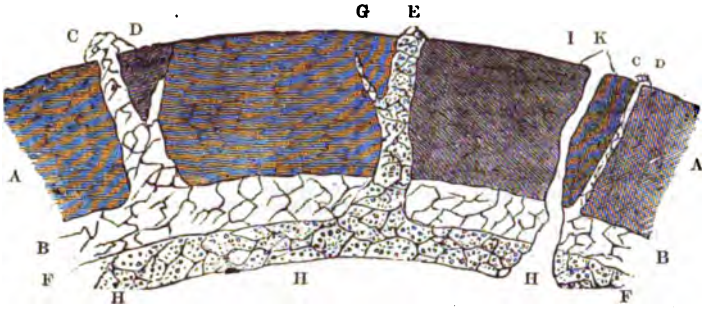
THE DISRUPTION OF THE FIRST CRUST OF THE EARTH BY AN ERUPTIVE ROCK.

While you examine carefully fig. 4, keep in mind that the imagined mass of cinder, or the crust of the earth, is many scores of miles in thickness, from the surface down to the roof of the cavity. The bottom and the sides of the cavity are constantly in a state of being melted and torn away, to increase the glowing fluid. The intense action of the fire on the bottom may be melting deep rocks, which may consist of materials very different from those of the first roof, and also from those which, by cooling or crystallising below, have formed the additional roof.

Let A A, fig. 5, represent the first hardened crust of the earth, B B the next ther-formed (hypogene) rock which first, in a fused state, was heaved against the roof, and then by bursting the crust, forced the vent C, and formed the mountain D above and the crystallised beds below. After the cooling of the rock B, B the expansive power of the heat below requires again an outlet to get rid of the materials accumulated by the constant fusion of the bottom and the sides, and perhaps of the new roof. And now another vent E is formed, and other fissures are made in the crust, the melted matter is thrown up from F, F to form a new mountain at E, differing in lithological character from that

D, and also to form another "dike" under G. When the heat becomes diminished in intensity, the rock F cools, hardens, and crystallises, and forms a roof below B as B did below A. The burning sea of fused matter having thrown off its old surface, begins again to melt and wear away deeper rocks at its bottom, and other rocks at its sides. It again acquires intensity of action and accession of mass, and with them, a fresh elevating force that seeks a vent. The crust is again cracked and rent at H, I, and from depths greater than those of any former eruption; and through the crystallised or calcined beds F and B, which had been formed by other eruptions along the concave side of the arch, melted matter is again thrown up to the surface at I, where a new mountain K is formed, differing in composition from both the preceding eruptive rocks. The same process and the same results may be repeated again and again by the same Plutonic lake; or another Plutonic sea may be acting on a different material of the crust, and may form a rock, either on the surface, or in a dike, different in structure from all the others.

Fig. 5.



THE UNEQUAL DEPTHS OF THE SOURCES OF DISSIMILAR ERUPTIVE ROCKS.

The difference, in the lithological structure of these eruptive rocks, does not always depend on the unequal depths from which they have been thrown up: it will also depend on the circumstance whether the eruption has taken place on the surface in the open air, or at great depth under the sea.

Let me now call your attention to the rocks represented in fig. 5, by B and F. You see that the crust of the earth has been thickened by accessions from below. It is evident that these rocks may be in the course of forming below, notwithstanding that the upper crust of A may not have been in the least affected by them. The stupendous chemistry which has the power of destroying one class of rocks, has also the power of forming new ones. The crust A may continue for ages undisturbed and unaffected, while the rocks B and F, at great depths, are passing from a solid into a fluid state, and then consolidating themselves again, so as to acquire a lithological character perfectly new.

This may have been the case, in ancient geological time, with granite, gneiss, hornblende, &c. On this account, Sir Charles Lyell has called these kinds of rocks "hypogene," a term derived from the Greek ὑπο, *under*, and γινομαι, to *be*, to *be born*, or to *be produced*. The name is intended to imply the hypothesis that rocks such as granite, hornblende, schist, certain porphyries, and other crystalline formations, are "nether-formed" rocks. They are supposed to be constituted and composed *beneath* the earth's crust, and not formed by cooling after they had been erupted to the surface. The hypothesis also supposes that these nether-formed rocks may be brought to view by the denuding action of water, which may cut deep into the overlying beds; and thus, by valleys of denudation, as well as by the uplifting and tilting action of eruptive rocks, expose some of the lowest rocks in the crust of the globe.

LESSONS IN LATIN.—No. XIII.

By JOHN R. BEARD, D.D.

PREPOSITIONS.

THE Latin prepositions may be divided into two classes, according to the cases which they govern or require. Some require an accusative, others require an ablative case.

PREPOSITIONS GOVERNING THE ACCUSATIVE CASE.

Ad, *to, at*	In'fra, *beneath*
An'te, *before*	In'ter, *among*
Ap'ud, *at, near, in the house of, in the writings of*	Jux'ta, *beside*
Cis or Cit'ra, *on this side of*	Ob, *on account of*
Cir'ca, *around, about* (used of both time and place)	Pe'nes, *in the power of*
Cir'cum, *around* (of place only)	Per, *through, by means of*
Cir'citer, *about* (of time)	Post, *after*
Con'tra, *over against* (of place), *against* (of hostility)	Præ'ter, *passing by, near*
Er'ga, *in regard to*	Pro'pe, *near*
Ex'tra, *out of, without* (*in opposition to within*)	Prop'ter, *on account of*
In, *into*	Secun'dum, *along*
In'tra, *within*	Su'pra, *above*
	Trans, *across*
	Ul'tra, *beyond*
	Ver'sus, *towards*

Versus stands with ad or in, the accusative being between the two, thus: in Italiam versus, *toward Italy*; ad oceanum versus, *toward the ocean*. The ad and in are omitted before names of cities, as, Romam versus, *toward Rome*.

VOCABULARY.

Propero 1, *I hasten*; finis, is, m. *an end*; mors, mortis, f. *death*; arma, orum, pl. *arms*; Galli, órum, *the Gauls, the French*; Rhenus, i, m. *the Rhine*; generosus, a, um, *generous*; victus, a, um, *conquered*; cometa, æ, m. *a comet*; raritas, átis, f. *rarity*; species, ei, f. *appearance, beauty*; mirabilis, e, *admirable*; navigatio, ónis, f. *navigation*; periculosus, a, um, *dangerous* (E. R. *perilous*) causa, æ, f. *a cause, a reason* (E. R. *to cause, excuse*); caducus, a, um, *falling, perishable*; odium, i, n. *hatred*; seges, ségĕtis, f. *a field of corn*; Pluto, ónis, *Pluto, the ruler of the lower regions in classical mythology*; piscis, is, m. *a fish*; exspiro 1, *I breathe out, expire, die* camēlus, i, m. *a camel*; pictus, a, um, *painted* (E. R. *picture*); vestis, is, f. *a garment* (E. R. *vest*); commemoro 1, *I mention, speak of*; congrego 1, *I meet together* (E. R. *congregation*); depascor 1, *I feed upon*; metus, ûs, m. *fear*; officium, i, n. *duty* (E. R. *official*).

EXERCISES.—LATIN-ENGLISH.

Nulla est firma amicitia inter malos; propero ad mortem; Galli habitant trans Rhenum; nulla habemus arma contra mortem; vir generosus mitis est erga victos; cometæ ob raritatem et speciem sunt mirabiles; servi parent propter metum, boni propter officium; navigatio juxta litus sæpe est periculosa; nemo est beatus ante mortem; quam ob causam (ob quam causam) rides? infra luna omnia sunt caduca; multos per annos (per multos annos) inter barbaros habitas; Plutónis regnum infra terram ponitur; imperium populorum est penes reges; pisces extra aquam exspirant; res præter opinionem cadit; camelus odium adversus equos gerit; pictæ vestes apud Homerum commemorantur; multa animalia congregantur et contra alia dimicant; Hippótămus segetes circa Nilum depascitur.

ENGLISH-LATIN.

There is no faithful society among the bad; man has no arms against death; beyond death is life; we hasten to the Rhine; the friends are before the house; my sons are at my house (*apud me*); are your children at your house? the king is mild towards the conquered; after death good men are happy; what is (there) below the earth? God is above and through all things; men dwell below the clouds; my children are in my power; in (*apud*) Cicero are many beautiful sayings (*dicta*); I love the country on account of thee (on thy account); the soldiers are within the walls.

PREPOSITIONS WHICH GOVERN THE ABLATIVE CASE.

A, before consonants Ab, before vowels Abs, before t and qu	*by* or *from*	E, not before vowels Ex, before vowels and consonants	*out of*
Ab'sque, *without*		In, *in*	
Clam, *without the knowledge of*		Præ, *before* (of place, denoting motion)	
Co'ram, *in the presence of*		Pro, *before* (of place)	
Cum, *with*		Si'ne, *without*	
De, *concerning*		Te'nus, *as far as* (stands after its case)	

Cum is united with pronouns, thus: te'cum, *with thee*; vobis'cum, *with you*; nobis'cum, *with us*.

VOCABULARY.

Hebesco 3, *I grow dull*; senectus, útis, f. *old age*; aquila, æ, f.

to five flowers on each stalk; the segments are white, tipped with green. There are, besides the common Solomon's seal, the narrow-leaved, and the angular; the former flowering in June, the latter in May and June.

We give an illustration of one of the family of lilies, frequently met with in our gardens. It has the upper leaves oval, and the petals spotted. It is often known under the names of Turk's turban, or Turk's head. In colour it resembles that of the tiger, whence its name of the tiger lily.

Of the rushes there is a great variety. Their long, thin leaves, form islets on the stream, or fringe its border with its greenness. The soft rush and the common rush are used, in many parts of the country, for plaiting into mats and chair-bottoms, and for constructing small toy-baskets. The wicks of the candles, called rush-lights, are made from the pith, as also the wicks of some lamps. The soft and the common rush grow in wet meadows and pastures, and flower in July.

The sweet flag is abundant in the fenny districts of England, and was much prized when rushes were used instead of carpets. On festival days, the old cathedral of Norwich has its floors still profusely strewn with this fragrant plant. The Turks make a sweetmeat of the root, and consider it a preservative from plague. Our native species is aromatic like that brought from the Levant. It is one of the oldest medicines known, and is still much used.

Such are the only specimens our limits allow us to give of this large class. DIGYNIA, contains only the mountain sorrel. It grows in moist rocks and by rills, on the higher mountains of Scotland, Wales, the north of England and of Ireland, where it is abundant. Its stem is from six inches to a foot high; it is almost leafless; and the flowers, which appear in June, are small and drooping. From the order TRIGYNIA, we select the docks, which are very various. The meadow dock grows in marshy ground, and flowers in June and July. The Alpine dock grows by road-sides, but is not indigenous. It flowers in July. The fiddle dock, so called from the shape of its leaves, flowers in the same month. The petals of its flowers are egg-shaped, and very deeply toothed, of a green colour, with a large spot of scarlet in the centre of each. The stamens are large and yellow, adding to the brilliancy of the flower; the stem is light green, striped with red; each whorl of flowers is attended by a single leaf.

The fifth order, POLYANDRIA, has the water-plantains, which are found in ditches and other shallow waters. They may be known by a cup of three leaves, and a greatly-expanded corolla of three proportionally large, flat, circular petals.

CLASS VII.—HEPTANDRIA.

Plants bearing flowers with *Seven* Stamens.

ORDER I. MONOGYNIA. *One Pistil.*

The cup of the winter green, or chickweed, has seven spear-shaped leaves; the blossom is formed like a star, and, though divided into seven segments, is of one petal. Though seven is the general number of stamens in this plant, it sometimes deviates from it. In one species, the parts of the fructification are defended against the injuries of rain, by the closing of the petals, and the hanging down of the flowers at its approach. Our song-birds, especially the tribe of finches, are much indebted to this plant for food; as they eat not only its numerous seeds, but its young tops and leaves.

CLASS VIII.—OCTANDRIA.

Plants bearing flowers with *Eight* Stamens.

ORDER I. MONOGYNIA. *One Pistil.*

The willowherbs are generally characterised by a superior cup of four tapering, coloured leaves; a corolla of four circular expanding petals; and the summit of the pistil divided into four clefts. In some species, the stamens and pistils are upright, but lean towards the lower side of the blossom in others. Another distinction that marks the different species, is the shape of the leaves. The small-flowered hairy willowherb has spear-shaped, woolly, toothed leaves, growing opposite to one another. The great-flowered willowherb has its leaves running along, and embracing the stem; the top shoots have a very delicate smell; but it is lost almost as soon as they are gathered. These plants are generally found in marshy places, or on the banks of rivers.

There are several species of heath. They generally have a calyx of four leaves upright, coloured, enclosing the germ; a blossom of one petal, cut into four segments, the figure of which varies between egg-shaped and oblong. The bell-heath is one of our prettiest wild-flowers, and though rather small when compared with the showy Cape heaths, it is well worthy of being cultivated in the

Fine-leaved Heath.

flower-garden, or even in the greenhouse. The common heath is but little regarded in this country, except for its honey, with which it supplies the bees in abundance. It is far otherwise in Scotland. Mrs. Grant says

"Gem of the heath! whose modest bloom
Sheds beauty o'er the lonely moor;
Though thou disperse no rich perfume,
Nor yet with splendid tints allure;
Both valour's crest, and beauty's bower,
Oft hast thou deck'd, a favourite flower.

Flower of the wild! whose purple glow
Adorns the dusky mountain's side,
Not the gay hues of Iris' bow,
Nor garden's artful, varied pride,
With all its wealth of sweets could cheer
Like thee, the hardy mountaineer."

Common Knot Grass.

The common heath is the badge of the clan Macdonell; the cross-leaved heath of the Macdonalds; and the fine-leaved heath of the Macallisters. Many other floral emblems are assumed by the different Highland clans, as the yew, holly, pine, cranberry, &c.

The heath tribe is said to be the largest genus of plants; all, except about a dozen, are from the Cape of Good Hope. It is a remarkable fact, that some have been found wild in America; and although in autumn our mountain-sides and moors are completely empurpled with heath-flowers, there are only five species in Britain.

TRIGYNIA.

Three Pistils.

The reddish-white blossoms of the knot-grass constantly meet the eye in passing from the paved ways of the city in the month of May. Milton speaks of

"The knot-grass dew besprent;"

and Herbert mentions this among wholesome and medicinal herbs. This little plant forms green patches by every wayside, on the borders of the public highways, and shoots up under the walls of the crowded city, or even between the stones of the street.

Several plants are found in the order TETRAGYNIA, but on them we must not dwell.

LESSONS IN FRENCH.—No. XIII

By Professor LOUIS FASQUELLE, LL.D.

SECTION XXVIII.

USE OF THE ARTICLE (§ 77).

1. THE article le, la, les, as already stated, is used in French before nouns taken in a general sense:—

Les jardins sont les ornements des villages et des campagnes.	*Gardens are the ornaments of villages and of rural districts.*

2. The article is also used in French, as in English, before nouns taken in a particular sense:—

Les jardins de ce village sont superbes.	*The gardens of this village are superb.*

3. It is also used before abstract nouns, before verbs and adjectives used substantively:—

La paresse est odieuse.	*Idleness is odious.*
La jeunesse n'est pas toujours docile.	*Youth is not always tractable.*
Le boire et le manger sont nécessaires à la vie.	*Eating and drinking are necessary to life.*

4. The article is used before the names of countries, provinces, rivers, winds and mountains [77 (3) (4)];—

La France est plus grande que l'Italie.	*France is larger than Italy.*
La Normandie est très fertile.	*Normandy is very fertile.*

5. The article is used before titles:—

Le général Cavaignac.	*General Cavaignac.*
Le maréchal Ney.	*Marshal Ney.*

6. In respectful address or discourse, the words, *Monsieur*, *Madame*, *Mademoiselle* are placed before titles and designations of relationship:—

Monsieur le président.	(*Mr.*) *President.*
Madame la comtesse.	(*Madam*) *Countess.*
Mademoiselle votre sœur,	(*Miss*) *your sister.*

7. The plural of *Monsieur*, *Madame*, and *Mademoiselle*, is *Messieurs*, *Mesdames*, and *Mesdemoiselles*.

8. The student should be careful to distinguish a noun taken in a general or in a particular sense from one taken in a partitive sense [§ 78].

General or particular sense.	*Partitive sense.*
Nous aimons les livres,	Nous avons des livres,
We like books.	*We have books*, i. e. *some books.*
Nous avons les livres,	Vous avez écrit des lettres,
We have the books.	*You have written letters*, i. e. *some letters.*

RÉSUMÉ OF EXAMPLES.

La modestie est aimable.	*Modesty is amiable.*
Le courage est indispensable au général.	*Courage is indispensable to the general.*
Les fleurs sont l'ornement des jardins.	*Flowers are the ornament of gardens.*
Les fleurs des jardins de ce château.	*The flowers of the gardens of this villa.*
Avez vous l'intention de visiter la France?	*Do you intend visiting France?*
J'ai l'intention de visiter l'Italie.	*I intend visiting Italy.*
Le capitaine Dumont est il ici?	*Is captain Dumont here?*
Le major Guillaume est chez lui.	*Major William is at home.*
Voyez vous Madame votre mère?	*Do you see your mother?*
Je vois Monsieur votre frère.	*I see your brother.*
Mon frère n'aime pas les louanges.	*My brother is not fond of praises.*

EXERCISE 55.

Aim-er, 1. *to be fond of, to like*;	Demeur-er, 1. *to dwell, live*;	Légume, m. *vegetable*;
Apport-er, 1. *to bring*;	Etudi-er, 1. *to study*;	Loin, *far*;
Bois, m. *wood, forest*;	Fleur, f. *flower*;	Lundi, m. *Monday*;
Capitaine, m. *captain*;	Fraise, f. *strawberry*;	Pêche, f. *peach*;
Caporal, m. *corporal*;	Framboise, f. *raspberry*;	Prune, f. *plum.*

1. Aimez vous le pain ou la viande? 2. J'aime le pain, la viande, et le fruit. 3. Avons nous des pêches dans notre jardin? 4. Nous y avons des pêches, des fraises, des framboises et des cerises. 5. Monsieur votre frère aime-t-il les cerises? 6. Il n'aime guère les cerises, il préfère les prunes. 7. Avez vous des légumes? 8. Je n'aime point les légumes. 9. Nous n'avons ni légumes ni fruits [Sect. 6. 3, 4]. 10. Nous n'aimons ni les légumes ni les fruits. 11. Allez vous tous les jours dans le bois de Monsieur votre frère? 12. Je n'y vais pas tous les jours. 13. Vôtre sœur apporte-t-elle les fleurs? 14. Elle les apporte. 15. Madame votre mère apporte-t-elle des fleurs? 16. Elle en apporte tous les lundis. 17. Voyez vous le général Bertrand? 18. Je ne le vois pas, je vois le caporal Duchêne. 19. Mesdemoiselles vos sœurs sont elles fatiguées? 20. Mes sœurs sont fatiguées d'étudier. 21. Monsieur le président est-il chez lui? 22. Non, Monsieur, il est chez Monsieur le colonel Dumont. 23. Demeure-t-il loin d'ici? 24. Il ne demeure pas loin d'ici. 25. Où demeure-t-il? 26. Il demeure chez Monsieur le capitaine Lebrun.

EXERCISE 56.

1. Does your sister like flowers? 2. My sister likes flowers, and my brother is fond of books. 3. Is he wrong to like books? 4. No, Sir, he is right to like books and flowers. 5. Have you many flowers in your garden? 6. We have many flowers and much fruit. 7. Is your cousin fond of raspberries? 8. My cousin is fond of raspberries and* strawberries. 9. Is the captain fond of praises? 10. He is not fond of praises. 11. Has the gardener brought you vegetables? 12. He has brought me vegetables and fruit.* 13. Is he ashamed to bring you vegetables? 14. He is neither ashamed nor afraid to sell vegetables. 15. Is your mother tired? 16. My mother is not tired. 17. Is your brother at colonel D's? 18. He lives at colonel D's, but he is not at home at present (*à présent*). 19. How many peaches have you? 20. I have not many peaches but I have many plums. 21. Does Capt. B. like peaches? 22. He likes peaches,* plums, raspberries and strawberries. 23. Are you going into (*dans*) your brother's wood? 24. I go there every morning. 25. Is general L. here? 26. No, Sir, he is not here, he is at your cousin's. 27. Does your friend General H. live far from here? 28. He does not live far from here, he lives at his brother's. 29. Have you fine flowers in your garden? 30. We have very fine flowers; we are fond of flowers. 31. Do you give them to him? 32. I give them to you. 33. I give you some? 34. I give them some. 35. Give us some. 36. Do not give us any.

SECTION XXIX.

USE OF THE ARTICLE CONTINUED.

1. Adjectives of nation will, according to R. 3 of the last lesson, be preceded by the article:—

Il apprend le français, l'anglais, l'allemand et l'Italien.	*He learns French, English, German, and Italian.*

2. After the verb parler, the article may be omitted before an adjective of nation, taken substantively:—

Votre frère parle espagnol et portugais.	*Your brother speaks Spanish and Portuguese.*

* The student must not forget that the article is repeated before every noun.

3. The article is not used in French before the number which follows the name of a sovereign. This number, (unless it be *first* and *second*) must be the cardinal, and not the ordinal [§ 26 (3)]:—

Vous avez l'histoire de Henri quatre.	*You have the history of Henry the Fourth.*

4. A noun placed in apposition with a noun or pronoun is not in French preceded by un, une, *a* or *an*, unless it be qualified by an adjective or determined by the following part of the sentence.

Votre ami est médecin.	*Your friend is a physician.*
Notre frère est avocat.	*Our brother is a barrister.*
Votre ami est un bon médecin.	*Your friend is a good physician.*
Notre frère est un avocat célèbre.	*Our brother is a celebrated advocate.*

5. PRESENT OF THE INDICATIVE OF THE IRREGULAR VERBS.

APPRENDRE, *to learn*;	CONNAÎTRE, *to know*;	SAVOIR, *to know*;
J'apprends, *I learn, do learn, or am learning*;	Je connais, *I know*, or *do know*;	Je sais, *I know*, or *do know*;
Tu apprends,	Tu connais,	Tu sais,
Il apprend,	Il connait,	Il sait,
Nous apprenons,	Nous connaissons,	Nous savons,
Vous apprenez,	Vous connaissez,	Vous savez,
Ils apprennent.	Ils connaissent.	Ils savent.

6. Connaître means *to be acquainted with*; savoir, *to know*, is said only of things.

Connaissez vous ce Français, cet Anglais, cet Allemand, et cet Espagnol?	*Do you know that Frenchman, that Englishman, that German, and that Spaniard?*
Savez vous le français, l'anglais, l'allemand, et l'espagnol?	*Do you know French, English, German, and Spanish?*

RÉSUMÉ OF EXAMPLES.

Le capitaine G. sait il le français?	*Does captain G. know French?*
Il ne le sait pas, mais il l'apprend.	*He does not know it, but learns it.*
Connaissez vous le Docteur L.	*Do you know Dr. L.*
Je ne le connais pas, mais je sais où il demeure.	*I am not acquainted with him, but I know where he lives.*
Ce monsieur est il peintre?	*Is that gentleman a painter?*
Non, il est architecte.	*No, he is an architect.*
Ce monsieur est un architecte distingué.	*That gentleman is a distinguished architect.*
Ce Français parle grec et arabe.	*That Frenchman speaks Greek and Arabic.*
Il parle le grec, l'arabe et l'italien.	*He speaks the Greek, Arabic, and Italian languages.*
Avez vous vu Charles dix, frère de Louis dix-huit?	*Have you seen Charles the Tenth, a brother of Louis the Eighteenth?*

EXERCISE 57.

Allemand, e, *German*;	Hongrois, e, *Hungarian*;	Quatre, *four*;
Ancien, ne, *ancient*;	Langue, f. *language*;	Russe, *Russian*;
Anglais, e, *English*;	Moderne, *modern*;	Suédois, e, *Swedish*,
Chinois, e, *Chinese*;	Polonais, e, *Polish, Pole*;	*Suede*;
Danois, e, *Danish, Dane*;	Quatorze, *fourteen*;	Tapissier, m. *upholsterer.*
Grec, que, *Greek*;		

1. Connaissez vous ce Monsieur? 2. Oui, Madame, je le connais fort bien. 3. Savez vous de quel pays il est? 4. Il est hongrois. 5. Parle-t-il allemand? 6. Il parle allemand, polonais, russe, suédois, et danois. 7. N'est il pas médecin? 8. Non, Monsieur, avant la révolution, il était capitaine. 9. Avez vous envie d'apprendre le russe? 10. J'ai envie d'apprendre le russe et le grec moderne. 11. Connaissez vous les messieurs qui parlent à votre sœur? 12. Je ne les connais pas. 13. Savez vous où ils demeurent? 14. Ils demeurent chez le tapissier de votre frère. 15. N'avez vous pas l'histoire de Louis quatorze, dans votre bibliothèque? 16. Je n'ai ni celle de Louis quatorze, ni celle de Henri quatre. 17. Avez vous tort d'apprendre le chinois? 18. Je n'ai pas tort d'apprendre le chinois. 19. Vos compagnons apprennent ils les langues anciennes? 20. Ils savent plusieurs langues anciennes et modernes. 21. Parlez vous anglais? 22. Je sais l'anglais et je le parle. 23. Connaissez vous l'Anglais que nous voyons? 24. Je ne le connais pas. 25. Il ne me connait pas et je ne le connais pas.

EXERCISE 58.

1. Does our physician know French? 2. He knows French, English, and German. 3. Does he know the French physician? 4. He knows him very well. 5. Are you acquainted with that lady? 6. I am not acquainted with her. 7. Is she a German or a Swede? 8. She is neither a German nor a Swede, she is a Russian. 9. Do you intend to speak to her? 10. I intend to speak to her in (*en*) English. 11. Does she know English? 12. She knows several languages; she speaks English, Danish, Swedish, and Hungarian. 13. Is your brother a colonel? 14. No, Sir, he is a captain. 15. Is your upholsterer a Dane? 16. He is not a Dane, he is a Swede. 17. Are you a Frenchman? 18. No, Sir, I am a Hungarian. 19. Do you know Chinese? 20. I know Chinese, Russian, and modern Greek. 21. Are you wrong to learn languages? 22. I am not wrong to learn languages. 23. Do you know the Englishman who lives at your brother's? 24. I am acquainted with him. 25. I am not acquainted with him. 26. Do you like books? 27. I am fond of books. 28. Have you a desire to learn Russian? 29. I have no desire to learn Russian. 30. Have you no time? 31. I have but little time. 32. What do you learn? 33. We learn Latin, Greek, French, and German. 34. Do you not learn Spanish? 35. We do not learn it.

[We have been so repeatedly asked questions by our students of French, relating to the pronunciation of certain syllables, words, and phrases, in that language, that we take the opportunity here, once for all, to mention that this elementary department has been so thoroughly gone into in the pages of the "Working Man's Friend," and in the "French Lessons, price sixpence," reprinted from that work, that it would be a task of supererogation to reproduce them in the Popular Educator. On all questions of this kind, therefore, we shall beg to refer our correspondents to the manual above mentioned. As to questions relating to grammar, such as the genders of nouns, the conjugation of verbs regular and irregular, and syntax in general, we must again refer our readers to the SECOND PART of the Lessons in French, which are to appear in the Popular Educator, when we hope that all their remaining difficulties will be solved, if they do not vanish beforehand.]

LESSONS IN ARITHMETIC.—No. XII.

RULE OF SIMPLE DIVISION—*Concluded.*

In our last lessons we simplified the process of division by the use of the table of the multiples of the divisor, so as to render it comparatively an easy matter to find the successive figures of the quotient. In many cases, however, it might be rendered both tedious and unnecessary to find these multiples, because several of them are frequently not required in the operation, especially when the quotient is to consist only of a few figures. In such cases, the common method of finding the quotient figure by trial or guess, is more frequently resorted to in practice; and, therefore, we proceed to explain this method, which includes all the preceding rules, and completes the rule of division.

Rule 5.—Write down the divisor and dividend, with a place for the quotient, as formerly directed in Rule 3. Count off on the left of the dividend the smallest number of figures which will make a number greater than the divisor; and find how many times the divisor is contained in these figures, putting the number of times in the quotient as its first figure. Observe that in trying to discover without the table of multiples how many times one number is contained in another, especially when the divisor is beyond the limits of the multiplication table, proceed thus: Mark off mentally that number of figures from the right of both, which will bring the rest of the figures to the left, within the limits of that table, and use the remainders as trial numbers; that is, as trial divisor and dividend, in order to find the first figure in the quotient. Having found this first quotient figure, multiply the whole divisor by it, and subtract the product from the whole of the number of figures counted off from the left of the dividend at first. To the right of the remainder, annex the next figure of the dividend, for a dividuum (that is, a number to be divided). If this number be greater than the divisor, find how many times the divisor is contained in it, and annex the number of times to the quotient figure already found, repeating the process described with this quotient figure as with the first.

dividuum be not greater than the divisor, annex to it the next figure of the dividend, and the next again, and so on, until the dividuum be greater than the divisor, taking care to annex to the figure in the quotient, a cipher for every figure of the dividend annexed to the dividuum. Proceed in the same manner with this and every successive dividuum, as above directed, until all the figures of the dividend have been taken into the operation, when the complete quotient is then obtained: the last remainder is the complete remainder, which may be treated as before directed, and annexed in its fractional form to the quotient.

EXAMPLE 1.—Divide 35821649 by 764.

Divisor.	Dividend.	Quotient.
764)	35821649	(46886
	3056	
	5261	
	4584	
	6776	
	6112	
	6644	
	6112	
	5329	
	4584	
	745	remainder.

MODE OF OPERATION.

Here, according to the rule, counting off the smallest number of figures from the left of the dividend, which will make a number greater than the divisor, we have 3582; and we are to find how many times this number 3582 will contain the divisor 764. Now marking off mentally two figures from the right of both in order to bring the rest within the limits of the multiplication table, we have divisor 7 and dividend 35; hence, we find that 5 ought in this case to be the quotient figure. On trial, we should find this figure too much; because 5 times 764, or 3820, is greater than 3582 the dividuum, or number to be divided. This leads us to consider a little the nature of the figures mentally cut off; these were in the divisor 64, and in the dividend 82; now 82 does not contain 64 as many times as 35 contains 7. We must, therefore, adopt some method to meet this difficulty as much as possible. The simplest practical method is this; when the next figure, mentally cut off to the right, is 5, or a figure above 5, consider the rest of the figures to the left in the divisor, or the dividend, or in both, as the case may require, to be increased by unity, or 1; and then find the quotient figure as before. Thus, the trial numbers 7 and 35, in the preceding case, will become 8 and 36; because the next figures mentally cut off to the right were 6 and 8 respectively; now the dividend 36, and the divisor 8 will give the quotient figure 4, which is the right one. The reason of increasing the rest of the figures by 1, when the next figure cut off to the right is 5, or above 5, is that the figures so increased are nearer to the true number, though above it, than the figures not increased are, though below it. Thus, in the preceding case 800 is nearer to 764, though above it, than 700 is, though below it; and 3600 is nearer to 3582, though above it, than 3500 is, though below it.

The same principle carried out and applied to the successive dividuums, will give the successive quotient figures in the preceding example, with great accuracy. Practice in this rule will render the student very expert at division, and will enable him to work without the use of the table of divisor-multiples; at the same time, let it be remembered that this table will explain the nature of division more clearly and simply to a learner. But if at any time, the preceding method of finding the true quotient figure should fail, and should give a quotient figure either too great or too small by unity, which will be the greatest limits in general; the remedy is easy, and is quite at hand, the student having only to put the next less figure, or the next greater figure in the quotient, as the case may require.

PROOF OF DIVISION.

The best method of proving division is to multiply the quotient by the divisor, and to the product add the remainder if there be any; the result of this operation will in all cases reproduce (bring forth again) the dividend. In cases where there is no remainder, the reason of this method of proof is plainly this: that every product which arises from the multiplication of two factors, when divided by one of the factors gives the other factor; because the product being the one factor repeated as many times as there are units in the other, it is evident that the product contains the former as many times as the latter denotes,—that is, the divisor is the one factor and the quotient is the other. In the case where there is a remainder it is plain that if the remainder were subtracted from the dividend the same relation would subsist between the divisor, the quotient, and the dividend as subsists in the preceding case; consequently, the addition of the remainder to the product of the two factors,—viz., the divisor and quotient, must necessarily reproduce the dividend.

EXAMPLE.—In the case of the preceding example in division, the quotient is 46886, and the remainder 745. Therefore, multiplying 46886 by the divisor 764, and adding the remainder, the operation will be as follows:—

46886	quotient
764	divisor
187544	
281316	
328202	
35820904	product
745	remainder
Proof 35821649	dividend reproduced.

In cases where there is no remainder, it is evident from what has been said, that the product of the quotient and the divisor will reproduce the dividend; so that an example of this kind is unnecessary.

Another ingenious mode of proof is the following:—Arrange all the products of the divisor by the several quotient figures, under each other in the order in which their figures stand in the operation, for in each case they have a very different value, as already explained, placing the remainder in its proper place under the last product; find the sum of these products and the remainder thus arranged, and it will be the same as the dividend, if the operation be correct. The reason of this method and arrangement is, that these successive products are those which would arise from multiplying the divisor by the quotient, instead of the quotient by the divisor; so that the product must be the same as in the latter case; and the addition of the remainder is explained on the same principle as before.

EXAMPLE.—In the case of the example already referred to, the successive products and remainder, arranged according to the preceding observations, would stand as follows:—

3056	
4584	
6112	successive products
6112	
4584	
745	remainder
Proof 35821649	dividend reproduced.

EXERCISES ON THE PRECEDING AND FORMER LESSONS.

1. Divide one thousand billions by eighty-one.
2. Divide the same number by 729.
3. Divide a thousand thousand millions by 111.
4. Divide a thousand millions of millions by 1111.
5. Divide 90807060504030201O by 654321.
6. Divide 4678179387300 by the following divisors, separately, 2100, 36500, 8760, 957000, 87700, 1360000, and 87000.
7. Prove all the preceding questions by one or both methods above prescribed.
8. If the annual revenue of a nobleman be £87960, how much is that per day, the year being supposed to be exactly 365 days?
9. What is the nearest number to one thousand billions, that can be divided by 11111 without a remainder?
10. How often could 43046721 be subtracted from 22876792454961, and at last leave no remainder?
11. How many times does 310314420 contain 39390.
12. What number is that which divided by 123456 would give a quotient of 826451, and a remainder of 70404.

THE NEW DECLENSION.

	Masculine.	*Neuter.*
N.	Der gut-e, the good;	das gut-e, the good;
G.	Des guten, of the good;	des guten, of the good;
D.	Dem guten, to, for the good;	dem guten, to, for the good;
A.	Den guten, the good;	das gut-e, the good.

EXERCISE 10.

Alles, all;	Jung, young;	Schön, beautiful, fine;
Eng'länder, *m.* Englishman;	Klein, small, little;	Schwach, weak, feeble;
	Messer, *n.* knife;	Schwarz, black;
Frack, *m.* dress-coat;	Na'delkissen, *n.* pincushion;	Stark, strong;
Goldschmied, *m.* goldsmith;	Neu, new;	Uhr'macher, *m.* watchmaker;
Groß, great, large;	Oheim, *m.* uncle;	Weber, *m.* weaver;
Gut, good, well;	Scharf, sharp;	

III. ENDINGS OF ADJECTIVES IN THE NOMINATIVE, AFTER THE NEW DECLENSION.

Attributive.	*Predicative.*
Aller hart-e Stahl ist nützlich.	All hard steel is useful.
Alles nützlich-e Eisen ist hart.	All useful iron is hard.
Der nützlich-e Stahl ist hart.	The useful steel is hard.
Das hart-e Eisen ist nützlich.	The hard iron is useful.
Dieser schön-e Vogel ist weiß.	This beautiful bird is white.
Dieses weiß-e Papier ist schön.	This white paper is beautiful.
Einiger roth-e Wein.	Some (a little) red wine.
Einiges roth-e Papier.	Some (a little) red paper.
Jeder zufrieden-e Mann ist glücklich.	Every contented man is happy.
Jedes glücklich-e Kind ist zufrieden.	Every happy child is contented.
Jener schön- Baum ist groß.	Yonder (that) beautiful tree is large.
Jenes groß-e Pferd ist schön.	Yonder (that) large horse is beautiful.
Mancher gut-e Mann ist arm.	Many a good man is poor.
Manches schön-e Mädchen ist eitel.	Many a beautiful girl is vain.
Solcher fein-e Stahl ist kostbar.	Such fine steel is costly.
Solches kostbar-e Tuch ist fein.	Such costly cloth is fine.
Welcher alt-e Mann ist glücklich?	Which old man is happy?
Welches klein-e Kind ist zufrieden?	Which little child is contented?

1. Ist dieser junge Mann der Sohn des Capitains? 2. Nein, er ist der Sohn des alten Webers. 3. Wer hat das Nadelkissen dieses kleinen Mädchens? 4. Dieses kleine Kind des guten Freundes hat es. 5. Wer hat das schöne Pferd des guten Oheims? 6. Der junge Goldschmied hat es. 7. Wer hat den großen schwarzen Hund des Jägers? 8. Der junge Bruder des Kaufmanns hat ihn. 9. Hat das kleine Kind das scharfe Messer des guten Bruders? 10. Nein, es hat den neuen Kamm des guten Mädchens. 11. Hat der junge Freund des alten Uhrmachers das schöne Pferd des alten Knechtes? 12. Nein, er hat das Pferd des reichen Engländers. 13. Haben Sie den Frack des guten Schneiders? 14. Nein, ich habe diesen neuen Frack von dem guten Schneider. 15. Haben Sie das Tuch dieses armen Webers? 16. Nein, ich habe Tuch von dem Weber. 17. Ist aller alte Wein stark? 18. Nein, und nicht aller neue Wein ist schwach. 19 Der neue Frack ist von schwarzem Tuche.

QUESTIONS. 1. What is said of the adjective as a *predicative*? 2. As an *attributive*? 3. What is the ending of the *masculine* nominative of the old declension? 4. What of the new? 5. What is the *neuter* nom. and acc. of the old declension? 6. What of the new? 7. Is the old form generally used in the genitive? 8. What is used instead of it?

SECTION XI.

a WHEN PRECEDED BY ANY ONE OF THE FOLLOWING WORDS,

Masculine.	*Neuter.*	*Masculine.*	*Neuter.*
Ein,	ein (a or an);	unser,	unser (our);
Mein,	mein (my);	ihr,	ihr (your);
Dein,	dein (thy);	euer,	euer (your);
Sein,	sein (his, its);	ihr,	ihr (their);
Ihr,	ihr (her);	kein,	kein (no or not any),

the adjective has, in the nominative masculine and in the nominative and accusative neuter, the terminations of the old declenaion, and, in all the other cases, those of the new, and is said to be of

THE MIXED DECLENSION.

	Masculine.	*Neuter.*
N.	Mein gut-er, my good;	mein gut-es, my good;
G.	Meines guten, of my good;	meines guten, of my good;
D.	Meinem guten, to, for my good;	meinem guten, to, for my good;
A.	Meinen guten, my good;	mein gut-es, my good;

I. In the preceding list of words, ein, mein, dein, &c., it will be seen, that their form for the *masculine* and *neuter* is the same; and hence that they do not (like the previous class, der, dieser, &c., and like adjectives of the old declension) indicate the *gender* of the nouns which they precede: The *adjective*, therefore, by taking the characteristic terminations (er for the *masculine* and es for the *neuter*) assumes the office of pointing out the *gender* of its *noun*. EX.:

Masculine: Ein groß-er Stein, a great stone.
Neuter: Ein groß-es Schiff, a great ship.

EXERCISE 11.

Aber, but;	Lamm, *n.* lamb;	Steil, steep;
Dach, *n.* roof;	Nicht, not;	Stets, always;
Faul, lazy, idle;	Schaf, *n.* sheep;	Thier, *n.* animal, beast;
Fett, fat;	Schutz, *m.* protection, defence;	Tief, deep;
Hol'länder, *m.* Dutchman;	Schwein, *n.* swine;	Treu, true, faithful
Ihr, your;	Sein, his;	Zufrie'den, contented, satisfied;
Keller, *m.* cellar;	Sopha, *n.* sofa;	Weiß, white.

II. ENDINGS OF ADJECTIVES, IN THE NOMINATIVE AFTER THE MIXED DECLENSION.

Attributive.	*Predicative.*
Ein warm-er Rock ist gut.	A warm coat is good.
Ein warm-es Kleid ist gut.	A warm garment is good.
Mein gut-er Hund ist alt.	My good dog is old.
Mein alt-es Pferd ist gut.	My old horse is good.
Dein schön-er Vogel ist weiß.	Thy beautiful bird is white.
Dein weiß-es Papier ist schön	Thy white paper is beautiful.
Sein hart-er Stahl ist gut.	His hard steel is good.
Sein gut-es Eisen ist hart.	His good iron is hard.
Ihr gut-er Bruder ist klein.	Her good brother is small.
Ihr klein-es Kind ist gut.	Her little child is good.
Unser groß-er Baum ist schön.	Our large tree is beautiful.
Unser schön-es Haus ist groß.	Our beautiful house is large.
Euer alt-er Koffer ist schwarz.	Your old trunk is black.
Euer schwarz-es Band ist alt.	Your black ribbon is old.
Ihr grün-er Garten ist groß.	Their green garden is large.
Ihr groß-es Feld ist grün.	Their large field is green.
Kein gut-er Stahl ist gelb.	No good steel is yellow.
Kein gut-es Silber ist gelb.	No good silver is yellow. (Compare Sect. 10. III.)

1. Ist Ihr guter Freund, der Capitain, noch ein junger Mann? 2. Ja, er ist noch jung, aber sein guter Freund, der Holländer, ist alt. 3. Haben Sie einen schönen großen Hund? 4. Nein, ich habe ein schönes großes Pferd. 5. Hat Ihr kleines Kind mein neues Messer? 6. Nein, aber Ihr guter Sohn hat Ihren neuen Stock. 7. Hat der Fleischer ein fettes Schaf? 8. Ja, und sein guter Sohn hat ein schönes weißes Lamm. 9. Ist Ihr Freund, der junge Holländer, reich oder arm? 10. Er ist nicht reich, aber er ist zufrieden. 11. Ein zufriedener Mann ist auch reich. 12. Ein reicher Mann ist nicht stets ein zufriedener Mann. 13. Ihr großes Haus hat ein steiles Dach und einen tiefen Keller. 14. Von wem haben Sie Ihr neues Sopha? 15. Ich habe es von einem guten Freunde. 16. Das Schwein ist ein faules fettes Thier. 17. Ein treuer Freund ist ein starker Schutz.

QUESTIONS. 1. Which cases in the mixed declension differ, in termination, from those of the new? 2. Which cases of the old and the mixed declension are alike? 3. In which cases do the endings of the mixed declension differ from those of the old? 4. Which are alike in all three declensions? 5. What office is assumed by adjectives of the old and mixed declensions? 6. What may we regard as an equivalent in the new?

LESSONS IN GEOGRAPHY.—No. IV.

In our last lesson, we referred to the influence of the writings of Ptolemy on the geographical knowledge of later times. According to him, the limits of the world were Thule on the north, and the Prassum Promontorium on the south; the former being most probably some part of Norway, and the latter some unknown point south-west of Madagascar. Its limits on the west, were the Fortunate Isles, now the Canaries; and on the east, Thinæ in Sinæ or China. He rejected the theory of all preceding geographers, who represented the world as surrounded by an impassable ocean on all sides; and he replaced it by an indefinite expanse of *terra incognita* (unknown land). He rejected the true reports of circumnavigation of Africa, and extended its limits southward beyond all reasonable bounds.

With Europe, Ptolemy was tolerably well acquainted; and he described Germany and Sarmatia with some degree of accuracy. He knew the Ems, the Weser, the Elbe, the Order, and the Vistula. He calls Jutland the Cimbric Chersonese, and the Baltic, the Sarmatic Ocean, but he failed in his account of this inland sea. He was better acquainted with the south of European Russia, with the Tanais, the Borysthenes, and the Euxine. In his description of the Mediterranean, there are many errors, but his account is more accurate with them all, than that of any previous geographer. In regard to Asia, his knowledge was obscure and unsatisfactory, though some features can be still identified with fact. Here he described the "Golden Chersonese," and the *Magnus Sinus*, or Great Bay of India; these appear to have the Indo-Chinese countries of Ava, Pegu, and Malacca, with their adjacent gulfs or bays; and Thinæ, which he places at this remote corner, is supposed to be Siam, rather than any place in China.

The Serica of Ptolemy in the north of Asia is supposed, with good reason, to be China, which was reached by great trading caravans which proceeded from Byzantium (or Constantinople), across Asia Minor, crossing the Euphrates at Hierapolis, and passing through Media, by way of Ecbatana to Hecatompylos, the capital of Parthia. Their next route was Hyrcania, Aria, Margiana, and Bactria; whence, they ascended the table-land of the interior of Asia, passed over the *Montes Comedorum*, or Beloor Mountains, and reached the celebrated *Lithinos Pyrgos* or "Stone Tower," a station whose site is still a doubtful question among geographers. From this station to the frontier of Serica was a seven months' hard and perilous journey. The description which Ptolemy gives of Serica corresponds more exactly to China than any other country; and his account of the manners and customs of the inhabitants, identifies it still more. Moreover, the staple commodity of this overland trade was silk, for which China has been celebrated from time immemorial. Ptolemy appears to have had a considerable knowledge of Hindostan or India, both within and without the Ganges; a knowledge said to be superior to that of the moderns till within the limits of the present century. With regard to Africa, this statement may just be reversed. But taking his work as a whole, and considering the age in which it appeared, it must be considered a singular monument of industry, and a valuable book of reference in all matters relating to the ancient geography of the world.

From the time of Ptolemy down to the tenth century of the Christian era, no geographical work appeared, either to supply the place of his, or to add to the knowledge which it conveyed. The invasion of the Roman empire by the northern hordes, the general anarchy which followed, and the seclusion into which literature was driven, produced a retrogression of all the arts and sciences, and especially of geography. A proper judgment may be formed of the ignorance which prevailed in this science immediately anterior to the time of the Crusades, by inspecting a map of the world published at that period. The sea, as in the age of Homer, is made to surround the world, which is divided into three parts, Europe, Asia, and Africa. Asia is as large as the other two parts; Africa is joined to Asia on the south, and the Indian ocean is made an inland sea. On the east, there is a small place indicating the position of the garden of Eden, by the words *Hic est paradisus*. Europe and Asia are separated from Africa by a very long canal, which some believed to be the Nile, others the Hellespont, and others again the Indian sea. Africa is considered the country of fable and mystery; its northern part only is seen, the rest is unapproachable on account of the torrents of flame poured on it by the sun. After the discovery of the Canary Isles and Cape Bojador, geographers represented in one of these islands the figures of colossal statues brandishing formidable clubs to warn navigators that they must not go beyond this point.

A fantastic dream, filled with chimeras and ridiculous sights, hovered over the world during the middle ages. The cosmological theories then rife, were inferior to the happy notions which prevailed in pagan antiquity. Light however had begun to dawn. At the commencement of the eighth century, pious monks had retired into Ireland and the Ferro Isles. In A.D. 795, Christian missionaries had visited Iceland, which was considered as the ancient Thule of Pytheas. In A.D. 855, the Norwegians landed on this island; proceeding farther west, they reached Greenland, and enlarged the boundary of geographical knowledge. Certain writers have advanced the opinion that the problem of a communication between the Atlantic ocean and the great ocean, now called the Pacific, was really current among the maritime people of that period. It is nevertheless an historical fact that America had been discovered by the Scandinavians at this remote period. Yet the discovery of Greenland detracts nothing from the glory of Columbus. The northern regions of America are still a *terra incognita;* and though a Franklin once freed America, a Franklin has not yet discovered its boundaries. The hardy adventurers of Norway were the first who penetrated into the middle of the mountains of ice which bristle round the confines of the polar countries. We are equally struck with wonder and admiration at their daring courage, in reading the history of the eighth, ninth, and tenth centuries, when we find that all the known seas were during this period covered with the vessels of the Scandinavians. The conquests of these pirates in Europe are well known. Their voyages in the icy regions are almost unknown to the general reader.

The expeditions we have now referred to were turned to some advantage by the geographers of the period, but all the light they were calculated to give was not rendered available. The learned writers of the tenth, eleventh, and twelfth centuries still united the Frozen Ocean, the Baltic, the White Sea, and the Caspian. They believed that all the northern regions formed only one island. Then the Amazons, those famous warriors, whose country antiquity had placed to the north of the Caucasus, were now removed to the countries newly discovered in the north of Europe. Scandinavia became their birthplace and their residence. "The fiction of the Amazons," says M. Humboldt, "has travelled over all the zones; it belongs to a complete circle, which proceeds from the reveries and ideas in which the poetic or religious imagination of all races of men, and of all periods, instinctively performs its evolutions."

PROBLEMS AND QUERIES.

1. Given the heights of three towers placed at the angular points of an equilateral triangle, a, b, c, in the order of their magnitude; with the base or side of that triangle, d; to find the point within the triangle, where a ladder must be placed to reach the top of each tower; that is, the distances of this point from the angular points of the triangle; and also the length of the ladder. In Keith's Arithmetic, the heights given, 28, 30, and 34 feet; and the side of the equilateral triangle, 50 feet.

2. Required a number such that when added to, or subtracted from its square, the sum or remainder shall be a square number.

3. Three gentlemen contribute £164 5 towards the building of a church at the distance of 2 miles from the residence of the first, 2½ miles from that of the second, and 3½ from that of the third. They agree that their shares shall be reciprocally proportional to their respective distances from the church. How much should they individually contribute?

4. To find a square which shall be equal to the difference of two given squares.

5. Through a given point within or without a given circle, to draw a chord that shall be equal to a given straight line.

6. Through a given point to draw a line such that the segment of it, intercepted between two given parallels, may be equal to a given straight line.

ANSWERS TO CORRESPONDENTS.

JAMES POLLITT is informed that the "Manual of the French Language," price 2s., is the title of the work respecting which he inquires. A copy of the "Lessons in French," as we have had occasion to say in reply to various correspondents, will be sent through the post direct from our office to any address, on the receipt of seven penny postage stamps.

W. W. (Coventry): We really are not aware of any books we can recommend on the subjects he mentions; but they will be treated of in due time in the POPULAR EDUCATOR. A *meniscus* lens is *convex* on the one side and *concave* on the other. The latest information on Photography and Daguerreotype, will be found in the official Illustrated Catalogue of the Great Exhibition, at Nos. 291, 292, 296, 297, 299, 303, 404, Class X.—TYRO (Newcastle), will be gratified with lessons in the other ancient languages as soon as convenient.—O. (Monebar): Greek, &c., all in good time.—GRACE E——G, will find an answer to her principal question at page 176, col. 2, line 14; and to her secondary questions at page 22, col. 2, lines 12 and 17 from the bottom.

We request our friend, R. P. (Islington-green), not to despair; we are preparing a cheap edition of Euclid for those who are anxious and willing to learn. He has given us no trouble. Let him try, try again. —J. S. (Port Glasgow) is right; 26 numbers will form a volume.—Our excellent friend, E. H. M. CAM, is informed that there is a fine paper edition at 1½d. each number, which wants the title of which she complains. —Z. R. (Birmingham): Will find mentioned among our Literary Notices, a "Handbook on Emigration," price 9d.—H. CARTNEY (Dublin), is informed that in No. 6, p. 96, col. 1, line 6 from the bottom, there is a reference which we hope will satisfy him on the subject of chronology —We recommend our friend PILATE to observe the same reference on chronology. When Greek comes up rules will be given for its pronunciation.—X. Y. Z.; F. B. (Horsham); R. C.: Painting, architecture, and colour will come in due course.—T. C. LATHBRIDGE (Fitzroy-square): Chemistry will appear in its turn.

J. B. R. (Glasgow): We do intend to give distinct treatises on Natural Philosophy, Mechanics, Engineering, Drawing, &c.; but we do not see the necessity of "groans;" if there be any one thing that requires explanation, we hold it our duty to give it, independent of either groans or cheers.—I. P. (Manchester), an "Enquirer" is informed that when we have ascertained what other system of "Shorthand" is best, we shall give it. Mr. Pitman's is *copyright*.

JOHN BOURTON (Paddington): His solution of the cases of the 47th are ingenious.—R. M. ROBSON (Sunderland): We thank him for his suggestion; it will be considered.—E. FINIGAN (Manchester): His solution of query 2, page 111, is correct.—WILLIAM PARKER (Newnham): His suggestions are good and practical. Our address is "Editor of the Popular Educator," 9, La Belle Sauvage-yard, Ludgate-hill, London. It is not necessary that every student should study *all* that is in every number *at one and the same time*. Does our correspondent not see that the variety is absolutely necessary to ensure a greater number of readers? In this way, every one may take up what he likes best; and let the rest stand over till another opportunity. The subjects will keep. We shall thank him for the list of words, which he cannot make out in the French vocabulary.—JOHN MACKAY (Whitehaven): When *Latitudes* are mentioned in the newspapers, if they are not marked N. or S. they are useless. When *Longitudes* are mentioned without being marked E. or W. they are equally useless. *Latitudes*, when properly marked, are estimated North or South of the *equator*. *Longitudes*, when properly marked, are estimated East or West of the *first meridian*, which among us, is the *meridian* of the *Royal Observatory* at *Greenwich*, and not of *London*. The *Latitude* of the *Royal Observatory* is 51° 28′ 39″ N., and its *Longitude* 0° 0′ 0″. The *Latitude* of *St. Paul's Church*, London, is 51° 30′ 49″ *N.*, and its *Longitude* 0° 5′ 47″ W.

A SCHOOLMASTER, who wishes to obtain a certificate of merit for his acquaintance with geometry, should read the lessons in the POPULAR EDUCATOR, and the edition of Euclid just announced.—JOHN WRIGHT (Glasgow), is right; we were *obtuse* not to see the error; it will be rectified.—T. B. ULMER, *Philus*, proposes an excellent mode of drawing a perpendicular; make a triangle whose base is 3 equal parts from any scale, and two sides 4 and 5 equal parts, respectively, from the same scale; then the angle opposite the side containing 5 equal parts will be a right angle by the 48th Prop. of Book I., Euclid's Elements. Any equi-multiples of these numbers will do as well, and many other numbers, as, 12, 8 and 18, &c.—H. DUGDALE (Shaldburn), has sent us a very ingenious solution of query 5, page 111, being an ocular demonstration of the problem; we shall take an early opportunity of noticing it in our pages.—W. H. BATT (Rheerness): His solutions of problems 1, 2, 3, page 111, are correct. His different values of *s* should be all [illegible], and will be so, if worked fully out. We thank him [illegible] accompanying letter.—A CLACKMANNANSHIRE "HERD" [illegible] correct solutions of problems 2 and 3, same page.—[illegible]nas (Islington): Thanks for his solutions. As to his [illegible]steam, water generates steam at 212°, below that it only [illegible]vapour; and above that it generates *high-pressure steam*, which [illegible]increases in proportion as the degree rises above 212°. Ice gives out vapour, and that vapour has a certain pressure; but it [illegible] only is the pressure of steam equal to the pressure of the atmosphere.

A PUPIL TEACHER has only to substitute the word Zedekiah for Hezekiah in Lesson IV. on Ancient History. It is nothing more than an error of the press.

BOTANY.—A SCHOOL ASSISTANT: The statement about which our correspondent inquires is quite correct. A *thyrsus* is a panicle whose middle branches are longer than those of the base and apex. The *peduncle* is the stem or stalk that supports the fructification of a plant, and different lengths of the pedunules give to the lilac its ovate form.—SCIRE FACIAS: The effect about which our correspondent inquires is probably to be ascribed to the attack of a gall-fly; but the blossom was too much decayed to allow of a more precise answer.

FRENCH.—JEUNE FRANÇAIS is right; but we fear that Lesson on Pronunciation would take up too much of our room, and could not be made quite to accomplish the desired end; for, after all, the ear is very necessary for those who wish to *speak* French.—WILLIAM (Edinburgh) is right in his correction; it will be noted.—ONE OF THE ECOLIER (Preston) gives us great pleasure when he informs us of getting before us in our lessons: we hope to be up to him soon.—J. HILL: Right.—O. D. H. WELLS (Somerset): His offer is both kind and able and generous; we shall take it into serious consideration.—J. DAVIS (Whitechapel): Something will soon be done to meet his case as to French and Latin.

ENGLISH GRAMMAR AND COMPOSITION.—R. MASON (Lancaster) is informed that Dr. Beard's Lessons will include English Composition.—No. 10, page 150.—C. E. W.: The sounds of *ea* and *e* are the same in the words *thee* and *me*; but the sound of *e* in the definite article is very different, and approaches one of the sounds of *a*.—A. E. should learn English grammar first.—G. HOGG (Newcastle), is right: the positive is not strictly a *degree* of comparison, but it is the starting point if we had it not, we could not *compare*. A man must be *good* in some degree before we can say that another is *better*.

ERRATUM IN SOME COPIES.

page 139, line 42, col. 2, *for* tenth *read* eleventh.

LITERARY NOTICES.

HISTORY OF THE PAINTERS OF ALL NATIONS.—The first part of this magnificent work, in imperial quarto, containing a portrait of Murillo, and eight specimens of his choicest works, including the "Conception of the Virgin," lately in the collection of Marshal Soult, and recently purchased by the French Government for the Gallery of the Louvre, for the sum of £23,440, is now ready. The succeeding parts will appear on the first of every month, at 2s. each, and will be supplied through every bookseller in town or country.

CASSELL'S SHILLING EDITION OF EUCLID.—THE ELEMENTS OF GEOMETRY, containing the First Six, and the Eleventh and Twelfth Books of Euclid, from the text of Robert Simson, M.D., Emeritus Professor of Mathematics in the University of Glasgow; with Corrections, Annotations, and Exercises, by Robert Wallace, A.M., of the same university, and Collegiate Tutor of the University of London. Will be ready early in July, price 1s. in stiff covers, or 1s. 6d. neat cloth.

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LESSONS IN GEOLOGY.—No. IV.

By Thos. W. Jenkyn, D.D., F.R.S.

ON PLUTONIC CHANGES IN THE STRATIFIED SURFACE OF THE EARTH.

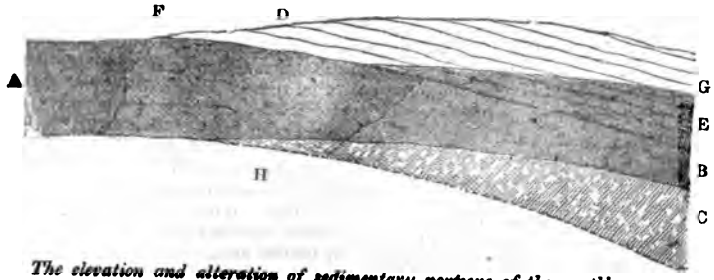
You have become acquainted with three causes which have contributed to the production of the earth's crust. These are—1, the first hardening of the surface by cooling; 2, the action of subterranean heat in throwing up eruptive rocks through fissures to the surface, and also consolidating "nether-formed" rocks below the crust; and 3, the action of water in dissolving, wearing away, or disintegrating, portions of upper rocks, and carrying down the sand, or detritus, to deposit it at a lower level.

Upon an examination of sedimentary rocks, there are two inferences which you cannot avoid making. The first is, that the rock which has been worn or abraded by the water, must have been older than the rock formed by disposition. The second is, that the rocks thus worn by running water must, at the time of disintegration, have been at a higher level than the place where they are deposited. To this second inference, there is one exception. Water, hot or boiling, has a greater disintegrating power to act upon rocks, chemically, than when it is cold. When the earth's crust, therefore, had only just become cool enough to allow water to exist upon it, in a fluid state, and not in one of vapour, the heated, boiling, agitated waters must have worn away the granite at their bottom very deeply and extensively. These abraded materials which the waters held in solution or suspension, they would deposit, either in deeper hollows, or along surfaces, that were of a lower temperature.

There are some phenomena developed in the condition of some of these sedimentary rocks that will greatly puzzle a young inquirer when he meets them for the first time. They are sometimes on a higher level than the rock from which their sands or clays have been derived. In other cases, they are so altered in general aspect and mineral character, that he would hardly recognise them as stratified deposits. In other places, they are so disjointed, dislocated, and separated from the series, of which they formerly constituted a continuous part, that their stratification appears almost reversed.

All these changes are owing to the action and force of subterranean heat, as will be shown in the following illustrations.

Fig. 6.



The elevation and alteration of sedimentary portions of the earth's crust by subterranean heat.

In fig. 6, is represented a large portion of the earth's crust, covered by sedimentary rocks, which have been deposited by the action of water. A B represents the original crust now resting on the nether-formed rock C, to which reference was made in Lesson III. D E are sedimentary beds, deposited on the crust in its primitive state along the line F B. The deposits are on a higher level than the crust A, from which the materials were originally worn down; or of which A has been denuded. Since the laws of Hydrostatics would prevent water from depositing matter at this high level, the elevation of the beds must be ascribed to the action of the heat from below.

This elevation would take place gradually and tranquilly, in consequence of the slow expansion of the crust A B. This elevating expansion of the crust is not represented in fig. 6, which is only designed to show the action of heat in *altering* rocks.

Before the sedimentary rocks had been deposited, the crust A B parted with its heat freely: but deposits of clay conduct heat very slowly, and the consequence would be that the temperature of the stratum, below such beds of clay, would increase to a higher degree. The increase of heat in the stratum below, would enlarge its bulk by expansion; which, in its turn, would elevate the newly-formed deposits, above their former level; so that what was once the bottom of the sea may become a large island or small continent. This you will more easily understand, if you imagine that, previous to the elevation of F D G, a sea existed on the line F G.

It is not the science of geology only which asserts and proves that such elevations have taken place in very remote ages; for our own observation can demonstrate that they take place in our day. The changes of level which take place along sea-coasts, are ascribed, by the common people, to the sea receding; but geologists can show that the change is the result of the earth rising.

Even so late as the year 1822, in the neighbourhood of Valparaiso, the whole coast of Chili, on the western side of South America, was raised three or four feet above its usual level along a line of more than a hundred miles in length. There could be no doubt of this elevation, for, after a tremendous earthquake, an old ship that lay as a wreck at some distance in the water, could, after Nov. 20th of that year, be safely visited dryshod: and an extensive bed of oysters and mussels, of whose existence the inhabitants of the city knew nothing, was now exposed, which with the dead fish contaminated the air with their bad odour. At this moment, the coast of Sweden, from Frederickshall to Abo in Finland, is gradually, but visibly, rising at the rate of about three feet in every hundred years; but the rate varies in different parts of the coast. This elevation is proved by the fact, not only that shores are now dry which used to be covered at low water, but, that the shells of fish which now live in the Baltic abound in the soil which is about four feet higher than the water, and that at the distance of about seventy miles from the present margin of the sea. It is also a fact that barnacles, shellfish which attach themselves only to rocks or walls washed by the sea, are now found fixed on high parts of the cliffs; which proves that these cliffs with their barnacles were once at a level which could be washed by the sea. You therefore see, that wherever the sea is receding, it is occasioned by the earth rising, and that this rising is caused by the expansive power of heat below.

While heat is, by expansion, affecting and elevating rocks that are remote from it, it is acting with greater intensity upon the rocks which lie nearest to it. It is consequently found, that, when the lower beds of the sedimentary rocks lie near enough to the fusing power of heat, they are the most altered by it, both in appearance and even in mineral, or lithological character. This is represented above in the darkened portion of the beds F D E, fig. 5.

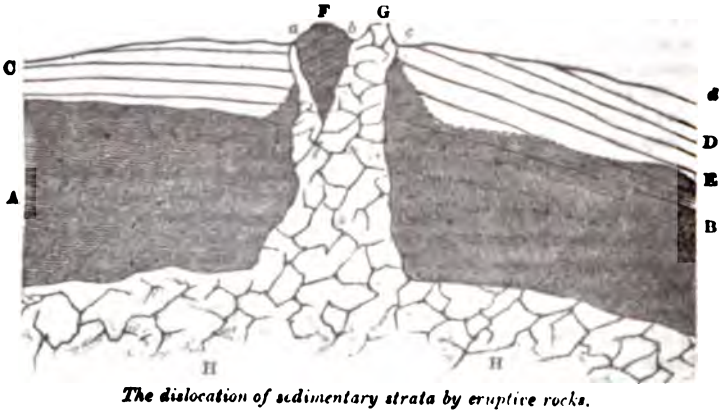
This operation of subterranean heat in altering sedimentary

rocks is not, in this lesson, to be mistaken for the action of volcanic intrusions, whether of granite, of basalt, or of trap, to which future lessons will refer. Both actions are analogous to each other: but this lesson refers to very early changes which have taken place in the earth's crust, and which might have been expected from the influence of intense melted matter, and from the effort of disengaged gases struggling to make their way through the porous rocks that overlay them.

The alteration which intense heat produces in a sedimentary rock, will always be according to the nature of the deposit of which it is formed. Shale, a laminated clay, will become so indurated and compact as almost to lose its slaty peculiarity. Argillaceous, or earthy limestone, will become granular and crystalline, like the white marble of the statuary. The clays of the coal formations will appear like flinty or jaspery slate. Coal is turned into anthracite, or stone-coal; and anthracite into coke. Chalk becomes crystallised marble; which has been verified by a chemist who applied intense heat to chalk, sealed in a gun-barrel. Thus, then, it is seen that the clay-slate used in roofing houses, is nothing but clay that has been subjected to strong heat under great pressure.

Though these kinds of alteration are remarkable, still greater ones may have been produced in proportion to the greater intensity of the fusing heat; or according to the length of time in which the action of heat continued. There are, for instance, in the extreme south of Norway, sedimentary rocks penetrated by a large mass of granite, which must have protruded itself in a state of fusion. All about the mass of granite, the sedimentary beds are altered to the distance, from the once melted matter, of from fifty to four hundred yards. Before this protrusion took place, the shale or the schist consisted of green and chocolate-coloured layers of sediments; but the fused granite has changed these into ribboned jasper, like those which are found in the pebbles at Aberystwith, in South Wales,—specimens in which each stripe faithfully represents the original lines in which their various clays were deposited. The limestone of the neighbourhood, which was originally of an earthy texture, and of blue colour, as it is still found at a distance from the granite, is become white granular marble. It is also remarkable that both the slate and the limestone of that rock contain garnets, and ores of iron, copper, lead, and silver.

Fig. 7.



The dislocation of sedimentary strata by eruptive rocks.

In Cornwall, also, the fused granite has protruded veins into a rock, which the Cornish miners call "killas," a coarse argillaceous or earthy schist or slate,—a rock which has been altered by the heat of the fused matter, into hornblende schist. This operation is well developed both at St. Agnes, and St. Michael's Mount in the Bay of Penzance. These and a thousand similar instances prove that powers exist in nature which are capable of transforming sedimentary and fossiliferous rocks into crystalline strata.

It has been intimated that in altering rocks, heat not only changes their appearance or aspect, but also gives them a new mineral character, and causes them, in some instances, to become identical with the melted rock which has changed them, though they themselves have not been melted. Chemists have proved by experiment, that a rock need not be perfectly melted before its component parts will re-arrange themselves,—that is before they crystallise, or take a new mineral character. Sedimentary rocks, therefore, may be completely altered, without having the lines of their stratification obliterated.

This theory will help you to understand a phrase often used by geologists, when they speak of "one rock *passing* into another," and that by imperceptible gradation. If you imagine thick beds of stratified gneiss, which is only granite worn away by water, to be deposited on a bottom of granite, you can imagine that the subterranean heat might acquire such intensity as to melt the granite crust under the gneiss afresh. This fresh fusion would rise to reach the lower beds of the overlying gneiss, and to penetrate them so thoroughly, as almost to destroy completely, all trace of the original lines of their stratification, and make them to appear as if they had never been under the action of water.

Keep in mind that these changes in the character of altered rocks is not produced by heat alone. Volcanic action, in what may be called recent and modern epochs of geological time, assists us in studying the character of Plutonic action in more remote ages. It is well known that volcanoes send forth immense volumes of heated gases, which disengage themselves from melted matter, and struggle to make their way from the enormous pressure which overlies them. They maintain this effort for weeks, months, and years. When, therefore, fused granite or porphyry is burning, boiling, and heaving under great pressure, and containing powerful gases which cannot escape, these gases will act upon the crust above; and, when they are near porous rocks, they will pass through them with great facility, and, in passing, greatly modify them.

It is true that we can study these phenomena only as they are observed on the surface of the earth; but it is clear that as gaseous fluids have altered the upper surface of the rocks, so as these fluids could only come from subterranean sources, they must have made their way through the entire crust, from the deep reservoirs below into the open air.

Other alterations of strata will be more fully considered when we come to the subject of metamorphic rocks, and to the influence of volcanic action in the protrusion of trap and basalt. The Plutonic changes, just alluded to, are mentioned here only to illustrate the operations of heat on the early crust of the earth.

In fig. 6, which represents the lower portions of the sedimentary beds D E are represented, by darkened lines, as having been altered either by heat or by gases, the altered strata still retain their original relation to the beds that have not been altered. There are, however, innumerable instances in which stratified beds, whether altered or not, have been completely disturbed and dislocated, as represented in fig. 7. A thousand instances are found, in which the strata have been broken through and tilted up, so that what was deposited horizontally appears now with their lines of stratification highly inclined; sometimes almost perpendicular; at other times perfectly vertical; and in some instances, quite inverted. Sections of vertical position we may find at Alum Bay, in the western end of the Isle of Wight, and, at Whitecliff Bay, in the eastern end of it. The same may be seen near Welshpool, in North Wales, where Powis Castle is built upon Silurian strata almost perfectly vertical.

In fig. 7, A B is the earth's crust. C D, the sedimentary beds resting on it. F, a dislocated portion of the altered beds, and separated from them by the eruptive rock G, which has been thrown up to the earth's surface by the subterranean heat H.

The study of fig. 7, will help you to apprehend the nature of geological reasoning. Suppose that a geological student travels from C to *d*, along a sedimentary rock. At *d* he comes to a rock of a different mineral character, and may be in difficulty to account for it. As he walks over F, or passes to the side of it, and has the face or section of F on his left hand as he walks towards *d*, he may not understand the new rock, when he comes to *b*. Here he finds the Plutonic rock G, say granite or porphyry, evidently of igneous origin. He goes over, or

the side of *a*, till he comes to *c*, where he finds the same rock over which he travelled from *c* to *a*. He now conjectures, and then reasons out, the conclusion that the rock *a p b* is a portion of the beds *c d*, first altered by heat, and then tilted up by the eruptive rock *b g a*. He also argues with perfect certainty; first, that if he could follow *g* down to its depth or origin, he would find that eruptive rock to be continuous to the heated reservoir at *h*; and secondly, that if, between *c* and *d* he could sink a pit to the lowest line of *e h*, he would be sure to come to the altered beds of which he had a specimen in *a p b*.

In the few lessons already given you, I have endeavoured to place in your mind the two great principles of geology: first, that the earth's crust is a fabricated article, produced in the laboratory of a stupendous chemistry, according to the fixed laws of the supreme Contriver and Intelligent Maker of the whole; and secondly, that the article thus fabricated has been from the beginning, and at successive periods, disturbed, altered, and dislocated by agencies from within itself.

In the course of the lessons on which you are next to enter, you will find how the crust of the earth has been affected and modified by volcanoes, by the waters of seas and rivers, by organic life, by vegetation, by ice and snow, and by other means and agencies.

LESSONS IN FRENCH.—No. XIV.

By Professor Louis Fasquelle, LL.D.

Section XXX.

Relative Pronouns (§ 38).

1. **Qui**, used as nominative, may relate to persons or to things:—

Les fleurs qui sont dans votre jardin. *The flowers which are in your garden.*

2. Qui, used as the object of a verb, can only be said of persons. It is used interrogatively with or without a preposition:—

Qui votre frère voit il?	*Whom does your brother see?*
De qui parlez vous ce matin?	*Of whom do you speak this morning?*

3. Que may be said of persons or things. It can never be understood, and must be repeated before every verb [Sect. 18. 1].

Les personnes que nous voyons.	*The persons whom we see.*
Les langues que nous apprenons.	*The languages which we learn.*

4. Ce que is employed for *that which*, or its equivalent *what*:

Ce que vous apprenez est utile.	*That which you learn is useful.*
Trouvez vous ce que vous cherchez.	*Do you find what you seek?*

5. Que answers to the English pronoun *what*, used absolutely before a verb:—

Que pensez vous de cela?	*What do you think of that?*

6. Quoi, when not used as an exclamation, is generally preceded by a preposition, and relates only to things:—

De quoi voulez vous parler?	*Of what do you wish to speak?*
A quoi pensez vous?	*Of what do you think?*

7. Lequel, m. laquelle, f. lesquels, m.p. lesquelles, f.p. *which*, or *which one* [Sect. 17. 6], or *which ones*, relate to persons or things. They may be preceded by a preposition:—

Lequel avez vous apporté?	*Which one have you brought?*
Duquel parlez vous?	*Of which one do you speak?*

8. Dont, *of which*, or *of whom*, *whose*, may relate to persons or things, in the masculine or feminine, singular or plural. It can never be used absolutely, and must always be preceded by an antecedent. It is preferable to de qui or duquel, &c.

Les fleurs dont vous me parlez.	*The flowers of which you speak to me.*
Les demoiselles dont votre sœur vous parle.	*The young ladies of whom your sister speaks to you.*

9. Present of the Indicative of the Irregular Verbs.

Di-re, 4. *to say.*	Fai-re, 4. *to make, to do.*	Mett-re, 4. *to put.*
Je dis, *I say, do say,* or *am saying.*	Je fais, *I make* or *do, I am making* or *doing.*	Je mets, *I put, do put,* or *am putting.*
Tu dis,	Tu fais,	Tu mets,
Il dit,	Il fait,	Il met,
Nous disons,	Nous faisons,	Nous mettons,
Vous dites,	Vous faites,	Vous mettez,
Ils disent,	Ils font.	Ils mettent.

Resumé of Examples.

Connaissez vous le monsieur qui parle à notre cousin?	*Do you know the gentleman who speaks to our cousin?*
Je connais celui qui lui parle.	*I know him who speaks to him.*
Comprenez vous ce que je vous dis?	*Do you understand what I say to you?*
Qui vous a parlé de cette affaire?	*Who has spoken to you of this affair?*
L'Anglais dont vous parlez est ici.	*The Englishman of whom you speak is here.*
L'Espagnol dont la sœur est ici.	*The Spaniard whose sister is here.*
Que faites vous ce matin?	*What do you do this morning?*
Que dites vous à notre ami?	*What do you say to our friend?*
Nous faisons ce que vous nous dites.	*We do that which you say to us.*
Pour qui faites vous cet habit?	*For whom do you make this coat?*
De quoi parlez vous à votre frère?	*Of what do you speak to your brother?*
Nous faisons ce que nous pouvons.	*We do what we can.*
Nous parlons de ce dont vous parlez.	*We speak of that of which you speak.*

Exercise 59.

Arriv-er, 1, *to arrive.*	Habillement, m. *dress, clothes.*	Plaisir, m. *pleasure.*
Avec, *with.*		Presque, *almost.*
Coffre, m. *trunk.*	Hollandais, e, *Dutch.*	Rien, *nothing.*
Command-er, 1, *to order.*	Linge, m. *linen.*	Soulier, m. *shoe.*
Ecossais, e, *Scotch.*	Monsieur, m. *gentleman.*	Vrai, e, *true.*
Enfant, m. *child.*	Nom, m. *name.*	

1. Qui connaissez vous? 2. Nous connaissons les Hollandais dont vous nous parlez. 3. Quelles leçons apprenez vous? 4. Nous apprenons les leçons que vous nous recommandez. 5. Ce que je vous dis est il vrai. 6. Ce que vous nous dites est vrai. 7. De qui nous parlez vous? 8. Nous vous parlons des Ecossais qui viennent d'arriver. 9. Savez vous qui vient d'arriver? 10. Je sais que le monsieur que votre frère connait vient d'arriver. 11. Vos sœurs que font elles? 12. Elles ne font presque rien, elles n'ont presque rien à faire. 13. Que mettez vous dans votre coffre? 14. Nous y mettons ce que nous avons, nos habillements et notre linge. 15. N'y mettez vous pas vos souliers? 16. Nous y mettons les souliers dont nous avons besoin. 17. De quoi avez vous besoin? 18. Nous avons besoin de ce que nous avons. 19. Cet enfant sait il ce qu'il fait? 20. Il sait ce qu'il fait et ce qu'il dit. 21. Ne voulez vous pas le leur dire? 22. Avec beaucoup de plaisir. 23. Faites vous ce que le marchand vous commande? 24. Nous faisons ce qu'il nous dit. 25. Il parle de ce dont vous parlez.

Exercise 60.

1. Have you what (*ce dont*) you want? 2. We have what we want. 3. Is the gentleman whom you know here? 4. The lady of whom you speak is here. 5. Is she just arrived? [Sect. 25. 2.] 6. She is just arrived. 7. Do you know that gentleman? 8. I know the gentleman who is speaking with your father. 9. Do you know his name? 10. I do not know his name, but I know where he lives (*demeure*). 11. What do you do every morning? 12. We do almost nothing; we have very little to do. 13. Does the tailor make your clothes? 14. He makes my clothes, my brother's, and my cousin's. 15. Do you know what you say? 16. I know what I say, and what I do. 17. Do you know the Scotchman of whom your brother speaks? 18. I know him well. 19. What does he put into his trunk? 20. He puts his clothes. 21. Is that which you say true? 22. What I say is true. 23. Do you understand that which I say to you? 24. I understand all that you say. 25. Of whom does your brother speak? 26. He speaks of the gentleman whose sister is here. 27. Is your brother wrong to do what he does? 28. He cannot be wrong to do it. 29. What are you doing? 30. I am doing that which you do. 31. Where do you put my books? 32. Into (*dans*) your brother's trunk. 33. Is your brother here? 34. He is not here. 35. He is at my brother's, or at my father's.

Section XXXI.

1. The verb mettre is used in the same sense as the English *to put on*, in speaking of garments. Mettre le couvert, means *to lay the cloth*, or *set the table*:—

Quel chapeau mettes vous?	*What hat do you put on?*
Votre frère met son habit noir.	*Your brother puts on his black coat.*
Le domestique va mettre le couvert.	*The servant is going to lay the cloth.*

2. Oter means *to take off*, *to take away*, *to take out*:—

Mon domestique ôte son chapeau.	*My servant takes off his hat.*
Otez ce livre de la table.	*Take away that book from the table.*
N'a-t-on pas ôté le dîner?	*Have they not taken away the dinner?*

3. The verb faire is used before another verb, in the sense of *to have, to cause* :—

Votre frère fait il bâtir une maison? *Does your brother have a house built?*
Il en fait bâtir plus d'une. *He has more than one built.*

4. It may be used in the same sense before its own infinitive :—

Je fais faire un habit de drap. *I have a cloth coat made.*
Vous faites faires des souliers de cuir. *You have leather shoes made.*

5. Vouloir [Sect. 27. 6] followed by dire is used in the sense of *to mean* :—

Que voulez vous dire *What do you mean?*
Votre sœur que veut elle dire? *What does your sister mean?*

Résumé of Examples.

Ne mettez vous pas vos habits?	*Do you not put on your clothes?*
J'ai peur de les gâter.	*I am afraid of spoiling them.*
Ne portez vous jamais vôtre habit noir?	*Do you never wear your black coat?*
Je le mets tous les samedis.	*I put it on every Saturday.*
Pourquoi n'ôtez vous pas votre manteau?	*Why do you not take off your cloak?*
J'ai trop froid, j'ai peur de l'ôter.	*I am too cold, I am afraid to take it off.*
Faites vous raccommoder vos souliers?	*Do you have your shoes mended?*
Je fais raccommoder mes habits.	*I have my clothes mended.*
Je fais faire une paire de bottes.	*I have a pair of boots made.*
Je fais creuser un puits.	*I have a well dug.*
Votre frère que veut il dire?	*What does your brother mean?*
Que veut dire cela?	*What does that mean?*
Cela ne veut rien dire.	*That means nothing.*
Otez vous vos souliers et vos bas?	*Do you take off your shoes and stockings?*
Je n'ôte ni les uns ni les autres.	*I take off neither these nor those.*
Le dîner est prêt; le domestique va mettre le couvert.	*Dinner is ready; the servant is going to lay the cloth.*
Voulez vous ôter le couvert?	*Will you take away the things from the table?*
Je vais mettre le couvert.	*I am going to lay the cloth.*
Je vais ôter le couvert.	*I am going to take away the things.*

Exercise 61.

Apothicaire, m. *druggist.*	Gât-er, 1. *to spoil.*	Prêt, e, *ready.*
Après, *after.*	Gilet, m. *waistcoat.*	Raccommod-er, 1, *to mend.*
Cave, f. *cellar.*	Grand, e, *large, very.*	Tout-à-l'heure, *immediately.*
Creus-er, 1. *to dig.*	Noir, e, *black.*	Uniforme, m. *uniform.*
Dimanche, m. *Sunday.*	Pantoufle, f. *slipper.*	Velours, m. *velvet.*
Dîner, m. *dinner.*	Pourquoi, *why.*	
Fâché, e, *sorry, angry.*		

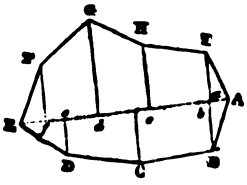
1. Le général N. met il son uniforme? 2. Il ne le met point. 3. Pourquoi ne portez vous point votre manteau noir? 4. J'ai peur de le gâter. 5. Mettez vous vos souliers de satin tous les matins? 6. Je ne les mets que les dimanches. 7. Il est midi; le domestique met il le couvert? 8. Il ne le met pas encore; il va le mettre tout-à-l'heure. 9. Le dîner n'est il pas prêt? 10. Le domestique ôte-t-il le couvert? 11. Il ne l'ôte pas encore, il n'a pas le temps de l'ôter. 12. Otez vous votre habit quand vous avez chaud? 13. Je l'ôte quand j'ai trop chaud. 14. Faites vous faire un habit de drap? 15. Je fais faire un habit de drap et un gilet de satin noir. 16. Ne faites vous point raccommoder vos pantoufles de velours? 17. Ne faites vous pas creuser une cave? 18. Je fais creuser une grande cave. 19. L'apothicaire que veut il dire? 20. Il veut dire qu'il a besoin d'argent. 21. Savez vous ce que cela veut dire? 22. Cela veut dire que votre frère est fâché contre vous. 23. Avez vous envie de mettre votre manteau? 24. J'ai l'intention de la mettre, car j'ai grand froid. 25. Je vais l'ôter, car j'ai chaud.

Exercise 62.

1. Do you take off your coat? 2. I do not take off my coat, I put it on. 3. Do you take off your cloak when you are cold? 4. When I am cold I put it on. 5. Does your little boy take off his shoes and stockings? [§ 21 (4).] 6. He takes them off, but he is going to put them on again (*remettre*). 7. Does that little girl lay the cloth? 8. She lays the cloth every day at noon (*midi*). 9. Does she take away the things after dinner? 10. She takes away the things every day. 11. Do you intend to have a coat made? 12. I intend to have a coat made. 13. I am going to have a coat and a vest made. 14. Does your brother have his boots mended? 15. He has them mended. 16. What does your son mean? 17. I do not know what he means. 18. Is he angry with me or with my brother? 19. He is neither angry with you nor with your brother. 20. Is he afraid to spoil his coat? 21. He is not afraid to spoil it. 22. Does the druggist want money? 23. He does not want money. 24. Has your sister taken my book from the table? 25. She has not taken it away. 26. Why do you take off your shoes? 27. I take them off because they hurt me (*gênent*). 28. Do you intend to have a house built? 29. I intend to have one built. 30. Does the tailor spoil your coat? 31. He does not spoil it. 32. Who spoils your clothes? 33. No person spoils them. 34. What hat do you wear? 35. I wear a black hat.

LESSONS IN GEOMETRY.—No. VII.

Having, in the preceding lesson, given some account of the nature of the apparatus and instruments used in surveying, we now proceed to explain more particularly the nature of their application to actual practice. Let us begin with the most simple,—namely, the chain and surveying cross. A B C D E F G H I is the representation of a field, and of the manner of measuring a base line within it, and the perpendiculars drawn to it from every corner. This figure is divided into several triangles and trapezoids, and their sides are taken parallel to each other, and perpendicular to the base-line, on each side. The method of measuring in the field is as follows:—Set up a picket or station-staff at each end of the base-line to be measured, that is, at A and E, and beginning at A, measure with the chain in the direction from A to E, using the sights of the cross for the purpose of preserving the measurement constantly in that direction. While this process advances, find, by the use of the cross, the different places along the base-line where perpendiculars would be drawn to it from the several corners or bends in the boundary of the field on both sides,—viz., from I, H, G, and F, on the one side; and from B, C, and D, on the other side. These perpendiculars are to be measured at once by the chain as soon as their places are found, by using the sights of the cross, before the rest of the base-line is measured, in order to save time and ensure accuracy. The proper places from which they are to be measured, will be found by the cross after a few trials, by viewing both ends of the line through one pair of sights, and the corners or bends in the boundary of the field, through the other pair of sights; for it will be impossible to see the extremities of the base-line A and E, and any corner such as G, to which the measurement is to be made, or the picket placed there, unless the exact spot as *d*, of the perpendicular G *d* is found. In measuring these perpendiculars *a* I, *c* H, *d* G, and *f* F, on the one side; and *b* B, *g* C, and *e* D, on the other; one of the assistants keeps a book to record the observations as they proceed. Sometimes a rough sketch is made of the field as it appears to the eye, or as it is suggested by the measurements, and the measurements are marked on the corresponding lines drawn on the sketch. Both are useful, and both should be practised. The following is the form of the field-book in the present instance, where the measurements are marked in links of a chain.



FIELD-BOOK.

Offsets.	Left.	Base-line A E.	Offsets. Right.
	0	station A	0
		A *a* 200	*a* I 530
b B	630	A *b* 210	
		A *c* 850	*c* H 700
g C	560	A *g* 1010	
		A *d* 1400	*d* G 1020
e D	370	A *e* 1770	
		A *f* 1960	*f* F 600
		A E 2230	

From this field-book, the necessary numbers for calculating the contents or area of the field are easily found, and the computation made in the following manner.

First, for the areas on the right of the base line:

1st. For the area of the triangle A a I.

Offset or perpendicular a I	530
Base A a	200
Double area of the triangle A a I	106000 product.

2nd. For the area of the trapezoid a I H c.

Offset or parallel side a I	530
Offset or parallel side c H	700
Sum of the parallel sides	1230
Perpendicular distance a c	650
	615
	738
Double area of the trapezoid a I H c	799500 product.

The perpendicular distance here a c is found by subtracting the length of A a from that of A c; thus 850—200=650.

3rd. For the area of the trapezoid c H G d.

Offset or parallel side c H	700
Offset or parallel side d G	1020
Sum of the parallel sides	1720
Perpendicular distance c d	550
	860
	860
Double area of the trapezoid c H G d	946000 product.

The perpendicular distance here c d is found by subtracting the length of A c from that of A d; thus, 1400—850=550.

4th. For the area of the trapezoid d G F f.

Offset or parallel side d G	1020
Offset or parallel side f F	600
Sum of the parallel sides	1620
Perpendicular distance d f	560
	972
	810
Double area of the trapezoid d G F f	907200 product.

The perpendicular distance here d f is found by subtracting the length of A d from that of A f; thus, 1960—1400=560.

5th. For the area of the triangle f F E.

Offset or perpendicular f F	600
Base f E	270
Double area of the triangle f F E	162000 product.

The base f E, is thus found; take A f from A E, 2230—1960=270.

Double Areas on the right of the Base line.

Of the triangle A a I	106000
Of the trapezium a I H c	799500
Of the trapezium c H G d	946000
Of the trapezium d G F f	907200
Of the triangle f F E	162000
Sum of these double areas	2920700

Next, for the areas on the left of the base line:—

1st. For the area of the triangle A b B.

Offset or perpendicular b B	530
Base A b	210
	53
	106
Double area of the triangle A b B	111300 product.

2nd. For the area of the trapezoid b B C g.

Offset or parallel side b B	530
Offset or parallel side g C	560
Sum of the parallel sides	1090
Perpendicular distance b g	800
Double area of the trapezoid b B C g	872000 product.

Here the length of the perpendicular distance b g is found by subtracting the length of A b from that of A g: thus, 1010—210=800.

3rd. For the area of the trapezoid g C D e.

Offset or parallel side g C	560
Offset or parallel side e D	370
Sum of the parallel sides	930
Perpendicular distance g e	760
	558
	651
Double area of the trapezoid g C D e	706800 product.

Here the perpendicular distance g e is found by subtracting the length of A g from that of A e: thus, 1770—1010=760.

4th. For the area of the triangle D e E.

Offset, or perpendicular e D	370
Base e E	460
	222
	148
Double area of the triangle D e E	170200 product.

The base e E is found by taking A e from A E; thus 2230—1770=460.

Double areas on the left of the base line.

Of the triangle A b B	111300
Of the trapezoid b B C g	872000
Of the trapezoid g C D e	706800
Of the triangle D e E	170200
Sum of these double areas	1860300

Sum of double areas on the right	2920700
Sum of double areas on the left	1860300
Sum of double areas in all	4781000
2) 4781000	
Area of the field	2390500 square links.

Now as a square chain is 10000 square links; for 100×100=10000. And as 10 squares make an acre; it is plain that 100000 square links make an acre. Hence, the following simple operation for converting the square links into acres, roods, poles, &c.

Acres	23|90500
	4
Roods	3|62000
	40
Poles	24|80000
	30¼
	2400000
	20000
Square yards	24|20000

Area of the field A B C D E F G I, 23 ac., 3 ro., 24 po., 24 sq. yds.

LESSONS IN LATIN.—No. XIV.

By JOHN R. BEARD, D.D.

THE LATIN VERB.

IN form, the Latin verb has two chief divisions—1, *active;* 2, *passive.* Thus laudo is *I praise,* in the active voice, and laudor, *I am praised,* in the passive voice. There are some verbs which, though *passive* in form, are *active* in signification; as, hortor, *I encourage.* The ending in *r* shows that hortor is of the passive form. This form, the verb, so to say, lays down, or lays aside, and hence it is called *deponent* (from de, *down,* and pono, *I put*). Deponent verbs, then, are words which, disregarding the claims of their form, have an active import, just as if they were active in form. As these verbs have an active meaning, their past participle has an active meaning; e. g.—hortatus, the past participle of hortor, is not *being encouraged,* but *having encouraged.* This past participle joins with parts of the verb sum *I am,* to form the perfect tense; thus, hortatus sum, means *I have encouraged.* There are deponent verbs in all four conjugations.

The tenses of the verb in Latin are pretty much the same as in other languages. Thus we have PRESENT, amo, *I love,* or *I am loving;* IMPERFECT, amabam, *I was loving,* or *I did love;* PERFECT, amavi, *I loved,* or *I have loved;* PLUPERFECT, amaveram, *I had loved;* FIRST FUTURE, amabo, *I shall* or *will love;* SECOND FUTURE, amavero, *I shall have loved.*

The *present tense* denotes either an action continued in the present time, or an habitual action. The *imperfect tense* denotes an action continued in past time. The *perfect tense* has two meanings; first, it signifies an action done and completed in past time indefinitely, and from the period in past time being indefinite or undefined, it is called an *aorist,* or is said to have an *aorist* import; (*aorist* is a Greek word, denotes a tense of the Greek verb, and signifies *undefined,* or *indeterminate;*) in the second place, the *perfect tense* indicates an action which, in itself, or in its consequences, continues from the past to the

present, being somewhat the same as our phrase *I have dined*; that is, I have *just* dined; in contradistinction to the aorist *I dined*; that is, *yesterday*, or some time in the past.

The Latin has three moods, the *indicative*, or the mood of reality, the mood of simple statement; the *subjunctive*, or mood of dependence; the *imperative*, or mood of command. Mood is a Latin word (modus), signifying *measure* or *manner*. It is found in the French term *mode*, sometimes used in English. The term *mood*, therefore, denotes the modes or manners in which a statement is made. All propositions may be reduced to two general classes; they are either *independent* or dependent. The independent are in the *indicative* mood; that is, the mood which simply indicates or points out. The dependent are in the *subjunctive*. The word subjunctive (Latin, sub, *under* or *to*, and jungo, *I join*) signifies *that which is subjoined*; that which is connected in the way of dependence. The subjunctive mood, consequently, is the mood which is dependent on the indicative. The *imperative* mood, though differing in form from the other two, may logically be considered as a subdivision under the *subjunctive*. How closely the subjunctive and the imperative are allied, may be seen in the fact that the subjunctive is often used for the imperative; it is so used when a kind of softened command is desired. In the older Latin grammars, you will find the *potential* mood, and even the *optative* mood; but these are mere figments; they have no corresponding reality in the language. Another form of the verb has a better claim to be termed a mood; I allude to what is called the *infinitive*, as legĕre, *to read*. This, however, might probably be more rightly described as the verb in its abstract form. If, however, it is acknowledged to be a mood, then we must say that the Latins have four moods, the *indicative*, the *subjunctive*, the *imperative*, and the *infinitive*. The *infinitive*, however, must stand in the class of dependent modes of utterance, since it makes no sense unless when joined to a verb in another mood. Thus, vult legere, *he wishes to read*. Here legere has meaning by being united with vult. Vult is said to be a *finite* word, as legere is said to be an *infinitive*; *finite* and *infinitive* are the opposites of each other. The two words come from the same Latin word finis, *end* or *limit*; the former, therefore, means the *limited*, the latter having the prefix, in, *not*, means the *unlimited*; that is, the *definite* and the *indefinite* mood.

Another form in which the verb appears is the *participle*. In Latin there are *four* participles; 1, the *active* ending in *ns*, as amans, *loving*; 2, the *passive* ending in *tus*, as amatus, *loved*; 3, the *future* ending in *rus*, as amatūrus, *about to love*; and 4, the corresponding *passive* participle which ends in *dus*, as amandus, *to be loved*,—that is, *he who ought to be loved*. The usages connected with these participles will be set forth hereafter. The Latins have no active participle of past time, they cannot by means of a participle say *having loved*. But the past participles of their deponent verbs have an active signification, since the verbs themselves have an active signification; thus, hortatus means *having exhorted*.

Connected in form with the passive participle in *dus*, is what in Latin is called the *gerund*, as, amandum, which wears the appearance of being the neuter singular of the participle amandus. The gerund exists in the nominative as amandum, in the genitive as amandi, and in the dative and ablative as amando. It is not easy to set forth the distinctive meaning of the gerund in one English term. Its proper and full force must be learnt in reading Latin prose. I place before you a few instances of its use.

GERUND.

Scribendum est,	*one must write*
Scribendi ars,	*the art of writing*
Scribendo aptus est,	*he is ready at writing*
Inter scribendum,	*during writing*
Scribendo exerceor,	*I am exercised in writing*

Hence, you see that the *gerund* denotes under certain circumstances the whole act implied in the verb, as here the act of writing. Yet is it nearly connected in meaning as in form with participles. Similar indeed is the case with our word *writing*; and generally our active participles in *ing*, besides having a participial force, assume now a *verbal*, and now a *substantive* force; a *verbal*, as, *in writing the letter, say, &c.*,—that is, *while you write*, or *when you write*; a substantive force, as, *the writing is bad*.

As in form the *gerund*, so also the *supine* is peculiar to the Latin tongue. There are *two supines*, one ending in *um*, as amatum, *in order to love*; the other ending in *u*, as amatu, *to love*, or *to be loved*; the former is called the *first*; the latter, the *second*. The former is used after verbs of motion; the latter is used after certain adjectives; thus:

SUPINES.

1st.	Venio rogātum,	*I come in order to ask*
2nd.	Jucunda audītu,	*Pleasant to hear* or *to be heard*

You may see here an illustration of the propriety of my questioning whether the *infinitive* should be designated a mood. If it is a mood, is not the *supine* equally a mood? And if you admit the claims of the *supine*, can you deny the claims of the *gerund*? But if the *gerund* is a mood, equally is the *participle* a mood. Properly there can be no mode or manner of utterance where there is not a complete utterance; that is to say, moods imply propositions, without a proposition there is no mood. If so the *infinitive* can be called a mood only by some latitude of expression.

These then are the forms of the verb which you have to understand, to recognise, to construe, to form, and to employ in Latin. I will here recapitulate them:—

TWO VOICES.

1. *Active.* 2. *Passive.*

Deponent belonging to the passive in form and to the active in meaning.

SIX TENSES.

1. *Present.* 2. *Perfect;* 3. *Imperfect;* 4. *Pluperfect;* 5. *First Future.* 6. *Second Future*, or *Future Perfect.*

THREE MOODS.

1. The *Indicative.* 2. The *Subjunctive.* 3. The *Imperative.*

FOUR OTHER FORMS.

1. The *infinitive.* 2. The *participle.* 3. The *gerund.* 4. The *supine.*

In all, fifteen varieties of expression enter into the Latin verb. You are not to suppose that every verb has all these forms. Even when the Latin was a living language, some verbs, many verbs, were defective, that is, lacked some of the ordinary forms. We, however, are bound to write the language as we find it written in the remains of Roman literature, and so are restricted to forms which actually occur in extant Latin writings; and as poetry has its licences, so are we obliged, in order to be correct, to confine ourselves to the usages of the best prose writers. In general, *Cicero* is the model to be followed.

Verbs which have been above described as active, may also be called *transitive*; that is, *active* in voice, and *transitive* in import; thus, laudo puerum, *I praise the boy*, is a transitive verb, because the action of the verb passes over (trans, *across, over*, and eo, *I go*) to the object, puĕrum. As some verbs are *transitive*, others are *intransitive*, or *not transitive*. Such is dormio, *I sleep*, in which no action passes over to an object. *Intransitives* are sometimes called *neuters*; that is, neither active nor passive. When they have a passive form, they bear the name of *neuter passives*; as, ausus sum, *I have ventured*; gavisus sum, *I have rejoiced*. Sometimes a verb, in the passive form, has a *reflective* force, and may be Englished by a neuter or intransitive verb; as, moveor, *I move myself*, or simply, *I move*. A few active forms have a passive signification; as, vapulo, *I am beaten*; veneo, *I am sold*. Somewhat similar is fio (factus sum, fieri), *I become, I pass from one state into another; I am made*.

The tenses may be divided into three classes; thus:

I.	PRESENT TIME	the action incomplete	*Present*
		the action complete	*Perfect*
II.	PAST TIME	the action incomplete	*Imperfect*
		the action complete	*Pluperfect*
III.	FUTURE TIME	the action incomplete	*First future*
		the action complete	*Second future*

You thus see that there are three forms of complete action, and three of incomplete:

INCOMPLETE	1 scribo, *I write* or *am writing*	PRESENT
	2 scribebam, *I did write* or *was writing*	IMPERFECT
	3 scribam, *I shall write* or *shall be writing*	FUTURE
COMPLETE	1 scripsi, *I have written*	PERFECT
	2 scripseram, *I had written*	PLUPERFECT
	3 scripsero, *I shall have written*	SECOND (OR PERFECT) FUTURE

The natural sequence of our ideas requires a corresponding sequence of tenses. We do not in thought suddenly pass from the present to the past in the same sentence, or in the same member of a sentence. Consequently we must avoid doing so in the

employment of the tenses. The tenses may be divided into pairs,—namely, *similar* and *dissimilar*; e.g.:—

Similar Tenses.		Dissimilar Tenses.	
Present	Present	Present	Imperfect
Present	Perfect present	Perfect present	Imperfect
Imperfect	Imperfect	Pluperfect	Perfect present
Imperfect	Pluperfect		

Now *similar* tenses should *follow* each other, and not *dissimilar* ones. That is, if you use one present use another; if you use a present do not let an imperfect immediately follow. Observe, however, that the present infinitive may come after a finite verb in the imperfect tense, as solebat scribere, *he was wont to write*. The rule I have now given relates to what is called the consecutio temporum, or *sequence of tenses*. Compare the third Latin-English exercise, after the conjugation of the verb esse.

It will be convenient here to present the verb Esse, *to be*, in full. This verb is sometimes called an *auxiliary* verb, as by its *aid* (auxilium) parts of other verbs are formed. It is also called the *substantive* verb, as in its essence it denotes *being* or *substance*.

Conjugation of Esse—To Be.

Chief parts, Sum, fui, esse.

		Indicative.	Subjunctive.	Imperative.	Infinitive.	Participle.
Present.	*Singular.*	sum, *I am* es, *thou art* est, *he is*	sim, *I may be* sis, *thou mayest be* sit, *he may be*	es *or* esto, *be thou* esto, *let him be*	esse, *to be*	ens, *being* (not used in good Latin, but found in the compound *praesens*)
	Plural.	sŭmus, *we are* estis, *you are* sunt, *they are*	sĭmus, *we may be* sĭtis, *ye may be* sint, *they may be*	este *or* estóte, *be ye* sunto, *let them be*		
Imperfect.	*Singular.*	ĕram, *I was* eras, *thou wast* erat, *he was*	essem, *I might be* esses, *thou mightest be* esset, *he might be*			
	Plural.	erámus, *we were* erátis, *ye were* erant, *they were*	essémus, *we might be* essétis, *ye might be* essent, *they might be*			
Perfect.	*Singular.*	fui, *I have been* fuisti, *thou hast been* fuit, *he has been*	fúerim, *I may have been* fúeris, *thou mayest have been* fúerit, *he may have been*		fuisse, *to have been*	
	Plural.	fuĭmus, *we have been* fuistis, *ye have been* fuérunt, *they have been*	fúerimus, *we may have been* fúeritis, *ye may have been* fúerint, *they may have been*			
Pluperfect	*Singular.*	fuĕram, *I had been* fuĕras, *thou hadst been* ffuĕrat, *he had been*	fúissem, *I might have been* fúisses, *thou mightest have been* fúisset, *he might have been*			
	Plural.	fuerámus, *we had been* fuerátis, *ye had been* fuĕrant, *they had been*	fuissémus, *we might have been* fuissétis, *ye might have been* fuissént, *they might have been*			
Future.	*Singular.*	ĕro, *I shall be* eris, *thou shalt be* erit, *he shall be*			futúrum (am, um) esse, *to be about to be*	futúrus, a, um, *about to be*
	Plural.	erĭmus, *we shall be* erĭtis, *ye shall be* erunt, *they shall be*				
Future-Perfect.	*Singular.*	fúero, *I shall have been* fúeris, *thou shalt have been* fúerit, *he shall have been*				
	Plural.	fúerimus, *we shall have been* fúeritis, *ye shall have been* fúerint, *they shall have been*				

LESSONS IN NATURAL HISTORY.—No. V.

THE DOGS OF TURKEY AND OF THE COASTS OF THE POLAR SEA—THE SPOTTED DOG—THE GREYHOUND.

The dogs of Constantinople belong to everybody and to nobody; the streets are their homes; their appearance is between that of a wolf and a jackal. Though exposed to a rigorous winter and the casualties of a large city; and though actually littered and reared in the streets, the species is surprisingly continued. As the Turks throw the leavings of their kitchens out of doors, the streets would be very soon impassable, were it not for the scavenger-like propensities of the dogs and the storks, assisted occasionally by vultures. As they subsist entirely on charity and what they pick up, instinct leads to a remarkable course; for the dogs divide the city and the suburbs into districts, and to these they pertinaciously adhere. Were a dog found in a strange quarter, he would infallibly be torn in pieces by the resident dogs; and so well are they aware of this, that even a bone of roast meat—tempting as it is—will not induce a dog to follow a person beyond his district. Mr. Slade, a traveller, says,—"We caressed for experiment one of these animals; we daily fed him till he became fat and sleek, and carried his tail high, and was no longer to be recognised as his former self. With his physical and his moral qualities improved, he

lost his currishness, and when his patrons approached, expressed his gratitude by licking their hands, yet he would never follow them beyond an imaginary limit either way, where he would stop, wag his tail, look wistfully after them till they were out of sight, and then return to his post. Only once I saw him overstep his limit; he was very hungry, and we were alluring him with tempting food; but he had not exceeded twenty yards, when he recollected himself and ran hastily back."

THE DALMATIAN COACH-DOG.

The companion of man in all climates, from the islands of the South Sea, where the dog feeds on bananas, to the Polar Sea, where his food is fish, he plays a part in the high north latitudes, to which he is unaccustomed in more favoured regions. On all the coasts of the Polar Sea, from the Obi to Behring's Straits, in Greenland, Kamtschatka, and in the Kurile Islands, the dogs are made to draw the sledges loaded with persons and goods, and that for considerable journeys. Those born in winter enter on their training—which is a particular art—in the following autumn, but are not used in long journeys until the third year. Much skill is required in driving and guiding them.

The best-trained dogs are used as leaders, and as the quick and steady going of the team, as well as the safety of the traveller, depend on the docility and sagacity of the leader, they are taught always to obey the master's voice, and to keep their course when they come on the scent of game. This last is, as may be supposed, a point of great difficulty. Sometimes, the whole team, usually of twelve dogs, will start off under this impulse, and no endeavours on the part of the driver can stop them. At such times, the cleverness of the well-trained leader is singularly apparent; as he endeavours to turn other dogs from their pursuit; and if other devices fail, he will suddenly wheel round, and by barking, as if he had come on a new scent, try to induce his companions to follow him. In travelling in dark nights, or when the vast plain is veiled with impenetrable mist, and even in storms and snow tempests, the good leader, if he has ever been in this plain, and has stopped at a hut with his master, will be sure to reach the place wherever it is, and if buried in the snow, will stop and indicate significantly where his master must dig. Nor are the dogs without their use in summer: they tow the boats up the rivers, and instantly obey their master's voice, either in halting or in changing the bank of the river. On hearing his call they plunge into the water, draw the towing-line after them, and swim after the boat to the opposite shore; and on reaching it, replace themselves in order, and wait the command to go on. These dogs strongly resemble the wolf. They have long pointed, projecting noses, sharp and upright ears, and a large bushy tail; some have smooth, and others have curly hair: their colour is various—black, brown, reddish brown, white, or spotted. They vary also in size.

THE SPOTTED DOG.

There are two breeds of spotted dogs—the Dalmatian and the Danish; the latter being much smaller than the former. The Dalmatian is used in his native country in the chase, but in England he has never been so employed. He is said to have little sagacity or power of nose; but is fond of horses, and may often be observed gambolling about those that draw the carriages of the rich. This race is elegant in form; the body is generally white, and marked with numerous small round black, or reddish brown spots.

THE GRECIAN GREYHOUND.

THE GREYHOUND.

There exist representations of the greyhound race more than three thousand years old. The whole body is narrow and slender, the ears light and semi-pendulous, the neck long, the chest deep, the limbs slender and greatly lengthened, the back very considerably arched, the whole structure evincing the greatest elegance, and giving to the animal more swiftness than any other carnivorous beast. Destined to be hunters on open plains, their eyes are prominent and clear, but the power of scent not being wanted as in many other creatures, the respiratory organs are unusually free. English greyhounds have been known to run eight miles in twelve minutes time, not including a variety of turns and doublings, necessarily checking the velocity and increasing the exertion, while the hare that has been pursued, has then dropped dead. In other instances two greyhounds and the hare have been found lying dead

together. The principal differences between the Grecian and the English greyhound are that the former is not so large, the muzzle is not so pointed, and the limbs are not so finely formed.

Greyhounds appear to have changed the nature of their hair, according to the climate they originally inhabited. The Russian and Tartar have long and shaggy hair; the hair is rough in Syria, Germany, and Hungary; it is silky in the Deccan, Persia, Natolia, and Greece; and smooth in southern India, Arabia, Egypt, the Greek islands, and southern and western Europe. In Roumelia, the Turks have a breed with smooth hair, but with long-haired ears, like those of a spaniel. But in the west, the smooth coat is the result of importation; for the native races were rugged, until the French kings, down to Louis XV., began to introduce the more graceful breeds from Constantinople, Crete, and even from Alexandria.

THE GREYHOUND.

Very considerable differences have appeared even in the United Kingdom. According to Mr. Blaine, "Scotland, a northern locality, has long been celebrated for its greyhounds, which are known to be large and wiry-coated. They are probably types of the early Celtic greyhounds, which, yielding to the influences of a colder climate than they came from, became coated with a thick and wiry hair. In Ireland, as being milder in its climate, the frame expanded in bulk, and the coat, although not altogether, was yet less crisped and wiry. In both localities, there being at that time boars, wolves, and even bears, powerful dogs were required. In England these wild beasts were more early exterminated, and consequently the same kind of dog was not retained, but, on the contrary, was by culture made finer in coat, and of greater beauty in form.

Before we pass on the question should be noticed,—

"Seest thou the gasehound, how with glance severe,
From the close herd he marks the destined deer?"

This dog, in former times, was probably allied to, or connected with, the Irish greyhound. It hunted entirely by sight; and if the deer was lost, and then rejoined his companions, the dog unerringly selected him from all the herd. No dog of this quality is, at present, known in Europe.

The greyhound has been charged with wanting attachment, so commonly discoverable in other dogs, but circumstances have, probably, been wanting to awaken and sustain it. This accords with the statement of the younger Xenophon:—"I have myself bred up a swift, hard-working, courageous, sound-footed dog. He is most gentle and kindly affectioned; and never before had I any such a dog for myself, or my friend, or my fellow-sportsman. When he is not actually engaged in coursing, he is never away from me. On his return he runs before me, often looking back to see whether I had turned out of the road, and as soon as he again catches sight of me, showing symptoms of joy, and once more trotting away before me. If a short time only has passed since he has seen me or my friend, he jumps up repeatedly by way of salutation, and barks with joy as a greeting to us. He has also many different sorts of speech, and such as I never heard from any other dog. Now, really, I do not think I ought to be ashamed to chronicle the name of this dog, or to let posterity know that Xenophon, the Athenian, had a greyhound, called Hormé, possessed of the greatest speed, and intelligence and fidelity, and excellent in every point."

The story of Gelert is deeply affecting. Llewellyn was at the chase of hart and hare, but it was little enjoyed, and scant and small was the booty from the absence of

"The flower of all his race!"

Returning home, Gelert bounded to meet his lord, but his lips and fangs ran blood, and for Llewellyn there was a fearful sight:—

"O'erturn'd his infant's bed, he found
The blood-stained covert rent;
And all around the walls and ground
With recent blood besprent.

He call'd his child—no voice replied;
He search'd—with terror wild;
Blood! blood! he found on every side,
But nowhere found the child!

'Hell-hound! by thee my child's devour'd!'
The frantic father cried:
And to the hilt, his vengeful sword
He plunged in Gelert's side!

Aroused by Gelert's dying yell,
Some slumberer waken'd nigh:
What words the parent's joy can tell,
To hear his infant's cry!

Conceal'd beneath a mangled heap,
His hurried search had miss'd,
All glowing from his rosy sleep,
His cherub boy he kiss'd!

Nor scratch had he, nor harm, nor dread—
But, the same couch beneath,
Lay a great wolf, all torn and dead—
Tremendous still in death!

Ah! what was then Llewellyn's pain!
For now the truth was clear:
The gallant hound the wolf had slain,
To save Llewellyn's *heir*."

LESSONS IN GERMAN.—No. V

Section XII.

Adjectives denoting the material of which a thing is made, are formed by suffixing to nouns the letters *n*, *en*, or *ern*. Ex.: Leder, ledern (leather, leathern); Gold, golden (gold, golden); Blei, bleiern (lead, leaden), &c. If the root vowel be *a*, *o*, or *u*, it is frequently changed to its corresponding Umlaut. Ex.: Glas gläsern (glass; made of glass); Holz, hölzern (wood, wooden). (See Sect. 2. 12, *ae*, &c.)

Exercise 12.

Becher, *m.* cup, beaker;	Koch, *m.* cook;	Reif, ripe;
Bleiern, leaden;	Kupfern, copper;	Silbern, silver;
Bleistift, *m.* pencil;	Marmorn, marble;	Tintenfaß, *n.* inkstand;
Eisern, iron;	Mein, my;	Tisch, *m.* table;
Faß, *n.* barrel, cask;	Mörser, *m.* mortar;	Tischler, *m.* joiner;
Fleißig, diligent;	Obst, *n.* fruit;	Vetter, *m.* cousin;
Hölzern, wooden;	Obstmesser, *n.* fruit-knife;	Weder—noch, neither—nor.
Kessel, *m.* kettle, boiler;		

Ihr silberner Löffel ist schön, und mein eisernes Messer ist schwer.	Your silver spoon is beautiful, and my iron knife is heavy.
Dieser steinerne Tisch ist schwer.	This stone table is heavy.

Das Leben des Kindes ist ein goldner Traum.	The life of the child is a golden dream.
Ist nicht ein eisernes Schiff dauerhaft?	Is not an iron ship durable?

1. Haben Sie mein reifes Obst? 2. Nein, ich habe Ihr silbernes Obstmesser, und Ihr alter Freund, der Lehrer, hat das reife Obst. 3. Haben Sie meinen silbernen Bleistift? 4. Nein, der gute Lehrer hat ihn. 5. Hat der alte Koch meinen hölzernen Tisch? 6. Nein, der Tischler hat ihn, aber der Koch hat einen marmornen Tisch. 7. Hat er auch ein hölzernes Faß? 8. Ja, und dieser fleißige Schüler hat ein schönes bleiernes Tintenfaß. 9. Hat er auch einen silbernen Becher? 10. Ja, und er hat auch einen kupfernen Kessel und einen eisernen Löffel. 11. Haben Sie das neue Messer meines jungen Freundes? 12. Nein, ich habe ein neues Messer von dem guten Kaufmanne. 13. Hat dieser fleißige Schüler das gute Buch des alten Freundes, oder den silbernen Bleistift seines guten Vetters? 14. Er hat weder ein gutes Buch, noch einen silbernen Bleistift — er hat nur einen hölzernen Bleistift. 15. Wo ist der kupferne Kessel des Kochs? 16. Der arme Mann hat nur einen eisernen Kessel.

1. Has she (sie) my ripe fruit. 2. The old cook has my silver (silbernen) pencil. 3. Has he also a new (neues) knife? 4. The good merchant (Kaufmann) has an old marble table. 5. He has neither a golden (goldenes) fruit-knife nor a silver (silbernen) cup. 6. Summer (Der Sommer) is a golden (eine) time. 7. The diligent joiner has the iron (eisernen) kettle of the cook.

Questions. 1. How are adjectives, denoting the *material* of which a thing is made, formed? 2. Can you give an example of such an adjective ending in n? 3. In en? 4. In ern? 5. When do changes in the radical vowel occur?

Section XIII.

THE FEMININE GENDER.

The articles in the feminine singular are declined thus:

Nom.	die, the;	(diese)	eine, a;	(meine)
Gen.	der, of the;	(dieser)	einer, of a;	(meiner).
Dat.	der, to or for the;	(dieser)	einer, to or for a;	(meiner).
Acc.	die, the.	(diese)	eine, a.	(meine).

The pupil having now had in due course all the forms of the article in the singular, may note, that like dieser (which differs from the definite article only in having es instead of as, in the nom. and acc. neuter, Sect. 7), are declined all the words in list II., Sect. 10; and that like ein, are inflected all those in the list, ein, mein, sein, &c., Sect. 11.

Feminine nouns are in the *singular* indeclinable; as, nom. die Seide (the silk), gen. der Seide, dat. der Seide, acc. die Seide.

The adjective in the *feminine singular* has two forms. When it stands alone, or unaffected by a preceding word (§ 29), the nominative and accusative end in e, the genitive and dative in er. It is then said to be of

THE OLD DECLENSION.

Nom.	Gut-e, good;	roth-e, red;
Gen.	Gut-er, of good;	roth-er, of red;
Dat.	Gut-er, to or for good;	roth-er, to or for red;
Acc.	Gut-e, good;	roth-e, red.

When preceded by either of the articles, or by any one of the adjective pronouns (see lists Sect. 10 and 11), the adjective terminates in the nominative and accusative as in the Old declension, but in the genitive and dative in the letters en. Thus:

Nom.	die gut-e, the good;	meine alt-e, my old.
Gen.	der gut-en, of the good;	meiner alt-en, of my old.
Dat.	der gut-en, to or for the good;	meiner alt-en, to my old.
Acc.	die gut-e, the good;	meine alt-e, my old;

1. The personal pronoun Sie (*you*) is always written with a capital initial, while sie (*she* or *her*) is only thus written at the beginning of a sentence. Hence in *writing*, no ambiguity can arise. Ex.: Ich sehe Sie, I see *you*; ich sehe sie, I see *her*. When sie is used in the nominative, the *form* of the *verb* determines the person. Ex.: Sie sehen ihn, *you see* him; Sie sieht ihn, *she sees* him. Whether, however, Sie (when in the accusative) stands for *you* or *her*, can only be determined by the context. The orthography of the possessive pronouns Ihr (*your*) and ihr (*her*) is, also, identical, and, in speaking, is liable to equal ambiguity. Thus, Ihr Buch ist groß, may signify, *your* book is large, or *her* book is large; and Ich habe ihr Buch, may mean, I have *your* book, or I have *her* book. The significations of sie in the accusative, and of ihr in all the cases, must of course, when spoken, be determined by the connexion. (See Declension, Sect. 18.)

Exercise 13.

America, *n.* America;	Gläsern, glass;	Schwester, *f.* sister;
Bibliothek', *f.* library;	Golden, golden;	Seide, *f.* silk;
Brille, *f.* spectacles;	Ihr, her; (See I.)	Sie, she; it;
Dame, *f.* lady;	Kein, no, not any;	Tante, *f.* aunt;
Die, the;	Kette, *f.* chain;	Uhr, *f.* watch, clock;
Feder, *f.* pen;	Lampe, *f.* lamp;	Uhr'tasche, *f.* watch-pocket.
Fein, fine;	Leinwand, *f.* linen;	
Frankreich, *n.* France;	Mutter, *f.* mother;	
Fräulein, *n.* miss, young lady;	O'pernglas, *n.* opera-glass;	
Freundin, *f.* friend;	§10 Scheere, *f.* scissors;	

Der Bruder hat das Buch der Schwester.	The brother has the book of the sister.
Der Vater giebt der Tochter ein Buch.	The father gives the daughter a book.
Der Hut meiner Mutter ist schön.	The hat of my mother is beautiful.
Wo ist die Uhr Ihrer Fräulein Cousine?	Where is *your* cousin's watch?
Sie ist in der Hand ihrer Mutter.	It is in *her* mother's hand.

1. Ist die junge Schwester dieser jungen Dame in Deutschland? 2. Nein, sie ist in Frankreich, aber ihr Bruder ist in America. 3. Wo ist meine neue goldene Feder? 4. Ihre junge Freundin, Fräulein S., hat sie (Sect. 18. III.) 5. Hat Ihre Mutter die schöne Seide Ihrer Tante? 6. Ja und auch die schöne feine Leinwand. 7. Wo ist Ihre goldene Brille? 8. Ich habe keine goldene Brille. 9. Haben Sie eine silberne, oder eine goldene Uhr? 10. Ich habe eine silberne Uhr. 11. Ist sie eine gute Uhr? 12. Ja, aber sie ist nicht sehr schön. 13. Wo ist Ihre Uhr? 14. Sie ist in meiner Uhrtasche. 15. Hat Ihre Schwester eine goldene Uhr? 16. Ja, und sie hat auch eine schöne goldene Kette. 17. Wo ist meine neue Scheere? 18. Ich habe sie, aber sie ist nicht sehr scharf. 19. Wo ist Ihre Schwester? 20. Sie ist bei der (Sect. 17. III.) Mutter in der Bibliothek. 21. Wo ist meine gläserne Lampe? 22. Ich habe sie. 23. Wer hat mein neues Opernglas? 24. Ich habe es und Ihre neue Brille.

1. The mother of this lady is in France. 2. Has the beautiful (der guten) daughter of the good (gutes) aunt a golden (goldene) watch? 3. My diligent brother has neither a golden watch nor a good (feine) opera-glass (aber neue). 4. My good sister has no fine linen, but she has a new (mit der) glass lamp (bei). 5. My cousin with the golden spectacles is with (meinem) my beautiful brother in the library.

Questions. 1. What is the characteristic termination of adjective pronouns in the *feminine* nominative? 2. According to what *two* forms of declension are *feminine* adjectives inflected? 3. Which *cases* of the two declensions are alike? 4. What is said of *feminine* nouns in the *singular*? 5. How is Sie (you) always written? 6. When is sie (she or her) written with a capital letter? 7. How can Sie be distinguished from sie in the nominative, when *spoken*? 8. How when in the accusative? 9. How is Ihr (*your*) in *writing* to be distinguished from ihr (*her*)? 10. How is sie in the accusative and ihr in all its cases to be distinguished when *spoken*?

BIOGRAPHY.—No. IV.

JAMES FERGUSON.

One of the most extraordinary instances of self-culture presented to us in the annals of biography, is that of James Ferguson, who was born in the year 1710, a few miles from the village of Keith, in Banffshire, Scotland. It was the practice of his father, who was merely a day labourer, to teach his children to read and write, as they successively reached what he considered to be the proper age. But while he was instructing one of his elder children, James was secretly occupied in listening to what was going on; and it was his practice, as soon as he was left alone, to get the book and master the lesson that had thus been given. As he felt ashamed to let his father know what he was doing, he applied to an old woman who lived in a neighbouring cottage, to solve the difficulties that arose; and in this way he actually learned to read tolerably well. His father did not find out his little son's secret, till one day, to his great surprise, he caught him in the act of reading to himself.

The roof of the cottage having partly fallen in, Mr. Ferguson applied to it a beam, resting on a prop, in the manner of a lever, and thus raised the roof again to its place. James was now about seven or eight years of age, and this circumstance set his mind to work. Again and again did he think of what had been done; and, after a while, it struck him that his father, in using the beam, had applied his strength to its extremity, and that this had, probably, much to do with the matter. He now thought he would see if this were so, and, having made several *bars* as he called them,—levers in fact,—he discovered not only that he was right in supposing it to be important to apply the moving force at the point most distant from the fulcrum; but the rule or law, that the effect of any weight made to bear on a lever, is always exactly proportioned to the distance of the point on which it rests from the fulcrum.

He says, in the highly-interesting and instructive narrative of his life, "I then thought that it was a great pity that by means of this bar, a weight could only be raised a very little way. On this, I soon imagined that by pulling round a wheel, the weight might be raised to any height, by tying a rope to the weight, and winding the rope round the axle of the wheel; and that the power gained must be just as great as the wheel was broader than the axle was thick; and found it to be exactly so, by hanging one weight to a rope put round the wheel, and another to the rope that coiled round the axle."

Here, then, we see a mere child, by the solitary and independent movements of his own mind, not only discovering, but verifying by practical experiments, two of the most important elementary truths in the science of mechanics: the lever, and the wheel and axle. Such a child could not fail to hit on others; though he was without either book or teacher, and all the tools he had to fashion his blocks and wheels, were a little knife and a simple turning-lathe of his father's. He now proceeded to write an account of his discoveries, and to sketch his different machines with a pen; concluding, naturally enough, that they were the first of the kind that had ever been invented. Some time after, however, he was shown them all in a printed book; when, though he found that his schemes had been anticipated, he could not fail to be gratified by their coincidence with well-established and highly-important principles. The honour that encircles the brow of this young philosopher is as great and indisputable, as it would have been had he stood absolutely alone in reaching such results.

The same tendencies and feelings were displayed when as a boy, far from robust, he was employed as a shepherd in the neighbourhood of his birthplace; making models of mills, spinning-wheels and other machines by day, and, like those who kept flocks beneath the clear skies of Chaldæa, studying the stars by night. He was afterwards engaged in the service of Mr. Glashan, a respectable farmer; when he used to go at night into the fields, with a blanket about him, and a lighted candle, and there, lying down on his back, he pursued his observations on the heavenly bodies, for many successive, yet happily spent hours. "I used to stretch," he says, "a thread with small beads on it, at arms-length, between my eye and the stars; sliding the beads upon it, till they hid such and such stars from my eye, in order to take their apparent distance from one another; and then, laying the thread down on a paper, I marked the stars thereon by the beads."

He thus paints himself before us, as engaged in the most sublime and astounding of sciences, and not only as employed in astronomical observations, but in actually making a map of the heavens. "My master," he adds, "first laughed at me; but when I explained my meaning to him he encouraged me to go on; and that I might make fair copies in the day-time of what I had done in the night, he often worked for me himself."

On Ferguson being employed by his master to carry a message to Mr. Gilchrist, the minister of Keith, he showed that gentleman the drawings he had been making. Mr. Gilchrist, in consequence, put a map into his hands, and desired him to make a copy of it, supplying him at the same time with compasses, ruler, pens, ink, and paper. "For this pleasant employment," he says, "my master gave me more time than I could reasonably expect, and often took the threshing flail out of my hands, and worked himself, while I sat by him in the barn, busy with my compasses, ruler, and pen." No wonder he remarks, "I shall always have a respect for the memory of that man." Nor do we envy the mind that does not sympathise with him; Mr. Glashan presents a very rare example of sincere interest in the intellectual efforts of his servant, and of real concern for his advancement in life.

Having completed his map, Ferguson carried it to Mr. Gilchrist, where he met Mr. Grant, of Achoynaney, who offered to take him into his house, and promised that he should have lessons from his butler. He replied that he should rejoice in being at the house of Mr. Grant, as soon as his engagement with his master expired, and respectfully declined Mr. Grant's kind offer to put some one for the time in his place. Ferguson was in his twentieth year when he went to Mr. Grant's, whose butler, Cantley, was what might be generally termed a self-taught, and, at the same time, an extraordinary man. He was profoundly conversant with mathematics; understood Greek, Latin, and French; could play on every known instrument, except the harp; and, moreover, could prescribe for diseases, and let blood. Ferguson, who had mastered vulgar arithmetic by the aid of books, received instructions from him in Decimal Fractions and Algebra, and he was about to commence geometry when Cantly removed from his situation to one in the establishment of the Earl of Fife, and Ferguson returned home.

It will be remembered by those who have read the biographical sketch of Alexander Murray,* how much he was indebted to "Salmon's Geographical Grammar;" and it is remarkable that a similar work by Gordon, a parting gift of his friend Cantley, was of great service to James Ferguson. The book contains a description of an artificial globe, and though it was not accompanied by any figure, Ferguson made a globe in three weeks, having turned the ball out of a piece of wood, covered it with paper, and delineated on it a map of the world; he also made the meridian ring and horizon of wood, covered them with paper, and traced upon them the proper degrees; and was delighted to find that by the globe he had constructed—the first he ever saw—he could solve the problems which the book contained.

That he might not remain idle at home, he engaged himself to a neighbouring miller, who, finding he could confide in his servant, spent his time at the alehouse, leaving Ferguson everything to do, while a little oatmeal mixed with cold water was often all he was allowed. At the close of a year he returned home, much the weaker for his privations. He suffered greatly also in the service of a medical man, who promised him instruction, but broke his engagement, and treated him tyrannically. A severe hurt which he had received, to which the doctor was too busy to attend, confined him to his bed after his return home. In order to amuse himself in his low state, he made a wooden clock, the frame of which was also of wood, and it kept time pretty well. The bell on which the hammer struck the hours was the neck of a broken bottle.

On recovering his health, Ferguson accomplished an extraordinary work, which he thus describes:—"Having no idea how any timepiece could go but by a weight and line, I wondered how a watch could go in all positions, and was sorry I had never thought of asking Mr. Cantley, who could very easily have informed me. But happening one day to see a gentleman ride by my father's house (which was close by a public road), I asked him what o'clock it then was? He looked at his watch, and

* Popular Educator, No. 8, p. 47.

told me. As he did that with so much goodnature, I begged him to show me the inside of his watch, and though he was an entire stranger, he immediately opened his watch, and put it into my hands. I saw the spring-box, with part of the chain round it, and asked him what it was that made the box turn round? He told me that it was turned round by a steel spring within it. Having then seen no other spring than that of my father's gun-lock, I asked him how a spring within a box could turn the box so often round as to wind all the chain upon it? He answered, that the spring was long and thin; that one end of it was fastened to the axis of the box, and the other end to the inside of the box; that the axle was fixed, and the box was loose upon it. I told him that I did not as yet thoroughly understand the matter.

"'Well, my lad,' says he, 'take a long, thin piece of whalebone, hold one end of it fast between your finger and thumb, and wind it round your finger, it will then endeavour to unwind itself, and if you fix the other end of it to the inside of a small hoop, and leave it to itself, it will turn the hoop round and round, and wind up a thread tied to the outside of the hoop.' I thanked the gentleman, and told him that I understood the thing very well. I then tried to make a watch with wooden wheels, and made the spring of whalebone, but found that I could not make the wheel go when the balance was put on, because the teeth of the wheels were rather too weak to bear the force of a spring sufficient to move the balance, although the wheels would run fast enough when the balance was taken off. I enclosed the whole in a wooden case, very little bigger than a breakfast teacup; but a clumsy neighbour, one day looking at my watch, happened to let it fall, and turning hastily about to pick it up set his foot upon it, and crushed it all to pieces; which so provoked my father that he was almost ready to beat the man, and discouraged me so much that I never attempted to make such another machine again, especially as I was thoroughly convinced I could never make one that would be of any real use."

Ferguson's attention to timepieces, however, was turned to some account; for he made some money in the neighbourhood, as a cleaner of clocks. He was now invited to reside in the house of Sir James Dunbar, of Durn, where he usefully employed his ingenuity. He converted two round stones upon the gateway into a pair of stationary globes, by painting a map of the earth on one, and a map of the heavens on the other. "The poles of the painted globes," he states, "stood towards the poles of the heavens; on each the twenty-four hours were placed around the equinoctial, so as to show the time of the day when the sun shone out, by the boundary where the *half* of the globe at any time enlightened by the sun, was parted from the other half in the shade; the enlightened parts of the terrestrial globe answering to the like enlightened parts of the earth at all times. So that, whenever the sun shone on the globe, one might see to what places the sun was then rising, to what places it was setting, and all the places where it was then day or night, throughout the earth."

Lady Dipple, the sister of Sir James, induced him to attempt the drawing of patterns for ladies' dresses, in which he soon became an adept. He afterwards made them for other ladies, copied pictures and prints with pen and ink, and even took portraits in Edinburgh with great success. Sometimes, too, he pursued his astronomical observations; employing his beaded threads, and delineating on paper the apparent facts of the planets as thus ascertained. On such occasions he describes himself as conceiving that he saw the ecliptic lying like a broad highway across the firmament, and the planets making their way in parts like the narrow ruts made by cart-wheels, sometimes on one side of a plain road, and sometimes on the other, crossing the road at small angles, but never going far from either side of it. His circumstances were now greatly improved by his artistic labours; and in a short time, he made so much money as not only to defray his own expenses, but to gratify the affectionate dispositions he constantly cherished, by contributing largely to the support of his aged parents.

After Ferguson had been about two years in Edinburgh, he was seized with such a passion for the practice of medicine, that he returned to his father's, intending to carry out his design in his native village. But, not succeeding as he hoped, he went to Inverness. "When I was there," he says, "I began to think of astronomy again, and was heartily sorry for having neglected it at Edinburgh, where I might have improved my knowledge by conversing with those who were able to assist me. I began to compare the ecliptic with the twelve signs, through which the sun goes in twelve months, to the circle of twelve hours on the dialplate of a watch, the hour-hand to the sun, and the minute-hand to the moon moving in the ecliptic, the one always overtaking the other in a place forwarder than it did at their last conjunction. By this I contrived and finished a scheme on paper, for showing the motions and places of the sun and moon in the ecliptic for each day of the year, perpetually; and, consequently, the times of all the new and full moons.

"To this I wanted to add a method for showing the eclipses of the sun and moon, of which I knew the cause long before by having observed that the moon was for one half of a period on the north side the ecliptic, and for the other half on the south. But not having observed her course long enough among the stars by my above-mentioned thread, so as to delineate her path on my celestial map, in order to find the two opposite points of the ecliptic in which her orbit crosses it, I was altogether at a loss how and where in the ecliptic to place my scheme, to place these interesting points. This was in the year 1739.

"At last, I recollected that when I was with 'Squire Gordon of Auchoynanery, in the year 1730, I had read, that on the 1st of January, 1690, the moon's ascending node was in the first minute of the first degree of Aries, and that her nodes* moved backward through the whole ecliptic in 18 years and 224 days, which was at the rate of three minutes 11 seconds every 24 hours. But as I scarce knew in the year 1730 what the moon's nodes meant I took no further notice of it at that time.

"However, in the year 1739, I set to work, at Inverness, and after a tedious calculation of the slow motion of the nodes from January 1690 to January 1740, it appeared to me that (I am sure I remembered right) the moon's ascending node was in 23 degrees 25 minutes of Cancer at the beginning of the year 1740. And so I added the eclipse part to my scheme, and called it the Astronomical Rotula.

"When I had finished it I showed it to the Rev. Alexander Macbean, one of the ministers at Inverness; who told me he had a set of almanacks by him for several years past. He would examine it by the eclipses mentioned in them. We examined it together, and found that it agreed throughout with the days of all the new and full moons and eclipses mentioned in these almanacks, which made me think I had constructed it upon true astronomical principles. On this Mr. Macbean desired me to write to Mr. Maclaurin, professor of mathematics at Edinburgh, and give an account of the methods by which I had formed my plan, requesting him to correct it where I was wrong. He returned me a most polite and friendly answer, although I had never seen him during my stay at Edinburgh, and informed me that I had only mistaken the radical place of the ascending node by a quarter of a degree." Maclaurin was indeed so much pleased with the result that he had the scheme engraved, and Ferguson was once more induced to return to Edinburgh.

One day, having asked the professor to show him his orrery, Maclaurin immediately complied with his request, as the outward movements of the machine were concerned. He would not venture to open it—which indeed he had never done, being afraid that if he should displace any part of it, he should not be able to put it to rights again. But Ferguson was clever enough to set his mind again in vigorous action.

After a good deal of thinking and calculation, he found he could contrive the wheel-work for turning the planets in such a machine, and giving them their progressive motions. He considered he should be very well satisfied if he could make an orrery to show the motions of the earth and moon, and of the sun round its axis. He then employed a turner to make him a sufficient number of wheels and axles, according to the terms which he gave him in drawing; and after having cut the teeth in the wheels by a knife, and put the whole together

* Nodes in Astronomy are the two points in which the orbit of a planet intersects the plane of the ecliptic,—the great circle of the heavens in the sun appears to describe in his annual revolution. The point in the centre of a planet passes from the south to the north side of the ecliptic is called the *ascending* node; the opposite point, or that in which the planet passes to the south side of the ecliptic is called the *descending* node.

found that it answered all his expectations. It showed the sun's motion round its axis, the diurnal and annual motions of the earth on its inclined axis, keeping its parallelism in its whole course round the sun; the motions and phases of the moon, with the retrograde motion of the nodes of her orbit; and, consequently, all the variety of her seasons, the different lengths of days and nights, as well as the days of the new and full moons and eclipses. He now had the honour of reading a lecture on the orrery, to Maclaurin's pupils. He subsequently made an orrery of ivory, and, in the course of his life, he constructed six more, all unlike each other.

Ferguson now resolved to visit London, hoping to find employment as a teacher of mechanics and astronomy. After his arrival, he was introduced to the Royal Society. He soon after published his first work, "A Dissertation on the Phenomena of the Harvest Moon, with the description of a new Orrery, having only four wheels." Of this work he modestly says,—"Having never had a grammatical education, nor time to study the rules of just composition, I acknowledge I was afraid to put it to press; and for the same cause, I ought to have the same fears still." It was, however, well received, and this very ingenious man sent forth various other works, most of which attained high popularity. In 1748 he began to give public lectures on his favourite themes, to numerous and fashionable admirers, among whom when a boy occasionally was George III., who, soon after his accession to the throne, granted him a pension from the privy purse, of £50 per annum. He now ceased to paint portraits, in which he had been engaged for twenty-six years. In 1763 he was elected a Fellow of the Royal Society; the usual fees being remitted, which had only been done in two other instances—those of Newton and Thomas Simpson. He died in 1776.

"Ferguson," says Dr. Hutton, "must be allowed to have been a very uncommon genius, especially in mechanical contrivances and inventions. . . . . His mathematical knowledge was little or nothing. Of algebra he understood little more than the notation; and he often told me he could never demonstrate one proposition of Euclid, his constant method being to satisfy himself as to the truth of any problem with a measurement by scale and compasses."

We can now only remark that Sir David Brewster has pronounced on Ferguson the following high but just eulogium:—

"He possessed a clear judgment, and was capable of thinking and writing on philosophical subjects with great accuracy and precision. He had a peculiar talent for simplifying what is complex, for rendering intelligible what is abstract, and for bringing down to the lowest capacities what is naturally above them. His unwearied assiduity in the acquisition of knowledge may be inferred from the great variety of his publications; and when we reflect upon the very unfavourable circumstances in which he was educated, and the little assistance he received from others, we cannot fail to wonder at the style in which all his works were composed. On some occasions his style is uncommonly correct and animated. When admiring the displays of wisdom and beneficence in the accuracy of nature, he often rises into a species of eloquence, characterised by the most artless simplicity, and infinitely more affecting than the laboured and polished periods of the professed orator. In his manners he was affable and mild; in his dispositions communicative and benevolent. He was distinguished by none of those peculiarities of temper, and eccentricities of conduct, which we generally observe in literary men. If Mr. Ferguson had any foibles, they 'leaned to virtue's side;' and even his wonderful simplicity of character, which, in a state of artificial manners, is too apt to be regarded as a failing, and exposed to ridicule and scorn, tended only to heighten the respect in which he was constantly held."

LESSONS IN ENGLISH.—No. VI.

By JOHN R. BEARD, D.D.

SAXON ELEMENT OF THE ENGLISH LANGUAGE.

HAVING shown how the constituents of the English language enter into and form simple propositions, I might now speak of sentences in relation to the laws of their constitution, and exhibit the manner in which simple sentences may be expanded into compound sentences, and how compound sentences may be reduced to simple ones. But there is much, very much, to be learnt respecting the subject-matter already set forth. For instance every separate part of speech has to be more minutely investigated. Besides there are general facts which more or less bear on all the constituent elements of speech. These facts must be set forth, and this investigation must be gone through, before we treat of the formation of compound sentences, if only, because in proceeding in this way I shall conduct the learner onward by easier steps.

Before, then, we formally set about building the house, it may be desirable to consider the materials which we shall have to employ, in order that we may become familiar with their qualities and character. Let us then take what is commonly called "The Lord's Prayer," and look a little closely into the words of which it is made up.

"Our Father which art in Heaven, hallowed be thy name. Thy kingdom come. Thy will be done in earth, as it is in Heaven. Give us this day our daily bread. And forgive us our debts as we forgive our debtors. And lead us not into temptation; but deliver us from evil. For thine is the kingdom, and the power, and the glory, for ever. Amen."—Matt. vi. 9—13.

Now at the first glance I see that here there are words of diverse origin. *Father* I recognise as of Saxon birth; *temptation*, I know to be a Latin word slightly altered; and *amen* is a Hebrew term in English letters. Hence, I am led to see that if I would know my mother-tongue I must study it in relation to the diverse materials which enter into its composition.

You are not yet sufficiently advanced to assign each word in the preceding quotation to the family to which it belongs in the great community of languages. I must, therefore, be satisfied at present with a somewhat rough division of these words into the three classes already indicated,—namely, words of *Saxon* origin, words of *Latin* origin, and words derived from *other sources*. In all, there are in the Lord's Prayer 66 words. Of these 66 only *eight* are from sources that are not *Saxon*. More than seven-eighths of the words in the Lord's Prayer come from the Saxon. You may now judge to what extent the Saxon prevails in the English tongue. Of the eight words that are not Saxon, six are from the *Latin*, one from the *French*, and one from the *Hebrew*, as seen in this view:—

Latin.	*French.*	*Hebrew.*
name	deliver	amen
debts		
debtors		
temptation		
power		
glory		

The one *French* word might be added to the *Latin* column for *deliver*, though it comes into the English directly from the French, is *Latin* by extraction.

This analysis, however, shows that the materials of the English language may be arranged into two great classes; namely, the *Saxon* and the *Latin*. These classes have reference to the origin of the words.

Another view may direct our attention to the condition in which the words are. Some of the words are very short, others are somewhat long. *Our* has only three letters; *kingdom* has seven; and *temptation* has *ten* letters. *Our* is a word of one syllable; *kingdom* a word of two syllables; and *temptation* is a word of three syllables. Observing that all the words are Saxon, except the eight specified above, you will see that the Saxon words for the most part are short words, and words of one syllable. Of words, however, having more than one syllable, two kinds must be noticed. Take, as an instance, *father* and *kingdom*. Now *father*, though consisting of two syllables, is a simple word; while *kingdom* is a compound word. Hence arises another division. Words, whether of Saxon or of Latin origin, are either—1, *simple*; or 2, *compound*.

	Simple.	*Compound.*
Saxon	earth	forgive
Latin	name	deliver

The two compound words here presented, from the Lord's Prayer, may be resolved into their elements thus: *forgive* is made up of *for* and *give*, in German *vergeben*; *deliver* comes originally from de, *down*, *from*, and liber, *free*. Now observe, I do not put down the import of the component parts of *forgive*, for they are known. Words of Saxon origin are known to every Englishman. But I do assign their signification to the terms

which combine to make up *deliver*, since those terms awaken no corresponding state of mind in the mere English student; and consequently, their equivalents in terms of Saxon origin must be given. In the progress of these lessons, you will be led to study the constituent elements of all our compound words. Here I wish to dwell on the fact, that the vocabulary of the English language consists generally of words derived—1, from the *Saxon*; 2, from the *Latin*.

In order to possess a full and exact acquaintance with the Saxon treasures of our language, you must study that language historically; you must study it in its literature; and you must study the *Anglo-Saxon* in its productions, and in the laws of its structure. Apart from so prolonged a labour, you may here learn something on the subject, and at any rate acquire information, which, in general, will enable you to distinguish and recognise words which come from a Saxon source. I lay before you some results of the investigations made by the learned on this subject.

The English language consists of about 38,000 words. Of these, about 28,000, or nearly five-eighths are of *Anglo-Saxon* origin. The majority of the rest are *Latin* and *Greek*; of which the former has the larger share. If we look not merely to the number of words, but to their kind, as well as to the share that Anglo-Saxon has had in the formation of our language, we shall see how important is this element of the English tongue.

I. English grammar is almost exclusively occupied with what is of Anglo-Saxon origin. Our chief peculiarities of structure and of idiom are essentially Anglo-Saxon, while almost all the classes of words, which it is the office of grammar to investigate, are derived from that language. What few inflections we have are all Anglo-Saxon. The English genitive, the general modes of forming the plural of nouns, and the terminations by which we express the comparative and superlative of adjectives, *er* and *est*; the inflections of the pronouns; of the second and third persons, present and imperfect of the verbs; of the preterites and participles of the verbs, whether regular or irregular; and the most frequent termination of our adverbs (*ly*), are all Anglo-Saxon. The nouns, too, derived from Latin and Greek, receive the Anglo-Saxon terminations of the genitive and the plural, while the preterites and participles of verbs derived from the same sources, take the Anglo-Saxon inflections. As to the parts of speech; those which occur most frequently and are individually of most importance, are almost exclusively Saxon. Such are our articles and definitives generally, as *an, a, the, this, that, these, those, many, few, some, one, none*; the adjectives whose comparatives and superlatives are irregularly formed, and which in every language are amongst the most ancient, comprehensive in meaning, and extensively used; the separate words *more* and *most* by which we as often express the forms of comparison as by distinct terminations; all our pronouns, personal, possessive, relative, and interrogative; nearly every one of our so-called irregular verbs, including all "the auxiliaries" *have, be, shall, will, may, can, must*; all the adverbs most frequently employed; and the prepositions and conjunctions almost without exception.

II. The names of the greater part of the objects of sense, in other words, the terms which occur most frequently in discourse, or which recall the most vivid conceptions, are Anglo-Saxon. Thus, for example, the names of the most striking objects in visible nature, of the chief agencies at work there, and of the changes which pass over it, are Anglo-Saxon. This language has given names to the heavenly bodies, *sun, moon, stars*; to three out of the four elements, *earth, fire, water*; three out of the four seasons, *spring, summer, winter*; the natural divisions of time, as *day, night, morning, evening, twilight, noon, midday, midnight, sunrise, sunset*; some of which are amongst the most poetical terms we have. To the same language we are indebted for the names of *light, heat, cold, frost, rain, snow, hail, sleet, thunder, lightning*; as well as of almost all those objects which form the component parts of the beautiful in external scenery, as *sea* and *land, hill* and *dale, wood* and *stream*. The same may be said of all those productions of the animal and vegetable kingdoms which form the most frequent subjects of observation or discourse, or which are invested with the most pleasing and poetic associations; of the constituent parts or visible qualities of organised or unorganised beings, especially of the members of the human body and of the larger animals. Anglo-Saxon has also furnished us with that numerous and always vivid class of words, which denote the cries, postures, and motions of animated existence. These are amongst the most energetic that any language can supply; for the same reason that words expressive of individual objects are always stronger than general terms. It is a sound and universal maxim of rhetoric, that the more abstract the term is, the less vivid; the more special, the more vivid is the impression. Now, almost all the words which are expressive of these specialities of posture and bodily action, are the purest Saxon; such as, *to sit, stand, lie, run, walk, leap, stagger, slip, slide, stride, glide, yawn, gape, wink, thrust, fly, swim, creep, crawl, spring, spurn*. If all this is true, we need not be surprised at the fact that, in the descriptions of external nature, whether by prose writers or by poets, the most energetic and graphic terms are almost universally Anglo-Saxon. It is as little matter of wonder that in those simple narratives in which genius and wisdom attempt the most difficult of all tasks—that of teaching philosophy without the forms of it, and of exhibiting general truths in facts and examples, leaving the inferences to be drawn by the instinctive sagacity of human nature—the terms are often, almost without exception, Anglo-Saxon. It is thus with the narratives of the Old Testament,—the history of Joseph for instance,—and with the parables of the New Testament, perhaps the only compositions in the world that can be translated without losing much in the process, and which, into whatever language translated, at once assume a most idiomatic dress. The same remark holds good to a certain extent of "Robinson Crusoe," "The Vicar of Wakefield," "Gulliver's Travels," and other works in which the bulk of the words are pure Saxon.

III. It is from this language we derive the words which are expressive of the earliest and dearest connexions; and the strongest and most powerful feelings of our nature; and which are, consequently, invested with our oldest and most complicated associations; their very sound is often a spell for the orator and the poet to conjure withal. It is this language which has given us names for *father, mother, husband, wife, brother, sister, son, daughter, child, home, kindred, friends*. It is this which has furnished us with the greater part of those metonymies and other figurative expressions, by which we represent to the imagination, and that in a simple word, the reciprocal duties and enjoyments of hospitality, friendship, or love. Such are *hearth, roof, fireside*. The chief emotions, too, of which we are susceptible, are expressed in the same language, as *love, hope, fear, sorrow, shame*; and what is of more consequence to the orator and the poet, as well as in common life, the outward signs by which emotion is indicated, are almost all Anglo-Saxon; such are *tear, smile, blush*, to *laugh, weep, sigh, groan*.

IV. Most of those objects, about which the practical reason of man is employed in common life, receive their names from the Anglo-Saxon. It is the language for the most part of business, of the countinghouse, the shop, the market, the street, the farm.

V. Anglo-Saxon, also, are nearly all our national proverbs, in which, it is truly said, so much of the practical wisdom of a nation resides, and which constitute the manual or *vade-mecum* ("go with me;" that is, the pocket-book, or note-book) of "hobnailed philosophy."

VI. A very large proportion (and that always the strongest) of the language of *invective, humour, satire*, and *colloquial pleasantry*, is Anglo-Saxon; also all the terms and phrases by which we most energetically express *anger, contempt*, and *indignation*.

VII. It may be stated, as a general truth, that while our most abstract and general terms are derived from the Latin, those which denote the special varieties of objects, qualities, and words of action, are derived from the Anglo-Saxon. Thus, *move* and *motion*, very general terms, are of *Latin* origin; but those terms which express nice varieties of bodily action, are Anglo-Saxon. Sound is perhaps *Latin*, though it may be Anglo-Saxon; but to *buzz, hum, clash, hiss, rattle*, &c., are Anglo-Saxon. Colour is *Latin*; but *white, black, green, yellow, blue, red, brown*, are Anglo-Saxon. *Crime* is Latin; but *murder, theft, robbery*, to *lie*, to *steal*, are Anglo-Saxon. *Member* and *organ*, as applied to the body, are Latin and Greek; but *ear, eye, hand, foot, lip, mouth, teeth, hair, finger, nostril*, are Anglo-Saxon. *Animal* is Latin; but *man, cow, sheep, calf, cat*, are Anglo-Saxon. *Number* is immediately French, remotely Latin; but all our cardinal and ordinal numbers are Anglo-Saxon.

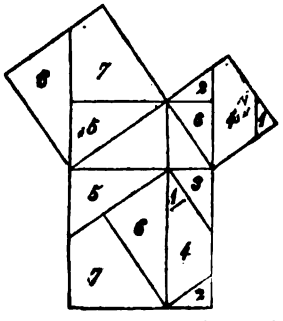
With these facts before us we need not wonder that the orator and the poet are recommended to cultivate assiduously the Anglo-Saxon portion of the language. "The common people," it is said, "cannot understand words which are of classical origin." And

this is a good reason for the advice. But it is not the only reason. The great object of the orator and the poet is to make their meaning felt; to stimulate the imagination, and thence excite emotion. They, therefore, seek the most special terms they can find. Again, the terms which, *ceteris paribus* (other things being equal), most vividly recall the objects or feelings they represent, are those which have been earliest, longest, and most frequently used, which are consequently covered with the strongest associations, the sign and the thing signified having become so inseparably blended that the one is never suggested without the other. And thus it is that of two synonymes (words having nearly the same meaning) derived respectively from Latin and the Anglo-Saxon, both equally well understood, the one shall impart the most vivid, and the other the most tame conception of the meaning. It is precisely for the same reason that the feelings with which we read beautiful passages in foreign poets are so faint and languid, compared with those which are exerted by parallel passages in Shakspeare, Milton, or Burns.

SOLUTIONS OF PROBLEMS AND QUERIES.

(From No. 7, page 111.)

5. SHOW how the squares described on the two legs of a right angled triangle must be cut so that the pieces may be laid upon the square described on the hypotenuse.



In this solution by ocular demonstration, the pieces of the two smaller squares marked 1, 2, 3, 4, 5, 6, 7, when cut out and laid upon the parts of the larger square marked with the same figures, will exactly cover the same.

The author of the preceding solution remarks that the sides of all the figures which form the pieces of the smaller squares, make exactly the *same angles* with the base of the larger, which the sides of the corresponding figures of that square make with its base. Accordingly, these pieces may be made to slide into their proper places on the larger square, by merely moving them downwards, and preserving the parallelism of their original position. We are indebted to Mr. Henderson, the Astronomer, at Liverpool, for his kindness in recommending this solution to be sent to us by the author, Henry Dugdale, of Slaidburn.

IN the interesting biography of James Ferguson contained in this Number, it appears that this wonderful genius was theoretically unacquainted with Euclid's geometry, and that when he had occasion for any proposition contained in that storehouse of valuable facts he consulted it, and tested the accuracy of the fact he wanted to employ in his own pursuits, by scale and compasses. We have somewhere read concerning this same Ferguson, that he satisfied himself of the truth of the 47th Proposition of the First Book of Euclid, by some method of ocular demonstration similar to the preceding. We do not know the exact mode in which he cut out the parts of the smaller squares and applied them to the larger one in order to cover it; but we know that there are many ways besides the above, and some that require fewer parts or divisions of the figures, which we consider a recommendation to any method, and a reason for its preference in general. In the editions of Euclid by Lardner and Playfair different methods are exhibited, and those which are accompanied with a demonstration are to be preferred; we shall be glad to see the author's demonstration of the preceding one.

In the solution of the problem "to draw a perpendicular to a straight line at one of its extremities," inserted in our last Number, there is an omission in the demonstration which we now supply. The omission consists in not proving that D B and B E are in the same straight line. To prove this, it is plain that the three angles A B D, A B C, and C B E, are equal to the three angles of any one of the equilateral triangles, and, therefore, by the 32nd of the first Book, they are equal to two right angles. Wherefore, by the 14th of the same Book, the two straight lines D B and B E, are in one and the same straight line.

This problem has been sent to us solved in various ways, which are all well known and appreciated. The following solution, which we give without a diagram, in order to exercise some of our younger pupils, appears to us to be the simplest and best; and it requires nothing more than the 11th of Euclid's first Book, and some preceding propositions. From the given extremity of the straight line cut off a convenient length towards the other extremity, and from the point of section draw a perpendicular to the given straight line. From this perpendicular cut off a part equal to the part of the given straight line between the given extremity and the point of section; and from the point of section in this perpendicular draw a perpendicular to it on the side next the given extremity of the given straight line. Bisect the angle on the same side between the first perpendicular and the given straight line, and the bisecting line will meet the second perpendicular. From the point of meeting in this perpendicular draw a straight line to the given extremity of the given straight line, and it will be a perpendicular to that straight line at the point required.

The proof is this: Because that the bisecting line divides the right angle between the first perpendicular and the given straight line into two equal angles, that this bisecting line is common to the two triangles thus formed, and that the part cut off the first perpendicular is equal to the part of the straight line between the first point of section and the given point; therefore, by the fourth of the first book, the two triangles are equal, their bases are equal, and the remaining angles of the one are equal to the remaining angles of the other each,—viz., those to which the equal sides are opposite. Therefore all their sides are equal, and the angle at the given point is equal to the angle at the point of section in the second perpendicular; but the angle at the latter point is a right angle. Therefore the angle at the given point is a right angle; and the straight line is drawn perpendicular to the given straight line at one of its extremities as required.

N.B.—The figure formed by the four straight lines which are all equal, has all its angles, as can easily be shown, right angles, and is therefore, according to Euclid's definition, a square.

CORRESPONDENCE.

ALLOW me to tell you a little story in connexion with the POPULAR EDUCATOR. About two miles from where I stay, is a small village; and in that village is a tinsmith. In that Tinsmith's shop, is a little orphan-boy apprenticed, quite young—no father, no mother, to tend him, and see that his young mind does not shrivel away into nothing for lack of food! Well, in this shop, a paper may be seen in a corner. On taking it up, we discover that it is the POPULAR EDUCATOR. In the inside of it is a little note-book which he (the boy) has made himself of a few shreds of paper. It is neatly ruled; and he has Latin words written on the one side, and English on the other. I was perfectly struck to see the poor little fatherless and motherless boy persevering, all unaided, unless by your lessons, and learning the language of ancient Rome.

You say, "The authority of such men as Macaulay, Macintosh, Addison, Dryden, Shakspeare, is in grammar paramount and supreme." I would like to have a prose composition that you would recommend as being worthy to be studied, every word and line for the style. Macaulay's are all too dear. Would Mackintosh's "History of England" do? I do not see how Shakspeare can be an authority for a grammar at all, since his expressions are antiquated and stiff. I should like if you would recommend a *book* written in a fine, flowing style.

FILOS.

LITERARY NOTICES.

HISTORY OF THE PAINTERS OF ALL NATIONS.—The first part of this magnificent work, in imperial quarto, containing a portrait of Murillo, and eight specimens of his choicest works, including the "Conception of the Virgin," lately in the collection of Marshal Soult, and recently purchased by the French Government for the Gallery of the Louvre, for the sum of £23,440, is now ready. The successive parts will appear on the first of every month, at 2s. each, and will be supplied through every bookseller in town or country.

CASSELL'S SHILLING EDITION OF EUCLID.—THE ELEMENTS OF GEOMETRY, containing the First Six, and the Eleventh and Twelfth Books of Euclid, from the text of Robert Simpson, M.D., Emeritus Professor of Mathematics in the University of Glasgow; with Corrections, Annotations, and Exercises, by Robert Wallace, A.M., of the same university and Collegiate Tutor of the University of London, will be ready early in July, price 1s. in stiff covers, or 1s. 6d. neat cloth.

SCRIPTURE LIBRARY FOR THE YOUNG, in Shilling Volumes.—The first two volumes of this instructive series of works, "The LIFE of JOSEPH," illustrated with sixteen choice engravings and maps, and "The TABERNACLE, its PRIESTS, and SERVICES," with twelve engravings, are now ready. "The LIFE of MOSES" is in the press.

ANSWERS TO CORRESPONDENTS.

MONGREL (Carnarvon): Something will be done for the Principality. —R. J. C.: Reading at meals is injurious to health.—JOHN SOMERS (Huddersfield): Persevere and you will succeed; try to write evenly, that is, parallel to the top and bottom of the page.—J. W. GARLICK (Halifax): We thank him for his useful suggestions.—E. C. (Brixton): We are preparing something of the kind.—GRIERSON (Edinburgh): Maps are to be printed in the P. E. The numerous exceptions in gender, &c., must be learnt from Dr. Beard's "Latin Made Easy," and other yet fuller manuals. We can give nothing more than a general view.—ISAK will succeed, if he perseveres.—XENOPHON: Your exercise is good; good, also, are several that have been sent to us; so good as to show that many are acquiring a sound knowledge of Latin from our pages. This is encouraging. Their progress will be more easy, more sure, and more rapid, if we are able to publish an English translation of the Latin Exercises, and a Latin translation of the English Exercises.—The translation asked for by R. runs as follows:—At Sparta there is no widow so noble as not to appear on the stage under the attraction of gain.—PILATE should pronounce *vocos* and *hess* like English words; thus, *wokoe* and *Hughs*. Maps will be given.—R. F. T. (Margate): Something will soon be done to meet his wishes, in Latin.—DELECTOR must read a little more carefully; his difficulties will then disappear.—G. PEPPER (Belfast): We think so; but see answers to former correspondents.—WESTMORELAND: Probably less than a couple of years; as to "Emigration," let him look to our "Literary Notices."—J.H.F. (Horbury-bridge): We intend to publish one. —T. SMITH (Islington): To bookkeeping, yes.—ALPHA: No.—R. WOOD (Chepstow): Yes.—W. N. B., an ANXIOUS INQUIRER: There is no artificial means of improving the memory applicable to all subjects. As to the dictionary and the shorthand, we are on the look-out for the best.—AN IGNORANT SUBSCRIBER (Edinr.) wants our advice. Let him study English first, and then arithmetic.—J. J. NEWTON (Bridgewater): Under consideration.—A STUDENT (Liverpool): Certainly. As to *dans* and *en*, we shall give rules soon: he should read the notices to other correspondents.—J. M. (Bristol): Yes.—G. STRANGE (Hackney): His question has been answered in our notices, to another correspondent.—J. VICKERS (Hulme): The error has been noticed and corrected.—WILLIAM: We are about to publish a work on the subject.

ARITHMETIC.—JOHN (Berwick-upon-Tweed): We should like to see the work to which the printed paper, he sent us, refers.—The remarks of JUVENIS on Inverse Proportion are just; when we come to this subject we hope to satisfy him.—J. L. (Waterhead Mill, Oldham): Yes.—R. BOLAND (Great Shelford): We thank him for his correct and useful remarks; we shall avail ourselves of them.—Answers to queries 1, 2, 3, page 80, from P. G. ANDERSON (Birmingham), correct.—J. BOWMAN (Preston), is thanked for his very ingenious communication on the mystical number 9.—A. CAMPBELL (Cathcart): Ditto.—LEWIS W. H. (Wolverhampton), proposes a curious question: "Can the nine digits be placed in rows nine times to form an exact square of 81 figures, without having two figures of the same name in any one line, either perpendicularly, horizontally, or diagonally?" We thank him for his second communication, and shall keep it in view.—DELECTOR: His answer to the arithmetical question is right.—G. J. E. (London): His difficulty is removed by making the second distance 2 and seven-eights, instead of 2 and one-eighth miles.—W. FAULKNER (Smethwick): Ingenious and correct.—A. Fleming (Broughton-in-Furness): Correct.—J. CAREY (Clapham): Ingenious.—F. R. W. (Islington): Not so foggy either.—J. N. L. (Dublin): Under consideration.—Correct solutions of Problems and Queries from H. S. T., of No 2, p. 111.—JOHN (Berwick-upon-Tweed), of No. 5; and from G. W. (Dundee), of No. 3.

MUSIC.—JOHN is informed that *some* of the best flute instructors are the following:—Tegg's "Flute Preceptor," 2s.; "Alexander's Flute Preceptor," 3s.; "Dresaler's Flute Instructions," 9s.; and Richardson's, Pratten's, and Wragg's "Flute Tutors."—GEORGE CON: The ME, in exercise 5, *is* printed on the wrong line.—A GREENWICH AMATEUR suggests for the monochord, instead of a weight, "a peg, similar to those of a violin, where weights cannot be easily obtained." If so, there should be one at *each* end, and *both* should be used in tightening the string. He "finds a string of thirty inches quite sufficient," and wants us to print "a scale of the divisions of the monochord fifteen inches long." Any length is sufficient if the divisions are correct. There would not be sale enough for the scale he proposes.—W. G. (Bury): A guitar is one of the worst instruments for a "pattern," on account of its inaccuracy of tune. Let W. G. take a pattern from the best instrument at hand, but use his pattern as little as possible. The natural ear, with frequent practice, will soon guide him to sing better than a falsely-tuned instrument. Let him practise well the first exercises, and study the mental effect of notes.—W. L. H. S.: We shall be happy to see his views on Pianoforte Teaching.—WM. PARKER (Newnham): Generally speaking, any simple instrument that allows you to play only in one key (the key of c for instance), is, for that key, correctly tuned. It is only when they attempt to combine several keys that the common instruments require "temperament." The eight-keyed flute is, therefore, not so free from temperament as that with one key; the word key in this last sentence, being used not for a musical scale, but for a lever and valve. Let W. P., however, use his flute for a pattern, but learn to be independent of it as soon as possible,—tuning his voice and ear to the chord, as in the earlier exercises, and marking the "mental effect" of notes. These things will give him accuracy of ear.—M. B. S. C. (Edinburgh) must mark the difference between DOH and c. c is a fixed sound, given by string or tuning-fork, that vibrates two hundred and fifty-six times a second. To make the monochord give the true c, our friends must consider not only the *length* of string, but also the *thickness* and the *tension*. They will have, in that case, to tune the monochord by a good c' tuning-fork, bought of a respectable musicseller. The alphabetical letters C' B A G F E D C, are well known throughout the civilised world as the acknowledged names for the fixed sounds, each one indicating a certain pitch. We do not make, therefore, the unphilosophical and useless attempt to force the syllables DOH, RAY, ME, &c., into the places of these alphabetical names; but we use them in a different sense. The principal thing in music, is the key-note of a tune. That key-note may be at one pitch in one tune, and at another pitch in another tune. But there is an essential sameness in the relationship of notes which attends it, and in the mental effect of those notes, whatever be its pitch. to familiarise the learner with that essential law of relationship and mental effect, which constitutes the simplicity and beauty of music, we give a distinct name to the key-note—a name which follows it to any pitch. That name is DOH. And distinct names, also, to its attendant notes. Those names are RAY, ME, FAH, &c. Therefore, *whatever* be the full length of your monochord string, and *whatever* be the sound in pitch it gives, you may take that for the key-note (or, as Euclid called it, the *Proslamonence*—the "given" sound) and the other notes of its scale will be given by the proportions of the string mentioned.—J. H. P. is right about the metronome. But it is usual to say "Metronome *crotchet* = 72," or "M, *quaver* = 72," &c.—UN JEUNE COMMIS must be *patient* with his breaking voice, and not use it too much. He must also read the lessons with greater care, as well as the remarks above. *German Concertina*.—As this instrument is founded on the tonic principle, is without temperament, and is moreover cheap, we may probably give, as our correspondent desires, a few brief instructions for its use.

A. FOAD (Whitstable) is recommended to Reid's work on "Watch and Clock Making."—POOR PEASANT is advised to drop the subject of perpetual motion.—A. D. (Edinburgh) should study Euclid.—A STRUGGLER (North Shields) should study the Lessons in English well. —TIRO (Leicester) can get a shilling's worth of "Etiquette," published by Longman. The diphthongs are separated for the sake of the learner. —ALPHA (Richmond) should consult "Cassell's Emigrants' Handbook," (9d.).—R. J. (Mount Sorrel) is advised to study French first.—CLAUDE (Blandford) should read all the answers to Correspondents.—ONE WHO PERSEVERES is advised to be content with stenography.—JAMES STEEL (Bradford), B. MILVERTON (Winsham), A FACTORY OPERATIVE (New Lanark), and A YOUNG BEGINNER, should read the notices appended to Lessons in French, No. 13.—GEORGE WETTON (Kirkby-in-Ashfield), received.—E. P. a YOUNG BEGINNER will find what he wants at present in the "Illustrated Exhibitor."—DAVID M. (Norwich): Study "Macculloch's Commercial Dictionary."—J. T. D. (Bloomsbury) should try by himself first.—S. Y. (North Shields): His problems are not sufficiently explicit.—Ὁ μαθητης (Backwell): See above.—GEORGE HERBERT (Brid. Quay): Thanks for his hints.—AMICUS (Delph); His question shall be inserted.—JAMES WILKINSON (Earby): We advise him to let such words alone as he sent to us; their meaning is bad.—JOHN GOWANS (Liverpool): His reasons are excellent for haste, but ours are better for delay at present.—A. M. BELL (Liverpool): As soon as other subjects are disposed of.—WILLIAM PEET (Bedford): Right.—H. F. (Belfast), DUNC. F. (Glasgow), A SUBSCRIBER (Dublin), THEOPHILUS (Caledonian-road): The subject of German pronunciation will soon be discussed more fully.—S. S. H. (Holywell-hill, St. Alban's): We are not in a state at present to avail ourselves of his kind offer.—ERNEST M. (Wolverhampton): His criticisms are on the whole just; errors will be corrected. Study Macculloch, above mentioned.—THOMAS PATTISON (Newcastle-on-Tyne) is right; the solution of James Veecock is defective.—C. F. P. (Dunmanway, Cork): His solutions are correct and good.—D. D. O. (Great Yarmouth): We say go on and prosper in the Co-instruction Society.—A. M. WHITE (Woodstreet): Thanks for his suggestions, they shall not be lost sight of.—DANKBAR: Yes.—A. D. is premature.—MURAT (Halifax), a system of bookkeeping is preparing. The least charge for an advertisement is 5s.—R. S. DALE (North Shields): It is in progress.—J. S.: The number of years from the creation of Adam to the deluge was 2262, according to the Scriptures and by the Christians. According to rule *g* is soft in Dolgelly.—P. E. A. (Bywell, Newcastle): "The Popular Educator."—T. CROX (Fareham): We are entirely of his mind. We should only be too happy if our numerous subscribers wanted lessons in religion. We hope and trust this will be a blessed consequence of the spread of education among all classes of the people.—WILLIAM LIVSEY (Manchester): We cannot positively say how soon, but they are sure to be given.

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LESSONS IN PHYSIOLOGY.—No. VII.

MAN.

We have disposed of the liver and its functions. But important as the office of that organ may be in separating and withdrawing certain superfluities from the blood, there are certain other matters which must be immediately and completely removed from the system, which would otherwise prove highly injurious. This is effected by the KIDNEYS, which are, perhaps, the most purely excreting or draining organs in the body. In each kidney, there are numerous secreting tubes, which project into its pelvis or basin; and from this basin there is a small but somewhat extended canal, called the URETER, which carries the urine from the kidney to the bladder. Each kidney has its own ureter or conducting canal. The secreting tubes are about $\frac{1}{700}$th part of an inch in diameter, and are lined throughout with nucleated gland-cells, as if the urine were filtered through those cells in its way to the pelvis.

But how is the urine formed? If we take a section of the kidney, and examine it with a slightly magnified power, we shall find that its cut surface is studded with a number of little dark points, each of which consists of a knot of minute blood-vessels. Each of these knots is included in the extremity of one of the secreting tubes, and is directly supplied by a branch of the renal artery.* This artery arises from the aorta, passes across, enters the kidney, divides into numerous branches which become very minute, frequently unite and form arches in the outward covering or substance of the organ; their extremities at last wind in toward the medullary or internal substance, and are coiled up into clusters, which take on the appearance and form of corpuscles. In these corpuscles or small bodies, which are situated in the external substance of the kidney, the urine is secreted, and is there received by the secreting tubes, which gradually unite to form larger tubes, and then converge towards the pelvis of the organ.

The separation of urine, as a superfluous fluid from the blood, is in all likelihood effected by the agency of the gland-cells which line the secreting tubes, and equally in all parts of these tubes. There are certain matters existing ready-formed in the blood, which require only to be separated from the vital fluid. That is to say, that all such matters may pass from the blood to the urine without any further elaboration; but there are certain other properties which do not exist in the blood, and must therefore be formed by the chemical agency of the cells. These, also, must be carried off, or life would soon cease.

Healthy urine is a clear limpid fluid, of a pale yellow or amber colour, with a peculiar faint aromatic odour; and yet, consistently with a good state of health, it may be all but colourless, or present every shade between that and a deep orange tint. Clear and transparent at first, it often becomes, as it cools, opaque and turbid from the settlement of those particles which before were held in a state of solution. The average amount of this fluid which is excreted within the four-and-twenty hours by an adult healthy man, is thirty-five ounces, and its average specific gravity may be taken as very near 1,020. In summer, owing to the larger proportion of fluid exhaled by the skin, its quantity is less than in winter, and consequently its specific gravity is proportionally higher.

The water holds in solution certain animal and saline matters as its ordinary constituents. The principal of these constituents is named UREA, and it is in this substance that the nitrogen of decomposed tissues and superfluous food is carried off from the body. If the nitrogen were not so removed, its retention in the blood would be followed with the most pernicious effects.

But how do we know that this urea takes off the nitrogen of wasted tissue and superfluous food? We get at this conclusion in two ways. If we substitute an animal for a vegetable diet, we find an increase of urea, and therefore it must be derived in part from those unassimilated elements of this highly nitrogenous food which circulate with the blood. That is one method. The other is this:—If we exclude all nitrogenous substances from the food, and let the diet for several days consist of sugar, starch, gum, oil, and such like articles, the quantity is diminished, still urea is excreted or thrown off. It comes off even if there be no food taken for a considerable time. And therefore it must, in a still larger part, be derived from the waste of those animal tissues of which the body is made up. Whatever of this injurious substance exists ready-formed in the blood is withdrawn by the kidneys; but by far the larger portion passes off with the water.

Another animal substance, rarely absent from the urine, is URIC ACID, which is derived from the breaking down or waste of albuminous tissues. The relation which this acid bears to urea has not yet been determined. It is increased like urea by the use of animal food, and is diminished by adopting an exclusively vegetable diet, or such as is free from nitrogen. A nitrogenous compound, named HIPPURIC ACID, in the quantity of about one-third of the uric acid, exists in the urine, and is removed from the system in the same way as the others.

It is now clear that the grand purpose of the urinary secretion is to carry off those products which neither can be set free in the condition of carbonic acid and water through the lungs, nor be got rid of by the agency of the liver in the form of solid biliary matter. In all this there is evident design. This design bespeaks a wisdom which is infinite, and a goodness which is exhaustless. The Father of our spirits is to be worshipped no less as the Framer of our bodies. The creation of man was nothing fortuitous—not a thing which happened by chance. It was one of the highest acts of divine power. How perfect is the structure of every organ! How beautiful and harmonious is their arrangement! How adapted to their end, and how beneficent in their functions! In the midst of such profound contrivance and skill—such arrangement, and harmony, and beneficence, we are lost in wonder, and fall down in silent adoration.

But we have not done with the process of secretion. The little glands which are disposed in the substance of THE SKIN, and in the walls of THE INTESTINAL CANAL, although individually minute, serve a most important end in the human economy. In the skin we meet with two distinct classes of these little glands, one of which is destined to free the blood of a large quantity of fluid, and is named PERSPIRATORY or SWEAT GLANDS; and the other being designed to draw off a considerable amount of solid matter is styled SEBACEOUS or OIL GLANDS. The first class presents the appearance of small oval or globular masses, situated just beneath the skin, and found in almost every part of the surface of the body. Of their number some idea may be formed from the fact that not fewer than three thousand five hundred and twenty-eight of these little glands exist in a square inch of surface in the palm of the hand. Now if we allow that each of these little coiled-up tubes measures one-fourth of an inch, we have thus within a single square inch, a length of tube equal to eight hundred and eighty-two inches, or seventy-three feet and a half, or twenty-four yards and a half. Nor is this all:—the number of square inches of surface in the body of a man of ordinary height and size, is computed at ten thousand five hundred, and if we allow two thousand eight hundred pores at an average in every square inch, then the number of pores in the human body cannot be fewer than twenty-nine millions!

* From the Latin word ren, the kidneys or reins.

We have said that each of these little glands consists of a small globe-like mass. Now from this mass there ascends a conducting-tube which makes numerous spiral turnings in its course, penetrates the outer skin rather obliquely, and opens by a sort of valve to allow the fluid to issue from it. On the palm of the hand, the sole of the foot, and the ends of the fingers, the opening of these ducts or tubes is visible to the naked eye. By means of this gracious and wonderful arrangement, a secretion of watery fluid is continually taking place, while a considerable amount of solid matter is at the same time drawn off by the cells which line these small tubes. The fluid secreted is formed so gradually, that as fast as it reaches the surface, the watery portions of it escape by evaporation. This is called insensible perspiration. But during strong exercise, exposure to great external warmth, in certain diseases, or when evaporation is prevented by any means, the secretion is increased and collects on the skin in the form of drops of sweat. This is named sensible perspiration. But the amount of fluid sent off by the skin depends very much upon the temperature of the surrounding medium. When the surface of the body is exposed to a high degree of external heat, an increased amount of fluid is set free from the perspiratory glands. But as this fluid is carried off in a state of vapour as fast as it is set free, and in this form withdraws a large quantity of calorie from the surface, the temperature of the body itself is kept down and regulated. On the other hand, if the hot atmosphere be already loaded with vapour, this cooling power fails to be exerted. The temperature of the body is raised, and if this temperature continues for any length of time, there follow the most fatal consequences.

The entire loss by exhalation from the lungs and skin may be taken at the average of two pounds and a half in the twenty-four hours. In a warm, dry atmosphere, it will rise above this, and in cold and damp, it will fall below it. Of this quantity, the exhalation from the lungs is about one-third, and rather more than two-thirds from the skin. The variations in the amount of fluid set free at different times, and in different states of the body, by exhalation from the skin and lungs, are counterbalanced by the action of the kidneys. If the exhalation be less, then the kidneys allow a larger proportion of water to be strained off in a liquid state from the blood-vessels. On the contrary, the kidneys have less to do in proportion to the quantity that is exhaled from the lungs and skin. It is supposed that at least one hundred grains of effete nitrogenous matter are daily thrown off from the skin; but let this excretion be checked or arrested, and how much more labour is imposed on the kidneys, since if it is not got rid of—if it accumulate in the blood—it must prove fatal to health and life! Great attention, therefore, should be paid to the functions of the skin, so as to keep its pores open, and its action free, and for this purpose nothing is so efficacious as bathing in cold water, followed by friction and exercise.

Besides this beautiful arrangement for the perspiration, the skin is provided with another set of special organs, named SEBACEOUS GLANDS, whose office it is to withdraw a peculiar fatty matter from the system, while the secretion itself prevents the skin from being dried and cracked by the influence of the sun and air. These glands are distributed more or less closely over the whole surface of the body, but are most numerous in those parts which are largely supplied with hair, such as the scalp and face, and are thickly distributed about the entrances of the various passages into the body, as the anus, nose, lips, and external ear. They are altogether absent in the palms of the hands and the soles of the feet. As the engraving very nicely indicates, they appear to be made up of an aggregate of small vesicles, and these small vessels are filled with an opaque white substance, something like soft ointment. These glands are overspread with minute capillaries or blood-vessels, and their ducts open either in the surface of the skin, or, which is more usual, directly into the follicle of the

hair. These hair-follicles, into which the sebaceous glands open, are in fact among the secretory organs of the skin; since it is only at their root or lowest part that the material produced from their walls is appropriated to the growth of hair. All the rest goes to anoint the hairs and the surface of the skin. Hence it is that this secretion is much more abundant in the inhabitants of tropical climates than in those which inhabit cold countries. But for this benevolent provision of the great Creator the skin would become parched and dry. And even with this provision of nature the natives of the warm countries are in the habit of lubricating their skin with vegetable oils of various kinds, to protect it from the scorching influence of the solar ray.

These wonderful functions of the skin have led some medical men to the conclusion, that hydropathy, or the use of the wet sheet, is the most valuable curative means we possess for almost every form and variety of disease to which the human body is subject. It is possible that not enough has been made of this most powerful of all diaphoretics—it is possible that it may come to be more generally employed as the functions of these glands are better understood—but we can never believe that any one remedy is equal to every type and development of disease. At the same time, we can, while in health never be too lavish in our daily use of cold water.

Another fact on this subject of secretion. The mucous surface of the alimentary canal, is, like the skin, furnished with a vast number of these small glands. There are simple follicles to secrete the mucus; there are more complex follicles to elaborate the gastric juice; while those which crowd the walls of the small intestine are destined to withdraw the nutrient matters from the blood, and convey them by the readiest channel completely out of the body. It may be very necessary—indispensable, if you will—to take food to repair that waste of the tissues which is going on within us at every successive moment of our earthly life; but there is a far greater necessity why these tissues, in a state of disintegration or decomposition, should be removed from the body. Life may be prolonged for a considerable period with little or no food, but the retaining of this morbific matter in the system even a short length of time would issue in a fatal result. For its removal the most beautiful provision has been made. And as we study, and perceive, and understand this provision, so it become us to lift up our hearts in adoring gratitude and praise to God, whose tender mercies are over all his works.

QUESTIONS FOR EXAMINATION.

What is the function or the office of the kidneys?
How is the urine carried from the kidney to the bladder?
How is the urine formed?
How is the separation of urine from the blood effected?
What is the grand purpose of the urinary secretion?
With what little organs do we meet in the skin?
Can you give their names and functions?
Where are the perspiratory glands situated?
What is the secretion which is effected by these glands?
On what does the amount of fluid sent off by the skin depend?
What is the entire loss by exhalation from the lungs and skin in the twenty-four hours?
What quantity of effete matter is daily thrown off from the skin?
Where are the SEBACEOUS GLANDS chiefly distributed?
What is their peculiar function?
Do the functions of the skin in any way favour the practice of hydropathy?
Is the alimentary canal furnished with many of these secreting glands?
Can you describe the various offices performed by these intestinal glands?
How is it more important to remove effete matter from the body than to supply the body with good nourishing food?
How do these facts illustrate the goodness of God?

LESSONS IN FRENCH.—No. XV.

By Professor Louis Fasquelle, LL.D.

Section XXXII.

UNIPERSONAL VERBS.*

1. The unipersonal verb is conjugated only in the third person singular of a tense. Its nominative pronoun il, *it*, is used absolutely, i.e. it represents no noun previously expressed.

Il pleut aujourd'hui.	*It rains to-day.*

2. The unipersonal verb assumes the termination of the class or conjugation to which it belongs. Some verbs are always unipersonal, and will be found in § 62. Others are only occasionally so, and if irregular, will be found in the *personal* form in the same § 62.

3. Present of the Indicative of the Unipersonal Verbs.

Y avoir, *to be there:*	Pleuvoir, *to rain:*	Neiger, *to snow:*
Il y a, *there is, there are.*	Il pleut, *it rains, it is raining.*	Il neige, *it snows, it is snowing.*
Grêler, *to hail:*	**Geler, *to freeze:***	**Dégeler, *to thaw:***
Il grêle (§ 49) *it hails, it is hailing.*	Il gèle (§ 49) *it freezes, it is freezing.*	Il dégèle (§ 49) *it thaws, it is thawing.*

4. Il y a means *there is*, or *there are*, and may be followed by a singular or plural noun [§ 61, 2].

Il y a du gibier au marché.	*There is game in the market.*
Il y a des pommes dans votre jardin.	*There are apples in your garden.*

5. In relation to the weather, the verb faire is used unipersonally in the same manner as the English verb *to be*.

Il fait beau temps aujourd'hui.	*It is fine weather to-day.*
Il fait chaud, il fait froid.	*It is warm, it is cold.*

Résumé of Examples.

Pleut il ce matin ?	*Does it rain this morning?*
Il ne pleut pas, il neige.	*It does not rain, it snows.*
Il va pleuvoir ce matin.	*It is going to rain this morning.*
Ne gèle-t-il pas ce matin ?	*Does it not freeze this morning?*
Il ne gèle pas, il fait du brouillard.	*It does not freeze, it is foggy.*
Y a-t-il du sucre chez vous ?	*Is there any sugar at your house?*
Il y en a beaucoup chez mon frère.	*There is a great deal at my brother's.*
Y a-t-il plusieurs personnes chez moi ?	*Are there several persons at my house?*
Il y a plus de cent personnes.	*There are more than one hundred persons.*
N'y a-t-il personne à l'église ?	*Is there nobody at church?*
Il n'y a encore personne.	*There is as yet no one there.*
Est il trop tôt ?	*Is it too soon?*
Au contraire, il est trop tard	*On the contrary, it is too late.*
Fait il froid ou chaud aujourd'hui ?	*Is it cold or warm to-day?*
Il fait chaud et humide.	*It is warm and damp.*
Fait il du vent ou du brouillard ?	*Is it windy or foggy?*
Il fait un temps bien désagréable.	*It is very disagreeable weather.*

Exercise 63.

Assemblée, *f. assembly, party.*	Couvert, e, *cloudy.*	Manuscrit, m. *manuscript.*
Bibliothèque, *f. library.*	Ecurie, *f. stable.*	Veau, m. *veal.*
Brouillard, m. *fog.*	Epais, se, *thick.*	Vent, m. *wind,*
Chambre, *f. room.*	Foin, m. *hay.*	Volaille, *f. poultry*
Cinquante, *fifty.*	Gibier, m. *game.*	
	Humide, *damp.*	

1. Quel temps fait il aujourd'hui ? 2. Il fait un temps superbe. 3. Fait il très beau temps aujourd'hui ? 4. Il fait un temps couvert et humide. 5. Pleut il beaucoup ce matin ? 6. Il ne pleut pas encore, mais il va pleuvoir 7. Fait il du vent ou du brouillard ? 8. Il ne fait pas de vent. 9. Le brouillard est très épais. 10. Combien de personnes y a-t-il à l'assemblée ? 11. Il y a plus de deux cents [Sect. 19. 7] personnes. 12. N'y a-t-il pas beaucoup de manuscrits dans votre bibliothèque ? 13. Il n'y en a pas beaucoup, il n'y en a que cinquante-cinq. 14. Fait il trop froid pour vous dans cette chambre ? 15. Il n'y fait ni trop froid ni trop chaud. 16. Y a-t-il beaucoup de foin dans votre écurie ? 17. Il y en a assez pour mon cheval. 18. Restez vous à la maison quand il pleut ? 19. Quand il pleut je reste à la maison, mais quand il fait beau temps je vais chez mon cousin. 20. Y a-t-il de la viande au marché ? 21. Il y en a beaucoup, il y a aussi du gibier. 22. Il y a du veau, du mouton et de la volaille. 23. N'y a-t-il pas aussi des légumes et des fruits ? 24. Il n'y en a pas. 25. Il y en a aussi.

* By unipersonal verbs is simply meant those verbs which are used only in the third person singular. Having, properly speaking, no personal subject, they are sometimes called impersonal; for the third person singular, used in English, is *neuter*; and in French, though *il* be used, it is understood and translated as *neuter* by the word *it*. These verbs express chiefly an abstract opinion or sentiment; most frequently they denote the state or change of the weather; and they generally precede or announce the occurrence of an event; as, *it happened.*

Exercise 64.

1. Are you cold this morning? 2. I am not cold, it is warm this morning. 3. Is it foggy or windy? 4. It is neither foggy nor windy, it rains in torrents (*à verse*). 5. Is it going to rain or to snow? 6. It is going to freeze, it is very cold. 7. It is windy and foggy. 8. Is there anybody at your brother's to-day? 9. My brother is at home, and my sister is at church. 10. Is there any meat in the market? 11. There is meat and poultry. 12. Is it too warm or too cold for your sister in this room? 13. It is not so warm in this room as in your brother's library. 14. Are there good English books in your sister's library? 15. There are some good ones. 16. Are there peaches and plums in your garden? 17. There are many. 18. Do you remain at your brother's when it snows? 19. When it snows we remain at home. 20. Are there ladies at your mother's? 21. Your two sisters are there to-day. 22. Have you time to go and fetch them? 23. I have no time this morning. 24. Is your horse in the stable? 25. It is not there, it is at my brother's. 26. Does it hail this morning? 27. It does not hail, it freezes. 28. What weather is it this morning? 29. It is very fine weather. 30. Is it too warm? 31. It is neither too warm nor too cold. 32. Is it going to freeze? 33. It is going to snow. 34. Does it snow every day? 35. It does not snow every day, but it snows very often (*souvent*).

Section XXXIII.

PLACE OF THE ADVERB (§ 136).

1. In simple tenses, the adverb generally follows the verb, and is placed as near it as possible:—

Votre commis écrit très bien.	*Your clerk writes very well.*
Cette demoiselle lit très mal.	*That young lady reads very badly.*

2. When a verb is in the infinitive, the two negatives ne and pas, ne and rien, should be placed before it:—

Ne pas parler, ne pas lire.	*Not to speak, not to read.*

3. The adverb assez, *enough, tolerably*, precedes generally the other adverbs. It precedes also adjectives and nouns:—

Vous écrivez assez correctement.	*You write pretty correctly.*
Vous avez assez de livres.	*You have books enough.*
Cet enfant est assez attentif.	*That child is attentive enough.*

4. Voici means, *here is*; voilà, *there is*:—

Voici le livre que vous aimez.	*Here is the book which you like.*
Voila le monsieur dont vous parlez.	*There is the gentleman of whom you speak.*

5. Dans is used for *in* or *into*, when the noun which follows it is preceded by an article, or by a possessive, demonstrative, or numeral adjective [§ 142 (2)]:—

Le crayon est dans le pupitre.	*The pencil is in the desk.*
Mettez cette lettre dans votre malle.	*Put this letter into your trunk.*

6. En renders *to, in*, or *into*, coming after the verbs *to be, to go, to reside*, followed by the name of a part of the earth, a country, or province:—

Notre ami est en France.	*Our friend is in France.*
Vous allez en Italie.	*You go to Italy.*

7. The preposition à is used for the words *at* or *to, in* or *into*, before the name of a town, city, or village, preceded by the verbs mentioned above:—

Il va à Paris le mois prochain.	*He is going to Paris next month.*

8. The same preposition is used in the expressions, à la campagne, à la ville, à la chasse, à la pêche, &c.

Nous allons à la campagne.	*We go into the country.*
Vous n'allez pas à la ville.	*You do not go to the city.*
Je vais à la chasse et à la pêche.	*I go hunting and fishing.*

9. Indicative Present of the Irregular Verbs,

Condui-re, 4. *to conduct.*	Ecri-re, 4. *to write.*	Li-re, 4. *to read.*
Je conduis, *I conduct, do conduct, or am conducting;*	J'écris, *I write, do write, or am writing.*	Je lis, *I read, do read, or am reading;*
Tu conduis,	Tu écris,	Tu lis,
Il conduit,	Il écrit,	Il lit,
Nous conduisons,	Nous écrivons,	Nous lisons,
Vous conduisez,	Vous écrivez,	Vous lisez,
Ils conduisent.	Ils écrivent.	Ils lisent.

Résumé of Examples.

Votre parent écrit il bien?	*Does your relation write well?*
Il écrit assez bien et assez vite.	*He writes well enough and rapidly enough.*
Nous avons assez de livres.	*We have books enough.*
Nous sommes assez attentifs à nos leçons.	*We are attentive enough to our lessons.*
Voilà la demoiselle dont vous parles.	*There is the young lady of whom you speak.*
Votre cheval n'est il pas dans le champ?	*Is not your horse in the field?*
Il n'y est pas, il est dans le jardin.	*It is not there, it is in the garden.*
Allez vous en France cette année?	*Do you go to France this year?*
Nous allons à Paris et à Lyon.	*We go to Paris and to Lyons.*
Où conduisez vous ce jeune homme?	*Where do you take this young man?*
Je le conduis en Allemagne.	*I take him to Germany.*
Demeurez vous à la ville?	*Do you live in the town?*
Nous demeurons à la campagne.	*We live in the country.*
Allez vous souvent à la chasse?	*Do you go often hunting.*
Nous allons quelquefois à la pêche.	*We sometimes go fishing.*

Exercise 65.

Associé, m. *partner.*	Fort, *very.*	Suisse, f. *Switzerland.*
Canif, m. *penknife.*	Pêche, f. *fishing.*	Terre, f. *farm, estate.*
Campagne, f. *country.*	Prusse, f. *Prussia.*	Ville, f. *town, city.*
Chasse, f. *hunting.*	Rapidement, *rapidly.*	Vite, *quickly.*
Commis, m. *clerk.*	Rend-re, 4. *to return.*	Voyage, m. *journey.*

1. Ecrivez vous encore la même leçon? 2. Je n'écris plus la même, j'en écris une autre. 3. Votre commis écrit il rapidement? 4. Il écrit fort bien, mais il n'ecrit pas vite. 5. N'avez vous pas assez d'argent pour acheter cette terre? 6. J'ai assez d'argent, mais j'ai l'intention de faire un voyage en France. 7. Voilà votre livre, en avez vous besoin? 8. Je n'en ai pas besoin, j'en ai un autre. 9. Avez vous encore besoin de mon canif? 10. Je n'en ai plus besoin, je vais vous le rendre. 11. Notre cousin demeure-t-il à la ville? 12. Il ne demeure plus à la ville, il demeure à la campagne. 13. Aime-t-il à aller à la chasse? 14. Il n'aime pas à aller à la chasse. 15. Il va tous les jours à la pêche. 16. Notre associé est il à Paris ou à Rouen? 17. Il est à Marseille. 18. Quand avez vous l'intention de conduire votre fils? 19. Je vais le conduire en Italie. 20. Demeurez vous à Milan ou à Florence? 21. Je ni demeure ni à Milan ni à Florence, je demeure à Turin. 22. Votre ami demeure-t-il en Suisse? 23. Il ne demeure plus en Suisse, il demeure en Prusse. 24. Votre domestique est il à l'eglise? 25. Non, Monsieur, il est à l'école.

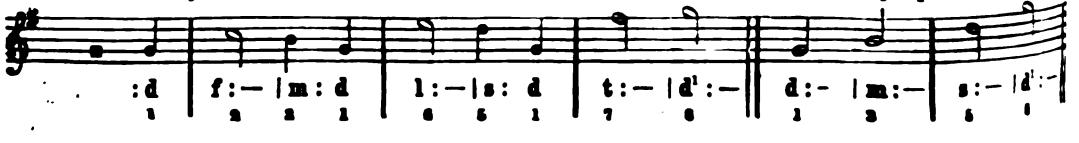
Exercise 66.

1. Does your clerk write as well as your son? 2. He writes tolerably well, but not so well as my son. 3. Have you books enough in your library? 4. I have not books enough, but I intend to buy some more. 5. Here is your sister's letter, will you read it? 6. I intend to read it. 7. Does your son like to go fishing? 8. He likes to go fishing and hunting. 9. What does he like to go fishing? 10. When I am in the country 11. What do you do when you are in the city? 12. When I am in the city, I read and learn my lesson. 13. Do you intend to go to France this year? 14. I intend to go to Germany. 15. Will you go to the city if it (*s'il*) rains? When it rains I always remain at home [R. 1]. 17. How many friends have you in the city? 18. I have many friends there. 19. Are there many English in France? 20. There are many English in France and in Italy (*Italie*). 21. Are there more English in Germany than in Italy? 22. There are more English in Italy than in Germany. 23. Is it fine weather in Italy? 24. It is very fine weather there. 25. Does it often freeze there? 26. It freezes sometimes there, but not often. 27. Does that young lady read as well as her sister? 28. She reads better than her sister, but her sister reads better than I. 29. Is there any one at your house? 30. My father is at home. 31. Is your brother-in-law there? 32. My brother-in-law is at your house. 33. There is none at home to-day.

LESSONS IN MUSIC.—No. VII.

By John Curwen.

M. Jeu de Berneval, in his expensive but admirable work "Music Simplified," uses certain signs for the notes of the scale, which well illustrate the closing remarks of our last lesson. He represents DOH, the key-note (the strongest of the three pillars of the scale), by a square firm-standing note; SOH, the fifth (next to the key-note in strength), by another, but standing on an angle; and ME, the third (also a strong note), by the ordinary round note; TE, the seventh (the most marked of the notes of "suspense and dependence," commonly called "the leading note," because of its "leading" to DOH, the key-note), he represents by a triangular shape pointing upwards, as though indicating its desire for DOH; FAH, the fourth (which is next in its leaning tendency), he marks by another triangular note, but pointing downwards, as though ready to resolve itself on ME; LAH and RAY are expressed by other signs which need not now be described. (LAH is a square with the sides hollowed out, and RAY a crescent moon.) We have seen another work in which the imagination of the author has represented the scale in the form of a four-barred gate,—DOH, ME, SOH, and upper DOH being the strong bars of the gate, while various animals and objects clinging to them set forth the various characters of "the leaning notes." We mention these illustrations for the purpose of retaining your attention on the *great musical facts* to which they point, and impressing them on your memory. For the same purpose we ask your attention to the following summary by Mr. Hickson (see "Westminster Review" and preface to "Part Singing") of M. Jeu de Berneval's views:—"After all we attach comparatively little importance to exercises on fourths or sevenths or any other intervals. They may be learnt by ear as well as nursery songs, and are so learnt in large classes. Progress is thus made, *but the pupil's great difficulty is in remembering* what 4ths, 3rds, 6ths, and 7ths are grouped promiscuously together. *What is the precise sound* [mental effect] *belonging to* each. As to learn this without the incessant practice of professional singers (which makes it an affair not of mind but of habit) appeal must be made to the understanding, and *the pupil must be taught to mark the quality of the sounds characteristic of each interval.* • • M. Jeu de Berneval's system [M. Jeu was professor of sight-singing at the Royal Academy of Music] which may be termed *an intellectual method*, differs entirely from that of Wilhem, which is purely mechanical from beginning to end. M. Jeu draws the attention of his pupils to the fact that each interval [it would be more correct to say each note of the diatonic scale *has a sound so peculiar to itself*, that, when character is once understood, they can never be at a loss to distinguish it from any other. For example, the 7th (TE) may be remembered by noting its tendency to *ascend* to the key (DOH). The ear cannot rest or repose on the 7th. It is a note of passage, leading to the octave of the key. The 4th (FAH) and the 6th (LAH) are in like manner notes of passage, the 4th having a tendency to *descend*. The 4th (FAH) leading to the 3rd (ME), and the 6th (LAH) to the 5th (SOH). While the 1st (DOH), 3rd (ME), 5th (SOH), and 8th (upper DOH), are all notes of repose,—notes upon which the ear may rest,—especially therefore, as the concluding chord of every composition, are remembered with ease as the most natural progression from the key-note to its octave. For example:—

Key G. *Leading notes.* *Notes of repose.*

[Let the learner in the old notation pay no attention to the new marks at the beginning of the staff. They will be explained in their place. They are inserted here for the sake of those who understand music. He has only to look for the place of DOH, indicated by the square note as before.] The way to impress these distinctions on the mind is, after having given the explanation, to sing or play to the pupil various intervals and to direct him to write them down, finding out for himself what the intervals are by listening attentively. We would strongly recommend the frequent repetition of such an exercise as one of the most profitable in which a pupil can be engaged. The teacher, however, must be careful, in singing, not always to use the same words or syllables, so as to give any other clue to the interval [note] than the actual sound [mental effect] belonging to it. [This is the practice of "copying by ear," which we shall recommend to our pupils in its proper place.] As an instance of the facility with which this power may be acquired, we may mention that we once heard a little boy, under six years of age (taught by M. Jeu), name correctly the intervals of every chord we struck on the pianoforte, the boy standing with his back to the instrument. Perhaps it is only the children of musicians—in the habit of hearing musical sounds from the moment of birth—who would at the same age attain an equal proficiency; but there is practically no difficulty in teaching either children or adults to distinguish by the ear separate intervals played upon a flute or a violin, and this kind of practice is generally as pleasing as it is profitable to the pupil."

Let us now simply state our own conclusions in reference to the three principal notes of the scale, asking our pupils to verify or reject them by observation.

DOH (being the "governing" note) gives a sense of POWER to the hearer, and of SECURITY to the singer in a greater degree than any other. The singer feels it to be the note to which he can, from any point, most easily return. It is more easy to perceive musical effects, than to find words that will sufficiently represent them; but if names must be given, this note should be called (in reference to its effect in a slow movement) THE STRONG OR *firm* NOTE.

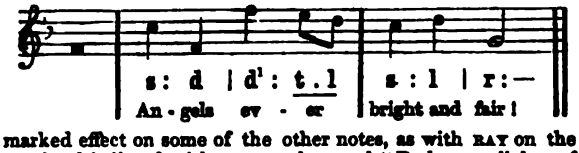
SOH has a similar effect to DOH, but is not equal to it in power. It may be distinguished (when sung slowly), as THE GRAND OR *clear* NOTE.

ME has a somewhat graver and softer effect than SOH. It may be denominated (especially in slow movements), THE STEADY OR *calm* NOTE.

When DOH, ME, and SOH, predominate in a tune, they contribute to its general character, if the movement be a quick one, great BOLDNESS and DECISION; and, if the movement be a slow one, they give to it DIGNIFIED SOLEMNITY. Of course, the power of any particular note to give a character to the tune in which it occurs, will depend on the frequency and the emphasis with which it is used, and will be modified, also, by the kind of "measure" and the rhythmical arrangement in which it occurs. In studying the following examples, let the pupil always strike the chord of the key-note, and part, at least, of the scale before he begins to sing the phrase; for our assertions in reference to the mental effects of notes are not true, unless the ear is first filled with "a sense" of the scale in which they occur.

For "dignified solemnity," notice the power of DOH, ME, and SOH, in the following opening phrases from Handel. You will remark how, in each case, the great artist takes advantage of these bold and grand notes to bring out, by contrast, a very

KEY F.



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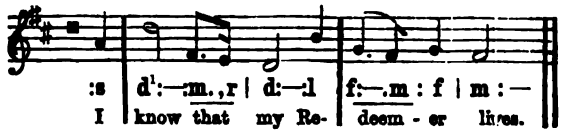
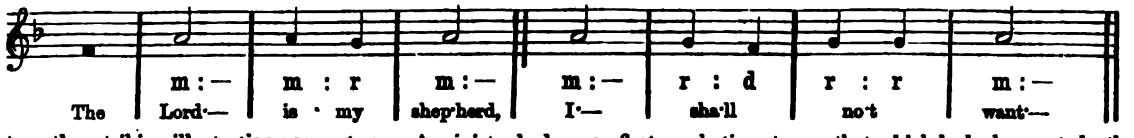

marked effect on some of the other notes, as with RAY on the word "fair," and with FAH on the word "Redeemer;" but of these notes we shall speak afterwards. You will also notice how the "triple time" (trinary measure), in the second example, allows increased emphasis and power to the great notes which so fully express the grand and sure confidence of faith.

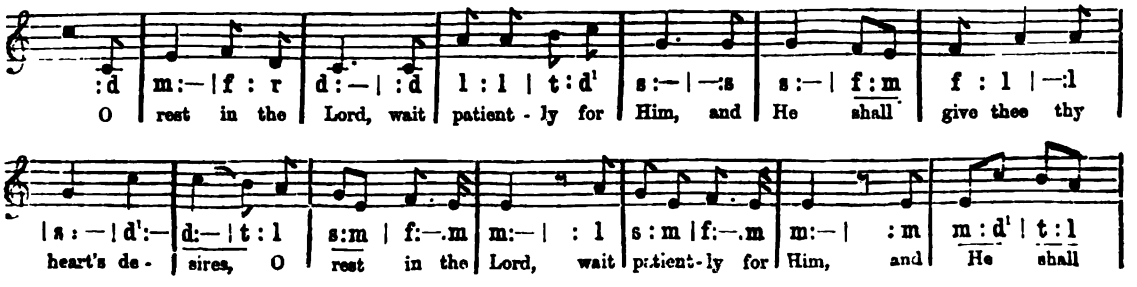
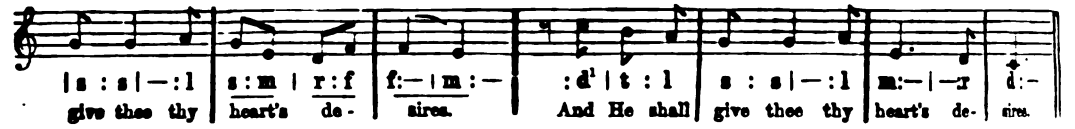
To illustrate the peculiar effect of ME, when sung slowly—so full of SERENE REPOSE—it might be enough to refer to the calm and restful effect of that best-known of all chants, of which the churches will never weary—Tallis's Gregorian Chant—

KEY F.

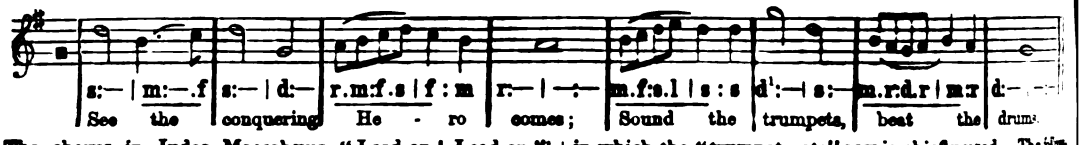


But another striking illustration occurs to us. A minister had heard, and had been greatly moved by Mendelssohn's song—"O! rest in the Lord." He preached on the text, and thought much of that repose which comes, not with weariness or sleep, but with living blessedness. Sometime after, thinking on the power, of the notes of the scale, it occurred that Mendelssohn must surely have expressed the idea of *rest in God*, chiefly by means of the third note of the scale, ME, which we have called the note of serene repose. "If, by any other note," he said to himself, "that peculiar effect was produced on my mind so strongly, then the theory about mental effects must fall to the ground." He at once analysed the song, and found, that the very first emphatic note was that which he had expected—that the power of this note was brought out, by placing it in ever-varying but most effective positions; and, that even when the key changes, the ear is surprised and pleased by the recurrence again of this same third note in the new scale. Among other studies, in this delightful song, it was pleasant to notice the change in the manner in which the word "Lord" is expressed in the latter part of the song. At first, it is uttered with the firm and sure confidence of the note DOH; but, when that spirit of confidence has risen to a somewhat triumphant feeling, then it must use the "clear" and "grand" note SOH.

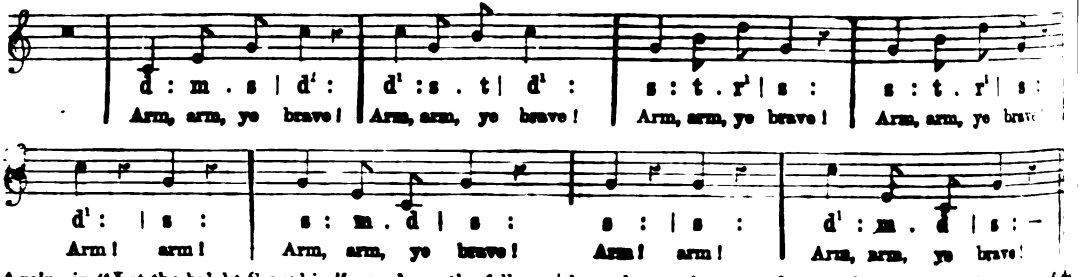
KEY C.


:d | m :— | f : r | d :— | :d | l : l | t : d' | s :— | —:s | s :— | f : m | f : l | —:l
O rest in the Lord, wait patient - ly for Him, and He shall give thee thy
| s : — | d' :— | d :— | t : l | s : m | f :—.m | m :— | : l | s : m | f :—.m | m :— | : m | m : d' | t : l
heart's de - sires, O rest in the Lord, wait pa.tient - ly for Him, and He shall

Notice the effect of ME, in each case where it occurs on the strong parts of the measure, but especially in the last case in this quotation. What full-hearted satisfaction and perfect rest it brings! The words and the music aid each other to move the heart.

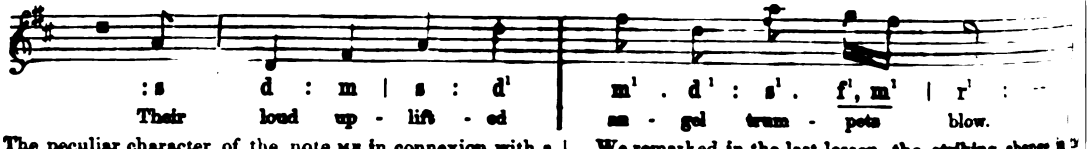
For the effect of "boldness and decision," which DOH, M and SOH (sung somewhat quickly) give to a tune, we may quote the martial music of Handel. "See the conquering Hero comes" begins thus:—

KEY G.

The chorus in Judas Maccabæus, "Lead on! Lead on!" begins thus,—KEY D. : s | d¹ : s | d¹ : s | d¹ : s | d¹. The call to arms in the same oratorio makes the most emphatic use of these notes. The most inspiring call is evidently that in which the "trumpet note" SOH is chiefly used. The following are some of the phrases in which the call to arms is the most *bold* and *decided*.

KEY C.

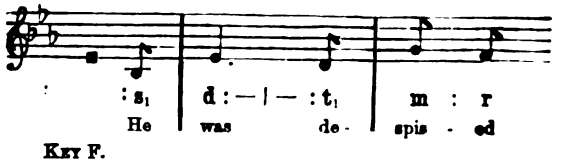

d : m . s | d¹ : | d¹ : s . t | d¹ : | s : t . r¹ | s : | s : t . r¹ | s :
Arm, arm, ye brave! Arm, arm, ye brave! Arm, arm, ye brave! Arm, arm, ye brave!
d¹ : | s : | s : m . d | s : | s : | s : | d¹ : m . d | s : —
Arm! arm! Arm, arm, ye brave! Arm! arm! Arm, arm, ye brave!

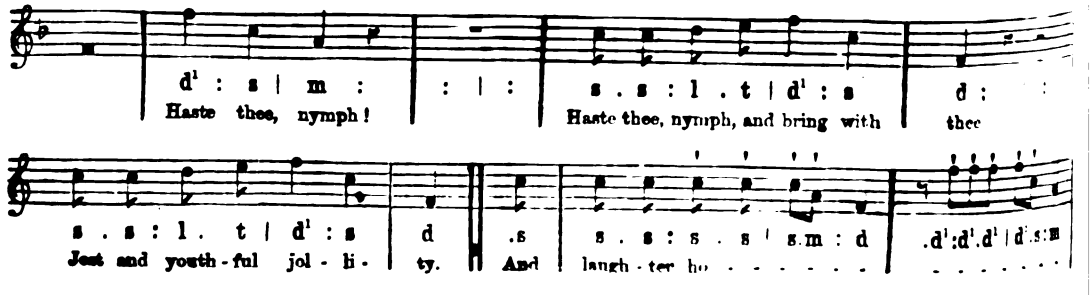
Again, in "Let the bright Seraphim" you have the following bold phrase at the opening. Could this bold character have been given to the words by any other note of the scale?—

KEY D.

The peculiar character of the note ME in connexion with a rather quick movement is strikingly illustrated by the opening of the song, in the Messiah, "He was despised," in which the singer does not, for the moment, express sympathy with the despised one, but rather seems passingly to personate the despiser. As you sing lessen the accent to DOH, and throw a fuller force of voice on ME.

We remarked in the last lesson, the striking change in the mental effect of a note produced by rapidity of movement, and observed that, though seemingly opposed, these double mental effects do hold a real relation to each other. We spoke of LAH passing (by change of movement) from the "abandonment of *sorrow* to the "abandonment" of *joy*. We have now noted the mental effect of DOH, ME, and SOH passing from the "dignified and solemn" to the "bold and decisive," and, by using yet quicker movement still, we may find these same notes, never, mark you, passing into that emotional character which belongs to TE, RAY, FAH, and LAH, but—expressing the *hearty* laughter "holding both its sides" of which Milton wrote, and Handel sung.

KEY E♭. M. 52. *Quickly.*



KEY F.

d¹ : s | m : : | : s . s : l . t | d¹ : s d :
Haste thee, nymph! Haste thee, nymph, and bring with thee
s . s : l . t | d¹ : s d .s s . s : s . s | s.m : d .d¹:d¹.d¹ | d¹:s:m
Jest and youth-ful jol - li - ty. And laugh - ter ho - - - - - - - - - - - -

The laughter having thus commenced with the last phrase, which is repeated in the other "parts" also, next changes to another key (that of the subdominant), but still keeping DOH, SOH, ME, as its accented notes. It afterwards falls into laughter of a different style, which is more musical, perhaps, but not so open and hearty. Enough of the example is given to show the character of DOH, ME, and SOH in rapid movements.

We trust that our pupils will study all these examples with great care, and practise them well. They could not have better exercises for voice or ear. An earnest endeavour to study the mental effect of notes will very greatly increase the power of singing those notes with accuracy.

LESSONS IN BOTANY.—No. VIII.

CLASS IX.—ENNEANDRIA.

Plants bearing flowers with *Nine* Stamens.

ORDER I. HEXAGYNIA. *Six Pistils.*

THE only plant found wild in England that belongs to this class, is the flowering rush. It is often called the water-gladiole. The old writers named it "grassie rush." One of them is exceedingly laudatory of this plant. He states that, "It is of all others the fairest and most pleasant to behold, and serveth very well for the decking and trimming-up of houses, because of the beautie and braverie thereof." The flowering rush grows in ditches, pools, slow rivers, and lakes in England and Ireland, and flowers in June and July. It has a round smooth stalk, which, according to its situation, rises from one to six feet in height. At the top of it is an umbel or head of flowers of a delicate rose-colour, tinged with purple. So sharp are the edges of the leaves, that they often wound the mouths of cattle. This plant, so stately from its height, and so beautiful from its cluster of flowers, is so hardy as not to be injured by a very severe frost, and might be made very ornamental to pieces of water.

CLASS X.—DECANDRIA.

Plants bearing flowers with *Ten* Stamens.

ORDER I. MONOGYNIA. *One Pistil.*

The arbutus, or strawberry-tree, is a beautiful shrub, bearing branches of white flowers of the present year, while the red berries of the last season, remain pendant upon it. It grows without culture in the West of Ireland, near the Lake of Killarney, on barren limestone rocks, to which it is a very delightful ornament. It has a very small cup, an egg-shaped corolla of one petal, with small segments, a woody stem, leaves smooth and toothed at the edges, and small seeds of a bony hardness. It flowers in September. It is a native of the South of Europe; it bears fruit of a fleshy substance like a strawberry. It is edible, and in Spain, both a sugar and a spirit are extracted from it.

The *black* bear-berry is so called from the colour of its berry; but its flowers, which appear in May and June, are white. It is a small shrub, which grows on dry, mountainous heaths in Scotland. The *red* bear-berry is a small shrub, growing abundantly on dry heaths. Its flowers are pale rose-coloured, or white, and grow in short, drooping clusters. The berry is bright red, mealy, and harsh, but often eaten in the Highlands. The leaves of this plant are used as an astringent and tonic in medicine.

DIGYNIA.

There are twenty-one wild species of the true saxifrage. They are distinguished by a calyx divided into five parts, a corolla of five expanding petals, narrow towards the base; a capsule or seed-vessel of one cell, terminating with two beaks or sharp points, in which are lodged many minute seeds. The golden saxifrage is much esteemed in some places as a salad, and is remarkable for its medicinal virtues. It blooms by the side of rivers, in the month of May. The white saxifrage is often found, in the same month, in meadows and on hedge-banks. It has a larger flower than some other kinds, and is remarkable for a bearded root, composed of a number of little bulbs, connected together in clusters by the fibres. Of a bright red colour, they resemble strings of coral beads. The stem is hairy, a little branched, and grows about a foot high, the leaves next the root are kidney-shaped, and placed on long foot-stalks. The flowers, in small bunches, terminate the stalk, and are white, streaked with yellow. No one of these plants is so well known as "London pride." It has been supposed that its name is derived from its growing on the little soil which borders the paved yards of the city, unharmed by its smoke and fog. Frequently, however, it adorns the cottage border. It requires a microscope to show all its beauty, and on examination of it by such means, justifies its old name of "Queen Anne's needlework," resembling as it does, an exquisite embroidery. The people of Ireland call it, strangely enough, St. Patrick's cabbage.

In the same order appear the rich carnation, with its aromatic odour, the whole tribe of pinks, and the modest sweet-william. If we trace some of them, in the true spirit of botanists to the fields, we shall find the pinks agree in having a cup formed like a cylinder, toothed at the mouth, and having four scales encompassing the base. The corolla has five petals, with claws of the length of the cup, and a capsule of one cell, opening with four teeth. The Deptford pink grows in pastures and hedges, and flowers in July and August. The proliferous pink grows in sandy pastures and flowers in July. The clove pink, naturalised on old walls, in various parts of England, flowers in June and July. The maiden pink grows in dry hilly banks and pastures, and flowers from July to October. The mountain pink grows on Cheddar rocks, Somersetshire, and flowers in July. The sweetwilliam has its flowers incorporated, or one head formed of many single flowers.

TRIGYNIA.

There are many kinds of catch-fly, which are distinguished by the honey-cup, composed of two little teeth at the neck of each petal, forming a kind of crown at the mouth of the tube. They grow in various places, as in cultivated fields, in sandy corn-fields, in pastures, and among rubbish. One species grows on the sea-shore above water-mark, another on rocks and walls, and on hilly pastures, and another in dense tufts and patches towards the summits of the Highland mountains, as well as on those of Wales. They generally flower in June and July.

Of stitchworts there are also several kinds. One of them grows most beautifully on loamy soils. It used to be called all-bones, or white-flowered grass. It is a very delicate and tender plant. So brittle is it that, in attempting to pull up the root, it breaks just above the fibre; and has often been said, in consequence, to have no root. The flower, white as the driven snow, and not much smaller than the primrose, is very common in most parts of England, and richly adorns our hedges in "the merry month of May."

PENTAGYNIA.

As this word has not occurred before, we apprise the reader that it means *five* pistils. Many are the plants thus distinguished; of which we can notice only the stonecrops and the woodsorrel. There are several kinds of the former plant, some having red and others white flowers. They are very similar in nature and habit; except the live-long, or orpine, which grows in the borders of fields, in hedges, and among rubbish, and flowers in August. It has a spotted stem; but, unlike the other stonecrops, has broad leaves, which are sometimes boiled and eaten. A large white kind of stonecrop adorns the rocks on the Highlands, with its white flowers and its thick green leaves; it is called English stonecrop. The biting stonecrop is often called wall-pepper, from its pungent taste. Some of the stonecrops have purplish flowers, but the greater number have yellow blossoms. All have very fleshy, juicy stems and foliage; hence they are enabled to retain a quantity of moisture during drought, and in places so dry, that little is yielded by the soil to their roots. This fact led to the lesson:

> "There from his rocky pulpit, I heard cry
> The stonecrop: See how loose to earth I grew,
> And draw my juicy nurture from the sky:
> So draw not thou, fond man, thy root too low,
> But loosely clinging here,
> From God's celestial sphere
> Draw life's unearthly food—catch Heaven's undying glow.

Most of the stonecrops bloom during the months of June and July. The purple orpine flowers two months later.

When the spring is forward, we shall find an abundance of the pretty flowers of the woodsorrel in the month of April,

Its delicate light green tripled leaf with its blossom so beautifully pencilled, adorns the woodlands; and in the thickest part of them these plants are generally the most plentiful, especially round the trunks of decayed trees. It is, in truth, though not in name, a sensitive plant; shrinking from the touch, closing its foliage and drooping at the approach of evening, and even when the rain is coming.

Children like the sorrels for their acid flavour; but, though harmless in small quantities, they are not so when eaten more freely. The expressed juice of this plant is used to remove spots and ironmoulds from linen. Gerarde, the old herbalist, says, "Apothecaries and herbalists call the woodsorrel alleluya and cuckowe's meat; either because the cuckowe feedeth thereon, or by reason when it springeth forth the cuckowe singeth most; at which time also alleluya has wont to be sung in our churches."

LESSONS IN GEOLOGY.—No. V.

By Thomas W. Jenkyn, D.D., F.G.S.

You have learnt how the earth's crust has been formed by cooling, and how sedimentary rocks deposited by water have been dislocated by eruptive rocks. You will now enter on a course in which, as was intimated in the last lesson, the various causes of subsequent changes in the earth's crust will be considered. We begin with volcanoes.

CHAPTER I.

ON THE CHANGES PRODUCED IN THE EARTH'S CRUST BY THE ACTION OF VOLCANOES.

SECTION I.

ON THE CRATERS OF VOLCANOES.

A volcano is a fissure, or perpendicular tunnel, in the earth's crust, through which heated matter from below is thrown up to the surface. This fissure goes under various names among geologists: it is called the vent, the chimney, the chasm of the volcano. The matter, which is thrown up, may be in the form of lava, scoriæ, or ashes. It is the upper part of this vent, or chimney, that is called the crater. It is always in the form of an inverted cone, or in the shape of a funnel or tunning dish, with the broadest part upward.

The structure of these craters exhibits manifold phenomena, according to which geologists give them different names; such as craters of Eruption, and craters of Elevation. There are, also, instances in which both kinds of craters are found in one mountain.

i. *Craters of Eruption.*

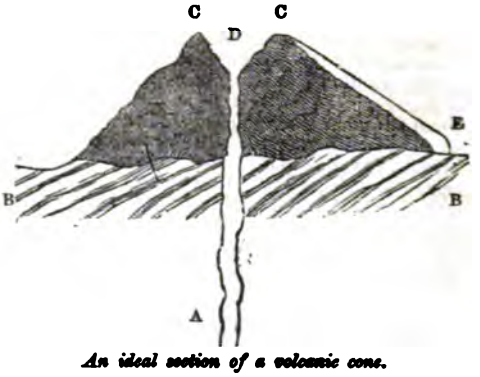
You have seen how the action of fire, however deeply seated in the earth's crust, may produce a fissure through its entire thickness. You can easily imagine that, as the deep fires below are sending up boiling streams of lava, emitting floods of hot mud called tuf, or hurling up showers of ashes and cinders, all these would gather or fall around the mouth of the vent. In proportion to the continuance and the repetitions of such eruptions, successive beds of volcanic products would accumulate around the mouth, and form themselves into the shape of a sugar-loaf or cone.

Look at a molehill. Put your stick through it from the top of it to the hole from which it was thrown up. Give a twirl to the stick in your hand, so that the opening at the top shall be wider than the vent at the bottom, and you have exactly a crater of eruption.

When the fresh matter erupted from a volcano comes down in a new shower, or cools down as a fresh overflow of lava, it forms regular beds around the whole of the commenced cone; and these new beds incline regularly towards the sides of the original cone, and have what geologists call a quaquaversal dip. This word means that the new beds or coatings dip equally all around the cone, just as when you put six saucers placed on the top of each other, and all upside down, the upper five have a quaquaversal dip around the bottom saucer. Or, if you imagine that in our molehill, the earth pushed up by the mole was, in each push, of a different colour, the different coloured soils would fall round the vent with a quaquaversal dip.

The height and the steepness of these cones, and the extent and the depth of these craters vary exceedingly in different volcanoes. The conical hill in which the vent exists, is formed, in most instances of the volcanic ashes and cinders which have been thrown up, and of streams of lava which have subsequently flowed over the ash accumulation.

Fig. 8

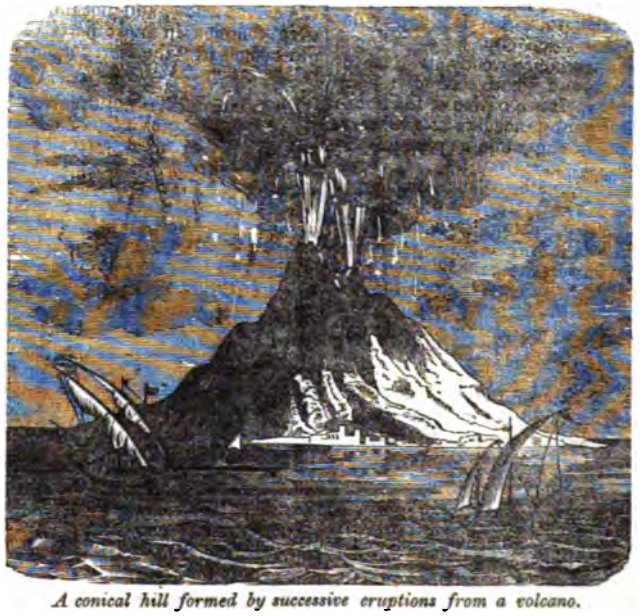


An ideal section of a volcanic cone.

Fig. 8 represents a crater of eruption. A is the fissure or vent produced by deep-seated heat. B B is a portion of the earth's crust through which it has penetrated. C C is a mass of cinders and ashes which has settled on the surface of the rock B B. D is the funnel-shaped crater of the volcano. E, a stream of lava which has flowed over the cinders, and has cooled upon it as a covering of the whole. This stream of lava is represented in the woodcut as flowing on one side only of the cone; but in reality it may boil up to the summits of C C, and then flow over the whole edge of the crater, all around, just as water is made to boil over the edges of a round vessel when steam has been generated at the bottom by heat.

When the cone and the crater of fig. 8 have been formed, you will see that every fresh eruption from A, will add new materials to cover what has already gathered. It is known that according to the expansive power of the gases entangled below, it will hurl large quantities of lava high up in the air. The mass hurled up separates into fragments of a spongy texture

Fig. 9.



A conical hill formed by successive eruptions from a volcano.

or, a part of it may become fine and impalpable powder. When the materials, thus hurled up, return in showers, you will see, by referring to fig. 8, that they will fall around the mouth of the vent. As these successive showers fall, they form additional layers, coverings or envelopes of scoriæ or dust all around, and dipping on all sides from the central orifice, as represented in fig. 9.

It is not unfrequently the case that the struggle of the entangled gases, in the melted matter, is so great as to wear away

Fig. 10.

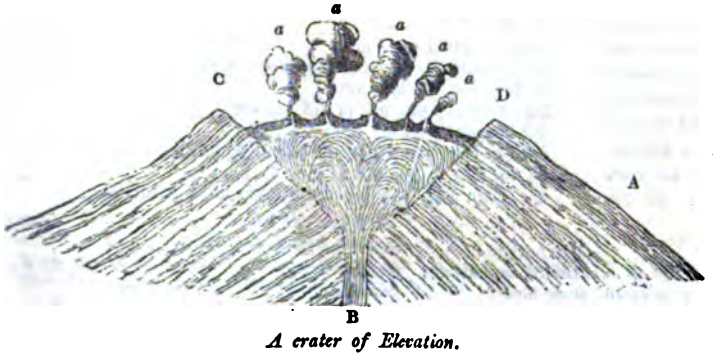
Barren Island, Bay of Bengal.

the sides of the vent or chimney, till the sides of the cone become too weak to withstand such an onset. The result is that the cone itself becomes cracked and fissured, and the burning lava flows out from the middle of the cone, or at the bottom of the hill, as is represented in fig. 10.

ii. *Craters of Elevation.*

In most instances, craters are formed by the rupture of horizontal strata previously existing on the crust of the earth. By this rupture the beds are tilted up, and thrown into highly inclined planes, on each side of the fissure, and of the melted matter which flows between the cliffs. In this case also, a cone is produced, with a central vent or chasm, between the dislocated rocks. On the declivities, on each side the gulf, the volcanic materials, thrown up by different eruptions, settle down so as nearly, or completely, to cover the original rocks through which the fissure was made. Craters of this kind are called craters of elevation, because they are formed by elevating the horizontal strata in which they are formed, until the beds snap, and rest in inclined planes about the mouth of the fissure. This name was first given to them by the Prussian geologist, L. von Buch.

Fig. 11



A crater of Elevation.

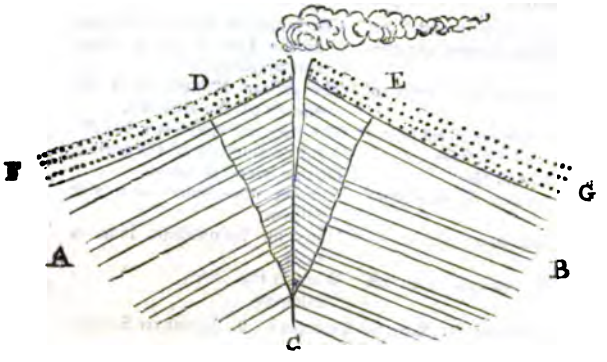
Fig. 11, represents a crater of elevation. A A are rocks which were originally horizontal, but which have been tilted up and snapped asunder by the force of melted matter at B. The melted matter is not sufficient in quantity to flow over the edges of the crater C D; or, the expansive power of the entangled gases below B, is not of sufficient intensity to throw it up in the air. It therefore boils in the crater. As it boils, the atmosphere cools its surface, and covers it with a thin crust, which will continue to thicken and accumulate as volcanic materials may escape at the minor vents *a a a a a*.

The theory of craters of elevation supposes that deeply-seated volcanic matter is in a state of fusion, expanding and swelling up until it reaches the concave roof of the earth's crust, penetrates the crust, and pushes against the sedimentary beds on the surface, with a force that heaves them up. As the upheaving continues, the solid beds at last give way and are broken asunder so as to produce a chasm, which, as represented in fig. 11, forms the mouth of the crater. This enlarged mouth is kept open partly by the melted matter wearing away the sides of the crater, and partly by the continued passage upward of steam and of other gaseous fluids.

iii. *Craters of Eruption and Elevation combined.*

In the crater of eruption represented in fig. 11, the surface of the boiling lava cools and forms a thin film or crust. Imagine the minor vents *a a a a a* to be closed, and the power of vent to become so intense as to keep a fissure open to the surface; then, with every new eruption, a fresh film or crust would be formed, until it reached the edges of the crater C D. The elastic gases and vapours, now having a free passage upwards by one vent, would pile up successive heaps or layers of ashes, cinders, and lava, in a curved or conical form, until eventually it formed a cone far higher

Fig. 12.



A crater of Eruption formed on a crater of Elevation.

than the original edges of the crater of elevation. In this case you would have in one mountain a crater of eruption formed upon a crater of elevation, as represented in the above woodcut.

Fig. 12, represents a crater of eruption, formed upon one of elevation. The horizontal strata A B are sedimentary rocks heaved up till they burst by the force of igneous action at C. Through the fracture between the dislocated rocks, gases and elastic vapours have free vents towards the surface, as represented in *a a a a a*, fig. 11. As the igneous force from below acquires intensity sufficient to form one great vent, and continues to throw up lava, cinders, or ashes, it will pile up these products in beds or layers of conical form as represented by the black lines in fig. 12, within the chasm D C E. After filling up this chasm between D E, it will, according to the continuance, and the repetition of eruptions, throw up heated materials, which will scatter themselves on all sides F G, until they entirely envelop and cover up the original rocks, as is represented by the dotted lines.

LESSONS IN GERMAN.—No. VI.

Section XIV.

Nouns of the New Declension form their *genitive* by adding n or en to the *nominative*. Ex.: Nom. Der Menſch, the man, the human being; der Herr, the Lord, or Mr.; der Fürſt, the prince; der Elephant, the elephant, &c. Gen. Des Menſchen, des Herrn, des Fürſten, des Elephanten, &c. Nouns of this Declension retain the form of the genitive in the dative and accusative.

Nearly all *masculine* nouns that end in e belong to the New Declension.

NEW DECLENSION OF THE NOUN.

N. Der gute Knabe, the good boy;	der Ochſe, the ox;
G. Des guten Knaben, the good boy's;	des Ochſen, of the ox;
D. Dem guten Knaben, to the good boy;	dem Ochſen, to the ox;
A. Den guten Knaben, the good boy;	den Ochſen, the ox.

Exercise 14.

An'ſtrengend, fatiguing, toilsome;	Grieche, *m.* Greek;	Pole, *m.* Pole;
Chriſt, *m.* Christian;	Hauptmann, *m.* captain;	Prinz, *m.* prince;
Deutſche, *m.* German;	Heiter, briak, lively;	Ruhig, quiet, peaceable;
Franzoſe, *m.* Frenchman;	Immer, always, ever;	Ruſſe, *m.* Russian;
Freiheit, *f.* liberty, freedom;	Jude, *m.* Jew;	Schreibtiſch, *m.* writing-desk;
Freiſtaat, *m.* republic;	Knabe, *m.* boy;	Soldat', *m.* soldier;
Fürſt, *m.* prince;	Land, *n.* country;	Sondern, but;
Geſicht', *n.* countenance, face;	Leben, *n.* life;	Türke, *m.* Turk;
Gewiſſ'en, *n.* conscience;	Monarchie', *f.* monarchy;	Unſer, our;
Graf, *m.* count;	Nachbar, *m.* neighbour;	Unſicher, unsafe, uncertain;
	Neffe, *m.* nephew;	Zeichen, *n.* sign, token;
	Nichte, *f.* niece;	

Karl der Große ſtarb in dem Jahre des Herrn Acht hundert und vierzehn.	Charlemagne died in the year of the Lord eight hundred and fourteen.
Der tapf'ere Ungar iſt der Feind des Ruſſen.	The gallant Hungarian is the enemy of the Russian.
Das duf'tende Veilchen iſt ein ſchönes Erzeug'niß des Frühlings.	The fragrant violet is a beautiful production of the spring.
Verdien'tes Brod iſt ſüß.	Earned bread is sweet.
Ein gutes Gewiſſ'en iſt ein ſanftes Kiſſen.	A good conscience is a soft pillow.
Mancher flei'ßige Mann iſt arm.	Many an industrious man is poor.
Noth iſt der verdien'te Lohn der Faulheit.	Want is the merited reward of idleness.

1. Hat der Franzoſe den Wein des Deutſchen? 2. Ja, und der Deutſche hat das Tuch des Franzoſen. 3. Was hat der Ruſſe? 4. Er hat das Land des Polen. 5. Dieſer Grieche iſt kein Freund des Türken. 6 Wer hat das ſcharfe Meſſer dieſes Knaben? 7. Der Freund dieſes Griechen hat es. 8. Haben Sie den Schreibtiſch Ihres Neffen? 9. Nein, ich habe den Schreibtiſch meines Vaters. 10. Haben Sie das Buch dieſes Knaben, oder das Papier ſeines Neffen? 11. Ich habe das Buch des Knaben, und meine Nichte hat das Papier des Neffen. 12. Iſt unſer Freund, der Hauptmann, ein Franzoſe, oder ein Grieche? 13. Er iſt ein Franzoſe und ein großer Feind des Ruſſen. 14. Iſt dieſes Kind ein Sohn unſers Nachbarn, des Kaufmannes? 15. Nein, es iſt der Sohn eines Juden, und ſein Vater iſt der Nachbar eines Chriſten. 16. Ein heiteres Geſicht iſt nicht immer das Zeichen eines ruhigen Gewiſſens. 17. Haben Sie das Buch des Grafen? 18. Nein, ſondern der Prinz hat das Buch. 19. Das Leben eines Soldaten iſt anſtrengend und unſicher. 20. Haben Sie eine Monarchie oder einen Freiſtaat? 21. Amerika hat keinen Fürſten, ſondern Freiheit. 22. Ich habe eine goldene Uhr, und Sie haben einen ſilbernen Bleiſtift.

1. The writing-desk of the gallant Pole. 2. The life of a prince is unsafe. 3. The gallant Pole countenance is an enemy of the Frenchman. 4. Is he a friend of the good captain? 5. That soldier is the brother of his beautiful cousin. 6. The diligent son of the briak German has a good conscience.

Questions. 1. How do nouns of the New Declension form their genitive? 2. Can you repeat some examples in the nominative and genitive? 3. What three cases are alike? 4. To what declension belong nearly all masculine nouns ending in e?

Section XV.

When mein, dein, ſein, &c. (§ 58) are not followed by an adjective, or a noun, they are called absolute possessives; and are declined, as are also kein and ein, like an adjective of the Old Declension. Ex.:

Mein Hut iſt groß und ſein-er (ſein Hut) iſt klein.	My hat is large and his (his hat) is small.
Sein Hut iſt groß und mein-er (mein Hut) iſt klein.	His hat is large and mine (my hat) is small.
Sein Buch iſt neu, ihr-es (ihr Buch) iſt alt und Ihr-es (Ihr Buch) iſt ſchön.	His book is new, hers (her book) is old, and yours (your book) is beautiful.
Er hat Geld und Sie haben kein-es (kein Geld).	He has money and you have none (no money).

Eines and keines (the *neuters*) often drop the vowel of the final syllable; thus producing the forms eins and keins: as,

Er hat ein Pferd, Sie haben eins, und ich habe keins.	He has a horse, you have one, and I have none.

OLD DECLENSION OF THE ADJECTIVE IN ALL GENDERS.

	Masculine.	*Feminine.*	*Neuter.*
N.	Gut-er Wein, good wine;	gut-e Seide, good silk;	gut-es Waſſer, good water;
G.	Gut-es Weines, of good wine;	gut-er Seide, of good silk;	gut-es (§ 28) Waſſers, of good water;
D.	Gut-em Weine, to, for good wine;	gut-er Seide, to, for, good silk;	gut-em Waſſer, to, for good water;
A.	Gut-en Wein, good wine.	gut-e Seide, good silk.	gut-es Waſſer, good water.

II. Etwas is to be rendered "something," "anything." Ex.: Haben Sie etwas? have you anything? Ich habe etwas, I have something.

Nicht (not) is seldom used with etwas; "not anything" being translated by nichts, which also signifies "nothing." Ex.: Ich habe nichts, I have not anything, or, I have nothing. So etwas is best translated, "such a thing."

III. "*At all*" in such phrases as "nothing at all," "none at all," and the like, has in German its equivalent in the particle gar, which, however, always comes immediately *before* the word to which it relates. Kindred to this, is the still stronger expression „ganz und gar", wholly and utterly; „ganz und gar nicht", wholly and utterly not, i.e. by no means; not at all.

IV. When an adjective is used with „etwas" or „nichts", it follows the Old Declension, and is written with a capital initial. Ex.:

Ich habe etwas Schönes, I have something beautiful.
Er ſagt nichts Schlechtes, he says nothing bad.
Sie ſprechen von etwas Neuem, you speak of something new.

V. German verbs are conjugated *negatively* in the *present* and *imperfect* tenses, without an auxiliary, like the English verbs "have" and "be." Ex.:

Ich habe nicht, I have not;
Er ſieht nicht, he sees not (he does not see);
Er hatte nicht, he had not;
Ich ſah nicht, I saw not (I did not see);
Sie ſind nicht, you are not;
Sie hört nicht, she hears not (she does not hear).
Es war nicht, it was not;
Sie liebten nicht, they loved not (they did not love).

Exercise 15.

Ander, other;	Gerber, *m.* tanner;	Sauer, sour;
Barbier', *m.* barber;	Gerſte, *f.* barley;	Schön, beautiful, fine;
Blau, blue;	Hafer, *m.* oats;	Seife, *f.* soap;
Buch'binder, *m.* bookbinder;	Häßlich, ugly;	Stimme, *f.* voice;
Etwas, something, anything;	Hier, here;	Süß, sweet;
Gar, (See III.);	Leder, *n.* leather;	Weizen, *m.* wheat;
	Nichts, nothing;	Wenig, little, few;
	Roth, red;	

Das Meer'waſſer hat einen ſalz'igen Geſchmack'.	The sea-water has a salt taste.
Dieſer Schneid'ergeſelle iſt ein geſchickt'er Ar'beiter.	This journeyman tailor is a skilful workman.
Der Hund iſt ein treues Thier, und die Katze iſt ein ſchlaues Thier.	The dog is a faithful animal, and the cat is a sly animal.
Sie haben etwas Schönes, und ich habe etwas Gutes.	You have something fine and I have something good.
Der Adler iſt ein Raub'vogel.	The eagle is a bird of prey.

1. Hat dieſer Tuchhändler gutes Tuch? 2. Ja, er hat gutes Tuch— und dieſer Gerber hat gutes Leder. 3. Was hat der Barbier? 4. Er hat gute Seife. 5. Wer hat gutes Heu? 6. Dieſer Bauer hat gutes Heu. 7. Was hat der Schmied? 8. Er hat gutes Eiſen, und ſein Bruder der Papierhändler hat gutes Papier, rothes, blaues, und weißes. 9. Haben Sie rothen oder weißen Wein? 10. Ich habe weder rothen, noch weißen. 11. Ihr Wein iſt ſüß, aber dieſer hier iſt ſauer. 12. Ihr rother Wein iſt ſtark, und der weiße Wein meines Nachbarn iſt ſchwach. 13. Hat dieſer Müller gutes Mehl? 14. Ja, und dieſer Bauer hat gutes Korn, guten Hafer, und gute Gerſte. 15. Dieſes Mädchen hat eine ſchöne Stimme. 16. Mein Bruder hat etwas Schönes und ich habe nichts Häßliches. 17. Dieſer Mann hat nur ein wenig Geld, und der andere hat gar keins.

1. Has my brother the tailor black (ſchwarzes) or red cloth? 2. The friend (meines) of my brother has good paper, red, blue (blaues), and white. 3. The son of the bookbinder has something of the barber (des). 4. The beautiful daughter of the old blacksmith has a dog and a cat. 5. The diligent carpenter (Tiſchler) has something beautiful. 6. The draper is a son of the industrious merchant (Kaufmannes). 7. The old tanner had not seen (geſehen) the sly cat and the faithful dog. 8. Is the carpenter at home (zu Hauſe)? No, he is not (Nein). 9. Have you taken something (genommen)? I have taken nothing. 10. Has pump-water (Brunnenwaſſer) a sweet or a salt taste? It has not a salt taste, but a sweet taste (keinen ſondern).

Questions. 1. How are the absolute possessive pronouns declined? 2. Are *eins* and *keins* often contracted? 3. How? 4. In what two ways is *nichts* rendered in English? 5. How is *etwas* rendered? 6. „Es etwas"? 7. How is *gar* rendered? 8. *Ganz* and *gar*? 9. How is an adjective declined, and how written after *etwas* and *nichts*? 10. How are German verbs conjugated negatively? 11. What analogy is noticed in the same tenses?

LESSONS IN GEOGRAPHY.—No. V.

ARABIAN NOTIONS—EUROPEAN TRAVELS—DISCOVERY OF AMERICA.

The Arabians, by a series of brilliant conquests under the successors of one of the greatest impostors the world ever saw, had reached a state of comparative ease and power, and had devoted themselves during the dark ages of Christianity to the study of the exact sciences, in as far as they had escaped the ravages of one of their own princes, who destroyed the library of Alexandria, which contained the treasures of the remotest ages. Geography, in connexion with astronomy, was one of the most interesting subjects of their investigation. But their cosmological system was scarcely less absurd than that of the ancients. They divided the world into seven climates, and each climate into a certain number of regions. Although some of the Arabs had made long voyages, and one of their geographers had actually explored Africa as far as Djoliba (the Niger), and the region in which is situated the famous Timbuctoo, still their knowledge of this continent was very incomplete. They always made the Indian Ocean an inland sea; and although they were familiar with the use of the astrolabe (an instrument similar to a quadrant) and the mariner's compass, they were afraid to navigate the open seas, a fact which contributed to their continued ignorance. One of the most learned Arabian geographers of the twelfth century, Edrisi by name, the same who constructed for Roger, king of Sicily, the famous silver planisphere which weighed 800 marcs (about 400 lb.) had the most singular ideas of the terrestrial globe. He fancied that all the people of the world lived in the northern regions; that the southern regions were desert on account of the sun's heat; that the latter were situated in its lower part; and that, consequently, all the waters were dried up, and that no living being could exist in those regions. He asserted that the ocean entirely enveloped the globe like a circular zone, so that only one part appeared like an egg partly immersed in water in a vessel. He placed Africa in the first climate, which commenced at the western sea, called the *Sea of Darkness*; and beyond this all existence becomes invisible. He speaks of the two islands called the *Fortunate Islands* (the Canaries), from which, as the first meridian, Ptolemy reckoned his longitudes. Such was the state of geographical knowledge among the most learned of the Arabians.

The call to arms against the infidels, in the various crusades or holy wars which extended over the greater part of the thirteenth century, drew the attention of Europe to the East. This was the epoch of the travels of Carpini, of Rubruquis, and of Ascelin in Tartary. These missionaries, after they had travelled along the shores of the Caspian Sea to its northern extremity, reached Karakorum, the capital of the empire of Cathay (China), situate on the Orchou, a tributary of the Selinga. The narratives of Ascelin and Carpini, reveal the existence of numerous tribes in a part of the world hitherto believed, by geographers, to be occupied by the ocean. "Eoüs," says a modern historian, "that fabulous sea of antiquity, the bed of Aurora, disappeared for ever, and hordes of savages, as well as nations of powerful and warlike people, emerged at once from its imaginary waters."

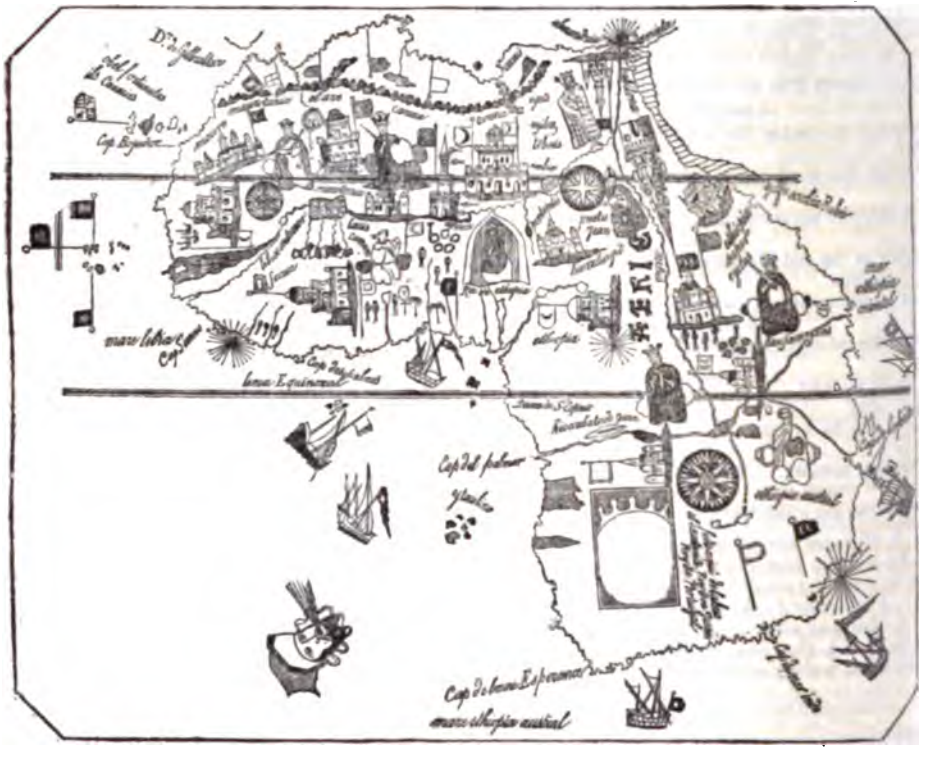
The celebrated travels of Marco Polo took place towards the end of the 13th century, from 1271 to 1297. They made known the centre and the eastern extremity of Asia, Japan, part of the islands of the Eastern Archipelago and of the continent of Africa, and the large island of Madagascar. Among the descriptions of the illustrious Venetian, that of China was the most curious and important; it was a complete disclosure of that empire, which had been hitherto almost an enigma to Europe. After long and continued suspicions of exaggeration in his narrative, the assertions of Marco Polo have been, after careful examination, acknowledged to be correct and agreeable to fact. It is with justice, therefore, that this traveller has been styled the founder of the modern geography of Asia. A very considerable time elapsed before any addition was made to the brilliant discoveries of the Venetian; but he was not without travellers to confirm his original statements. Oderic, of Portenau, visited India and China from 1320 to 1330; Schiltberger, of Munich, accompanied Tamerlane in his expeditions, and thus travelled over central Asia; in 1325, an Italian merchant Balducci Pegoletti went to Pekin by the central Asiatic route; and in 1403, Clavijo was sent as an ambassador by the court of Spain to Samarcand. About the end of the fourteenth century the brothers Zeni rediscovered Greenland, and announced the existence of a large island, which they called *Frisland*. Modern geographers have not yet arrived at the satisfactory solution of the problem,—to what country or island does this name apply.

Africa had almost become unknown, when the Portuguese began to explore the western part of this continent. This nation, animated by a zeal for making voyages and discoveries, undertook to rectify the errors of geographers, and to contradict the dreams of Greek and Roman antiquity, as well as the reveries of the middle ages, by experimentally proving the fact that the zone of the globe hitherto deemed uninhabitable was as accessible to man as the temperate regions. Previous to the year 1411, the Portuguese had never ventured beyond Cape Nun, which they considered as an impassable limit. An expedition was then fitted and sent out, which proved completely successful; it not only doubled this redoubtable cape, but extended its researches as far as Cape Bojador. Then commenced that series of successful enterprises which have gained

? Translate first "something" and then "taken."

for this people their lasting reputation as early discoverers of unknown lands. Under the direction of a noble and zealous prince, in 1432, Henry of Portugal, exploring squadrons from Lisbon doubled Cape Bojador, discovered the river Senegal, reconnoitred the coast of Africa from Cape Blanco to Cape Verde, landed on the islands which take their name from the latter cape, and took possession of the Azores, situated about nine hundred miles from the African continent. Some years later, the Portuguese crossed the equinoctial line or equator, and established the fact, hitherto problematical, that the torrid zone was not only habitable, but also very populous and fertile. No longer did the black statues of the Canary Islands appeal to the fears of the traveller and forbid him to go a step beyond that limit. Suddenly also was the *Sea of Darkness* illumined by the rays of the tropical sun, and soon were its waves opened up as a public highway to enterprising navigators. After new exploring expeditions to the kingdoms of Benin and Congo, the Portuguese, under Bartholomew Diaz, in 1493, reached the

illustrious Genoese met with in the execution of his proj and of all the obstacles which ignorance, indifference a jealousy raised up against him is well known; but the hon the discovery must be remembered. The three vessels chos with this great exploring expedition set sail on the 3r August, 1492, and after a short rest at the Canary Islands refitted on the 6th of September following. From that mom the crew of the little fleet, alarmed at the immensity of ocean, and destitute of the hope of success to sustain courage, cherished a thousand apprehensions which alm them to despair. Despondency gave place to anger anger produced revolt. The energy of the great leader enterprise calmed these extravagant fears and warded dangers with which even his life was threatened. Th anguish continued to agitate his noble heart during thos and dreary nights when the land, indicated by certa tomary signs, seemed to fly from his presence. At ten o'clock on the night of the 11th of October, 1492,



FAC-SIMILE OF THE MAP OF AFRICA BELONGING TO JUAN DE LA COSA, *Pilot of Christopher Columbus*, 1493.

Cape of Good Hope, which was then called by him the *Cape of Tempests*, on account of the stormy aspect which it presented to them on its first appearance. In 1497, however, under the auspices of Emanuel of Portugal, Vasco de Gama doubled the Cape of Good Hope, and reached India, after having rounded the whole western and southern coast of Africa.

Whilst the Portuguese were thus striking out a new route to the East Indies, the Spaniards were opening up America to Europe. The latter years of the fifteenth century made this double present to Christendom. The erroneous representations which the maps of the world presented at this period, and which according to the authority of Ptolemy and the travels of Marco Polo, gave an exaggerated extent to Asia on the east, led Christopher Columbus to imagine that by sailing continually westward, it was possible to reach the continent of Asia and the East Indies. There was besides, a vague but common belief that there existed towards the west a great unknown land. The history of all the difficulties which the

distinctly perceived a light. Some hours afterwards the sun showed him in the distance the land which he America was discovered!

The first land seen by Columbus, was the Island of Gua which was called *San Salvador*. The Spaniards discover succession, the Island of Conception, the Isles of Fern and Isabella, Cuba and Hayti, which received the na *Hispaniola*. It has been said that Amérigo Vespucc a year before Columbus, the coasts of Guiana and Terra Fi But this is mere conjecture. Two years later, however learned Florentine carefully reconnoitred this maritime ex the world. In the space of a few years, constant accessio male to these discoveries. Yanez Pinson, in 1500, reach Brazil, and three months after him, Alvarez Cabral land the same coast, which he transferred to the sovereign Portugal; while Gaspard Corteréal discovered Labrador, north-east of the same continent. Ponce de Leon, in 152 the first who landed in Florida. Three years later, the Fl

la Plata, or *river Plate*, was laid open to Europe by Juan Diaz de Solis. Magellan, one of the most illustrious of these early voyagers, in 1520, established the fact of the existence of the strait which bears his name, saw Terra del Fuego, and reached the Philippine Islands, after having ploughed the Pacific Ocean, which Nunez de Balboa had taken possession of, in the name of the king of Spain! This Balboa was the first who saw the waters of the great Pacific, which he named the South Sea, from the elevated shores of Central America. Now the Spaniards commenced the exploration of the new continent. The curiosity of Europe was raised to its highest pitch. An unknown and mighty world unfolded its wonders to bold adventurers, when Mexico, Guatimala, and Peru, exhibited to the eyes of the astonished Europeans, the splendours of their imperial cities, and presented to them the inexhaustible treasures hid in the bowels of their mountains; when Pizarro undertook the conquest of the immense empire of the Incas at the head of sixty-two cavalry and one hundred infantry! In the sight of pretended miracles, what golden dreams surprised the contemporaries of Columbus, Cortez, and Alvarado!

LESSONS IN ENGLISH—No. VII.

By JOHN R. BEARD, D.D.

HAVING thus furnished you with some criteria or means of ascertaining what words have their origin in the Saxon, or, as it is more correctly called, the Teutonic branch of our language, I must now request, that in all your studies, you will constantly ask yourself, whether each word you meet with, is, or is not, of Saxon derivation? Among English writers, no one has a larger portion of Saxon in his compositions than Dean Swift; and no one writes the language more correctly. I shall therefore make use of his writings in this part of my task. William Cobbett's works may be advantageously studied for the Saxon treasures which they contain.

EXERCISES FOR PARSING.

It is a miserable thing to live in suspense. To live in suspense, is to live the life of a spider. No wise man ever wished to be younger. An idle reason lessens the weight of good reasons. Complaint is the largest tribute paid to Heaven. Complaint is the sincerest part of our devotion. Praise is the daughter of present power. Every man desires to live long. No man is willing to be old. Kings are said to have long hands. Kings ought to have long ears. Vision is the art of seeing things invisible. Good manners is the art of making associates easy. Flattery is the worst and falsest way of showing our esteem. A fine gentleman has both wit and learning.

The reader may exercise his ingenuity, as well as his grammar, while he discovers the explanation of a Riddle of the learned Dean's, which is appropriate to my subject.

"We are little airy creatures
All of different voice and features;
One of us in glass is set,
One of us you'll find in jet;
Tother you may see in tin,
And a fourth a box within;
If the fifth you should pursue,
It can never fly from you."

An excellent practice in composition is letter-writing. I shall therefore, occasionally, give a specimen of epistolary correspondence. And I advise my pupils to accustom themselves to express their thoughts in the form of letters. Let the letters be real; I mean, let them be written, not as exercises in composition, but on some business, and to some friend or acquaintance. Your chief want at first, as I have before intimated, is the want of matter. "I don't know what to say," is a complaint with young composers no less true than embarrassing. You will find something to say if you take your pen in hand, and sit down to address a few lines to an absent friend. Only do not attempt anything great or fine. Be simple. Consult your heart, if your head is silent. Just say what occurs to you, without being anxious whether it is very wise or very foolish; whether it is trivial or important. Specially would I advise my pupils to correspond one with another. For instance, say that a young man in Exeter writes a letter to a former companion who has gone to reside at Bristol. B., living at Bristol, replies to his friend A. at Exeter. The two continue to interchange letters. If they have nothing else to write about, they may write about these lessons. Let them endeavour to give each other aid in their study of the English language. Let them freely and kindly criticise each other's letters. Let them ask and give explanations. Let A. correct B.'s exercise, and let B. do the same for A. Let them agree on some book which they will both read, with a view to make in writing and submit to each other remarks on the composition. For this purpose I would suggest to them the "Spectator."

In this counsel I have mentioned young men, by no means intending to exclude young women. Most desirous am I that young women should receive a good education. Most necessary to them as being the future mothers of our land, is a good education. A far better education ought they to receive than the best which they do receive. But to be well-educated they must be self-educated. Let young women then consider themselves specially addressed in the lessons I supply, and the advice I give.

LETTER.

To the Rev. Mr. William Draper,
Dean, near Basingstoke, Hampshire.

London, April 13, 1713.

SIR,—I am ashamed to tell you how ill a philosopher I am, and that a very ill situation of my affairs for three weeks past made me utterly incapable of answering your obliging letter, and thanking you for your most agreeable copy of verses. The prints will tell you that I am condemned again to live in Ireland; and all that the court and ministry did for me, was to let me choose my situation in the country where I am banished. I could not forbear showing both your letter and verses to our great men, as well as to the men of wit of my acquaintance; and they were highly approved of by all. I am altogether a stranger to your friend Oppian; and am a little angry when those who have a genius lay it out in translations. I question whether "Res angusta domi" (narrow means) be not one of your motives. Perhaps you want such a bridle as translation, for your genius is too fruitful, as appears by the frequency of your similes, and this employment may teach you to write like a modest man, as Shakespeare expresses it.

I have been minding my Lord Bolingbroke, Mr. Harcourt, and Sir William Windham, to give you a living; as a business which belongs to our society, who assume the title of rewarders of merit. They are very well disposed, and I shall not fail to negotiate for you while I stay in England, which will not be above six weeks; but I hope to return in October, and if you are not then provided for I will move heaven and earth that something may be done for you. Our society has not met of late, else I would have moved to have two of us sent in form to request a living for you from my lord chancellor, and if you have any way to employ my services, I desire you will let me know it; and believe me to be very sincerely, Sir, your most faithful, humble servant, JONATHAN SWIFT.

EXERCISES IN COMPOSITION.

HISTORICAL THEME.

The patriarch Abraham's Visit to Egypt.

Form sentences, each having in it one of the following words:—

Debts; light; sing; come; health; water; sky; home; day; night; lark; rose; Victoria; Mary; Henry; mother; bread; England; wife; buttercup; linnet; daisy; stone.

Describe a chair; a wheel of a coach; a kite; a waterpot; an oak-tree; the room in which you write; and the place where you work.

ON EPISTOLARY WRITING.

ITS first and fundamental requisite is, to be natural and simple; for a stiff and laboured manner is as bad in a letter as it is in conversation. This does not banish sprightliness and wit. These are graceful in letters, just as they are in conversation: when they flow easily, and without being studied; when employed so as to season, not to cloy. One who, either in conversation or in letters, affects to shine and to sparkle always, will not please long. The style of letters should not be too highly polished. It ought to be neat and correct, but no more. All nicety about words, betrays study; and hence musical periods, and appearances of number and harmony in arrangement, should be carefully avoided in letters. The best letters are commonly such as the authors have written with most facility. What the heart or the imagination dictates, always flows readily; but where there is no subject to warm or interest these, constraint appears; and hence those letters of mere compliment, congratulation, or affected condolence, which have cost the authors most labour in composing, and which, for that reason, they perhaps consider as their master-pieces, never fail of being the most disagreeable and insipid to the readers.

LESSONS IN LATIN.—No. XV.

By JOHN R. BEARD, D.D.

COMPOUNDS OF SUM.

THE verb *esse* is made up of parts of two separate verbs; first, a verb of which *es* is the root; and secondly, of a verb, *the stem* of which is *fu* (compare flo in Latin, and φυω, *fuo*, in Greek). From *es* (*esum* originally for *sum*), came the present, the imperfect, and the first future tenses; from *fuo* came the perfect, the pluperfect, and second future tenses.

The verb sum has neither *gerund* nor *supine*, and is in other respects defective, as appears from the *paradigm* just given.

Sum takes before it certain prepositions, and is modified by them in its meaning; thus, with *ad*, adsum, it means *I am at* or *near*; with *ab*, absum, it means *I am from, away from, absent*; with *pro*, prosum, it means *I am for*, that is, *I aid* or *benefit*. In prosum, the letter *d* is inserted to prevent the hiatus which would be caused if two vowels came in succession; thus, pro-(d)-es, pronounced prodes; also prodest, proderam, prodero, prodessem.

From the root mentioned above, namely, fu, fuo, come two forms not so common as those given in the table,—namely, forem and fore; forem (es, et; emus, etis, ent) is the imperfect subjunctive, and signifies, *I might be*; corresponding to essem of the table; fore is the infinitive future, *to be about be*; corresponding with the futurum esse of the table.

VOCABULARY.

Absum, abfui, abesse, *I am absent*; part. absens, *being absent*; adsum, adfui, adesse, *I am present*; intersum, interfui, interesse (E. R. *interest*), *I am among, I am concerned, I take an interest* or *part in*; praesum, praefui, praeesse, *I am before, I preside over, command*; prosum, profui, prodesse, *I am for, I am useful, I do good to*; concilio 1, *I reconcile, unite*; fera, ae, f. *a wild beast* (E. R. *feros*); pugna, ae, f. *a fight* (E. R. *pugilist*); arma, orum, n. *arms*; oratio, ōnis, f. *a speech* (E. R. *orator*); magistrātus, ūs, m. *a magistrate* or *governor*; foris, adv. *out of doors*; hodie, *to-day*; heri, *yesterday*; longe, *far*; perĕgre, *abroad*; quamdiu, *as long as, how long?* ubi, adv. *where, when*; dum, conj. *while*; nisi, conj. *unless*; quum, conj. *when, from the time when*; ut, *as*; ita, *so*. Observe that these compounds of sum require their object to be in the dative case, as prodest MIHI, *he does good* TO ME, *or he benefits me*.

EXERCISES.—LATIN-ENGLISH.

Deus omnibus locis adest; parvi pretii (*of little avail*), sunt arma foris, nisi est consilium domi; contemnuntur ii qui nec sibi nec ălteri prosunt; ut magistratibus leges, ita popŭlo praesunt magistrātus; ratio et oratio conciliat inter se homines, neque ullā re longius abstimus a naturā ferārum; ego sum laetus, tu es tristis; si sorte vestrā contenti estis, beati estis; dum nos in schŏlā erāmus, sorŏres nostrae in horto erant; quum Carŏlus (*Charles*) heri domi nostrae erat, ego perĕgre eram; quamdiu tu et frater tuus domi nostrae eratis, tu laetus eras, sed frater tuus erat tristis; quamdiu tu abĕras, ego eram tristis; cur heri in schŏlā non fuisti? quia cum patre perĕgre fui; quamdiu tu et pater tuus domo abfuistis? sex menses abfuimus; cur militis nostri pugnae non interfuērunt? quia longius abfuērunt; ubi heri fueras quum domi tuae eram?

ENGLISH-LATIN.

I am useful to thee; thou art useful to me; the boys are not useful to (their) mothers; why are the girls not useful to (their) fathers? when thou wast absent, I was sad; how long has your father been absent? Charles took part (*interesse*) in the fight; wast thou yesterday at my house? I shall be at thy house to day; unless thou art happy at home, thou art not joyful abroad.

VOCABULARY.

Desum, defui, deesse, *I am down, I fail*; obsum, obfui, obesse, *I am in the way of, I oppose, I injure*; provideo 2, *I see beforehand, foresee*, (E. R. *provide*); studeo 2, *I endeavour*; repeto 3, *I seek again, I repeat*; amīcus, i, *a friend*; inimīcus, i, *an enemy* (E. R. *inimical*); initium, i, n. *a beginning* (E. R. *initial*); pretium, i, n. *a reward* (E. R. *price, precious*); Demŏsthenēs, is, m. *Demosthenes, the celebrated Grecian orator*; actio, ōnis, f. *an action, doing* (E. R. *action*); aetas, aetatis, f. *age, a generation*; voluntas, ātis, f. *will* (E. R. *voluntary*); mens, mentis, f. *mind* (E. R. *mental*); exĕrcitus, ūs, m. *an army*; attentus, a, um, *attentive*; praeteritus, a, um, *past*; rectus, a, um, *right*; atrox, ōcis, *frightful* (E. R. *atrocious*); compos, ōtis, *partaking of, endued with*; prudens, tis, *prudent*; antĕa, adv. *before*; postĕa, *afterwards*; nunquam, *never*; propterĕa, *on account of*; solum, *alone*; nisi, conj. *unless, if not*; quod, *because*; sed, *but*.

EXERCISES.—LATIN-ENGLISH.

Quamdiu felix eris, multi tibi erunt amici; pugna fuit atrocissima, propterea quod utriusque exercitūs militēs fortissimi fuērunt; ante belli initium in urbe fuerāmus; Demosthenis aetate multi oratores magni et clari fuērunt, et antea fuērant, nec postea defuērunt; haec res non profuit nobis sed obfuit; si quis virtūtis compos erit, semper beātus erit; quamdiu sorte meā contentus ero, ero felix; actio resta nos erit, nisi recta fuerit voluntas; si probi fuerimus, non deerit hominum laus; attenti este, discipuli; homines mortis mémores sunto; contenti estote sorte vestrā! mi fili, semper virtutis praeceptorum memor esto! vir prudens non solum praesentia curat, sed etiam praetérita mente repetit, et futūra ex praeteritis provĭdet; boni bonis prodesse student.

ENGLISH-LATIN.

Our soldiers were very brave in the fight! why were our soldiers braver than yours in the fight? so long as you are happy, friends will not fail you; friends fail the wretched; before the beginning of the fight, I was in the city; the brave will always be useful to the brave; my enemies injure me; if you are partakers of virtue, you will be happy; so long as I am content with my lot, I shall be happy; O scholars, you ought to be attentive in school! they endeavour to be very brave; be brave, my son; prudent men foresee the future (pl.) from the past.

VOCABULARY.

Scio 4, *I know* (E. R. *science*); nescio, *I know not*; nescius, a, um, *ignorant*; non sum nescius, *I am ignorant of*; qualis, e, *of what kind* (E. R. *quality*); quantus, a, um, *how great* (E. R. *quantity*); quantum, *how much*; prius, adv. *before*; tum, *then*; et—et, *and—and* (*and—also*) *both*; in, *towards*; quā mente sis, *of what disposition you are, what your feeling is*.

Observe that in indirect questions the dependent verb must be in the subjunctive (or dependent) mood; e.g. (exempli gratiā, *for the sake of example*) narra mihi ubi fueris, *tell me where you have been*. Such a form is called an indirect question. The direct question would stand thus:—ubi fuisti? narra mihi, *where hast thou been? tell me*. In the latter case the question is direct, and the verb, as not being dependent, is in the indicative mood; but put narra mihi first, and then your question is implied rather than stated; it is, therefore, an indirect question. In both direct and indirect questions the English is in the indicative; consequently in putting the dependent verb into English, you must in English use the indicative mood; but in putting the dependent verb into Latin, you must in Latin use the subjunctive mood. Compare what is said of the consecutio temporum, and similar and dissimilar tenses, pages 260, 231.

EXERCISES.—LATIN-ENGLISH.

Non sum nescius quā mente tu in nos sis; scio quā mente tu in nos semper fueris; non sum nescius quā mente tu et prius in nos fueris et nunc sis; non eram nescius qua mente tu in nos esses; scio quam sint incerti animi hominum; cogita quam brevis sit vita! qualis sit animus, ipse animus nescit; cogita quantum nobis bona exempla prosint; incertus sum ubi frater meus nunc sit; incertus sum ubi amicus meus et fuerit et nunc sit; incertus eram ubi heri esses; narra nobis ubi heri fueritis.

ENGLISH-LATIN.

Tell me where thou art; tell me where thy father and mother are; I know not where my sister is; dost thou know how much good boys do good (*prosum*) to their parents? I know where my son is; my son, where art thou? I knew where my son was; I am uncertain where the enemies are; is the general ignorant where the army is? I know of what mind thou art toward the king.

A KEY TO THE EXERCISES IN THE LATIN LESSONS.

By JOHN R. BEARD, D.D.

LESSONS II. TO VII.

THIS key will consist of translations of the Exercises given in the Lessons on the Latin language. Those translations will be as literal—that is, as nearly word for word, as the idioms of the two languages allow. At the same time, some little variety both of word and position will be introduced, in order to accustom the learner to a proper degree of freedom, and intimate to him the limits within which such liberty may justifiably proceed. As we pass over the exercises, we shall correct any errors that may have escaped our eye previously, and occasionally throw in words which we may judge likely to assist our pupils.

It is not without some hesitation that we have resolved to supply this key. Great as is the assistance which it will give,

if wisely used, it will prove a hindrance, if not an insuperable obstacle to those who depend on it, rather than on their own care and diligence. Useful as a means of correcting exercises after they are done with the greatest possible care, the key should never be consulted until the student has done his best; first, to commit to memory the example, or to understand the rule, and then to write out the acompanying exercises, relying exclusively on his already acquired resources, and going over it again and again, until he has reason to believe that he has brought it as near to perfection as his power admits. If the spirit of these remarks is observed, the Key will prove of great service, and, in combination with the Lessons, afford such aid as may enable any industrious person to make himself master of the Latin language.

We now advise all our pupils to begin the lessons again. Having done each lesson as well as you can, proceed to study it and to correct your exercises, under the light, and with the assistance supplied by the key. While you thus review the past, you may beneficially go on with the lessons as they successively appear; for the two, the old lesson and the new lesson will throw light on each other. If you follow these suggestions, you will now soon find that you are making solid acquisitions and satisfactory progress.

LESSON II.

Page 34, col. 2—Latin-English.

I praise; thou blamest; he adorns; we educate; you grieve; they wound; he tries; he tries to dance (*tentat saltâre*); thou art wounded; he is grieved; we are praised; thou adornest; they are educated; thou art grieved; you are wounded; I delight; thou delightest; he delights; we delight; you delight; they delight; I am delighted; thou art delighted; he is delighted; we are delighted; you are delighted; they are delighted.

Page 34, col. 2—English-Latin.

Laudo; laudas; laudat; laudamus; laudatis; laudant; laudor; laudaris; laudatur; laudamur; laudamini; laudantur; delectant; ornas; vexamini; educantur; saltat; vituperamini; tentamus; tentamini; vulneratur; educor.

Page 35, col. 1—Latin-English.

Thou owest (oughtest); he teaches; he is exercised; we flourish (*floremus*); you rejoice (*gaudetis*); they are bitten; we move; you move; they move; thou fearest; he fears; he is frightened; you are frightened; I owe (that is, I ought) to obey (*debeo parere*); if you obey you are praised (*si paretis laudamini*); if we are silent we are praised (*si tacemus laudamur*); thou art taught and art educated; they are silent and are praised; I am bitten and am wounded; if thou woundest thou art blamed (*si vulneras vituperaris*).

Page 35, col. 1—English-Latin.

Times et terreris; si taceo vituperor; gaudet; gaudemus; gaudent; tentat mordere; tentamus educare; pares et laudaris; mordemus; si mordemus vituperamur; exercent; movemini; saltat; delectantur; ornamini.

Page 35, col. 1—Latin-English.

Thou deceivest; he is deceived; we are deceived; I deceive and am blamed; he yields; thou readest; he writes; he reads well; you deceivest greatly; if he is loved he rejoices; we are pricked; you conquerest; we are conquered; they are conquered; he falls; you slayest; if thou slayest thou art blamed (*si occidis vituperâris*); he reminds (advises) well; thou art badly educated; we are greatly moved; we dance and rejoice; he is injured; you are injured; you defend; they are defended; I am loved.

Page 35, col. 2—English-Latin.

Pareo; si pareo diligor (*if I obey I am loved*); valde diligitur; scribit bene; pingunt male; saltant bene; gaudeo si valde legit; regis; parent et laudantur; si regitis bene diligimini; defendunt; defendimini; fallitur; punguntur.

Page 35, col. 2—Latin-English.

Thou guardest; he is supported; he comes; why sleepest thou? he sleeps well; he is instructed; thou prickest; he slays; thou deceivest greatly; he is heard; if thou sleepest much thou art punished; he finds; if thou instructest well thou art praised; he is bound; why art thou silent? he is silent and is punished; they are found; thou art clothed; they are well clothed; if you are clothed well you are delighted; they are badly instructed; if thou art conquered thou art bound.

Page 35, col. 2—English-Latin.

Cur occidis (*why do you slay*)? custoditur; custodiunt; si custodimini vincimini; vituperat et punit; audit et eruditur; bene educamini; valde dormis; legunt; si saltatis delectamini; fulcitur; cur puniuntur? audiuntur; male vestior; feriuntur et monentur.

Page 35, col. 2—Recapitulatory Exercises: Latin-English.

I yield; thou readest; we move; thou art exercised; they bite; they flourish; I am deceived; he tries to read; why dost thou read badly? he sleeps badly; thou art much loved; you are conquered; they write well; if you paint well you are praised; we are defended; we strike; why do you punish? we are clothed; we bind; we are conquered; we are bound; you conquer; thou art guarded; he is adorned; they are praised (*laudantur*); we are feared; thou fearest much; you are bitten; we educate; they dance ill.

Page 35, col. 2—English-Latin.

Cedunt; si ceditis vincimini; si vincimini vincimini; fulcior; dormiunt; cur puniunt? cur puniuntur? male vestimini; vincis; vinceris; vincis; vincîris; pungunt; punguntur; cur moves?

Page 36, col. 1—Latin-English.

We are good; he is good; thou art good; I am not good; he is blind; he is not blind; they are very learned; you are safe; you are not safe; I am unlearned; you are unlearned; he is not unlearned; thou art very learned; why art thou bad? I am not bad; we are good; he is unlearned; why art thou unlearned? I am not unlearned; we are safe; safe are we; thou art learned and safe.

Page 36, col. 1—English-Latin.

Doctus sum; non sum doctus; doctus est; docti sunt; mali estis; non estis mali; bonus es; boni sunt; non sunt boni; cur boni non sunt? *or*, cur non sunt boni? Caecus est; non est caecus; cur est caecus? non es indoctus; caecus es et non salvus, *or*, caecus et non salvus es; caeci sunt; boni et salvi estis; valde indoctus est.

LESSON IV.

Page 70, col. 1—Latin-English.

The frog croaks; the frog is often (*saepe*) the prey of the stork; a stork injures a frog; or the stork injures the frog; the stork devours the frog; O frog, thou croakest; the water is disturbed by the frog; plants (or the plants) flourish; the earth is clothed with an abundance of plants; storms injure (*nocent*) plants; the earth produces plants; O plants, how beautifully you adorn the earth! the earth is clothed with plants.

Page 70, col. 2—English-Latin.

Plantae florent; procella nocet plantae; plantae nocentur procellâ; ranae devorantur a ciconiâ; terra gignit plantas, *or*, terra plantas gignit; plantae gignuntur terrâ; O plantae, quam pulchre gignimini terrâ! copiam aquae laudo; procella movet aquas; aquae procellâ moventur.

Page 70, col. 2—Latin-English.

I have a beautiful lark; (*est ne*) hast thou a beautiful lark? my lark is beautiful; is my lark beautiful? is not thy lark beautiful? thy pigeon is very beautiful; I have a good maid-servant; my maid-servant is beautiful; Julia is sacred (*augusta*); Julia Augusta is beautiful; is Julia Augusta beautiful? the lark of my maid-servant is beautiful; thy table is not square; the island is great.

Page 70, col. 2.—English-Latin.

Est mihi columba; est tibi bona puella, *or*, bona puella est tibi, *or* puella bona est tibi, *or*, tibi est bona puella; est ne tibi bona puella? non est mihi bona puella; alauda tua est pulchra, *or* pulchra est alauda tua; nonne magna est insula? magna non est insula, *or*, insula non est magna; est ne tibi bona ancilla? non est mihi bona ancilla, *or*, bona ancilla non est mihi; puellae alauda est pulchra.

Page 71, col. 1—Latin-English.

I have a deserter of Jugurtha's; thou hast a bad deserter; I praise a good poet; a good poet is praised; the mare is praised by the charioteer; the sailors sail to the island; good sailors praise their country; the eagle is often praised by poets; husbandmen greatly delight in plants, or are greatly delighted with plants; thou errest, O sailor! do you not err, O charioteers? I have the sadness of good poets; I greatly love the shades of the groves; the husbandmen ride through the wood.

Page 71, col. 1—English-Latin.

Est ne tibi profuga? malus ne est profuga? boni poetae laudantur; boni agricolae patriam laudant; bonorum poetarum patria laudatur; per sylvam equitat pirata; ad insulam navigant nautae; bona est equa aurigae boni.

(*To be continued.*)

ANSWERS TO CORRESPONDENTS.

LATIN.—The long wished-for Key to the Latin Exercises is begun in this Number; and all our Latin students can now compare their exercises from the beginning, with this key, and ascertain if they are right, and what progress they are making, just as if we were present with them.—The circumflex accent denotes a contraction, or that a vowel is long, and so requires the stress of the voice to be laid on the vowel over which it stands.—Why is curro of the third, and amo of the first, conjugation? These are ultimate facts which are to be taken as facts. You might as well ask why is the perfect of sing, sang; and the perfect of invite, invited?—Some of our correspondents ask questions which have already been answered, or to which answers may be found in the lessons themselves. A similar remark may be made as to errors.—Est ludus in ripâ means *there is play* (or *a game*) *on the river-bank*. "Have you" construe into Latin as if it were *habet thou*. Est re, p. 70, should be est ne.—The first signification given in Forcellini's Latin Dictionary to moneo is "I put in mind, bring to one's recollection." This is the original or proper meaning of the word; "to advise" is a derivation or secondary meaning. It is impossible to give the exceptions to the rules of gender; we have already enough to accomplish in the general view intended in the lessons. Amnis, is, m. *a river*; cervus, i, m. *a stag*; opes, opum, *f. wealth, resources*; dens, dentis, m. *a tooth*; senectus, útis, *f. old age*; hora, æ, *f. an hour*; Timeo Danaos et dona ferentes, *I fear the Greeks, even when they offer gifts*. The inquirer in this last case had not copied the Latin correctly. Another inquirer has been so careless in transcribing, as to present a series of words which belong to no language under the sun. It is not fair that our time should be thus occupied. G. ROBINSON would find great assistance in using Dr. Beard's "Latin Made Easy" in connexion with the lessons in the EDUCATOR. E.R. means English representative,—that is, the English word derived from the Latin.

GEOLOGY.—W. W.: We wish to encourage our readers to ask us questions freely; but we wish their questions or difficulties to be stated concisely. The igneous origin, and the subsequent formation of the earth's crust, do not in the least interfere with the inspired theology of Moses. Moses does not say how long ago it is since the heaven and the earth had a "beginning;" he merely says that they had a "beginning," by God *creating* them. After the earth had been created, it continued for some time "without form and void,"—that *is*, desolate and uninhabited by man. How long did it continue thus? For all that Moses says to the contrary, it may have existed for ages, and for many myriads of ages. Geology, as a science, refers to the history of the earth during these ages, called geological time, and not so much to its changes for the last six thousand years. We advise W. W. and others, to read Dr. King's "Geology and Religion." Hugh Miller's "Footprints of the Creator," and Dr. Hitchcock's "Religion of Geology." On "Geological time," let him read Dr. Pye Smith's "Lectures on Geology and Scripture." T. W. J.

GERMAN.—A. M. M. (Fife): His request will shortly be attended to.—JOSEPHUS: Flügel's Dictionary is the best; let him persevere and not heed the remarks of his friend.—DON JUAN (Blackburn): His translation is not quite correct, but deserves much encouragement; his questions will shortly be answered.

M. J. (Belfast): For the study of Greek, twenty-four years of age is a very good time. Scaliger, the most celebrated Greek critic of his age, it is said, began at forty.—NEANIAS: The Latin and French will do well together.—T. C. W. X. Y. Z. must all study Euclid.—E. T. B. E. must apply to a solicitor.—ABRAHAM LEE (Lynn): The correct expression is, "8 and 3 are 8; 8 and 1 are 9."—WILLING TO LEARN will soon learn Latin, if he sets about it.—C. S. R. (Belfast): Many thanks for his suggestions: they are valuable.—F. KENT (Croydon): The area of a circle is exactly what he says, the product of the radius and half the circumference; and if the ratio of these two quantities was expressible in integer numbers, the circle would be squared.—DIDASKALOS (Kendal): The *e* in *atque* is only dropt in reading poetry for *scanning*, and that only before a word beginning with a vowel.—JOSEPH H. MORAN (Dublin): We thank him for his useful communication.—C. A. MOLLYSON (Auchinblae): His solution of prob. 2, p. 111, is right.—AN ENGLISHMAN has sent us some excellent remarks on *Early Training*; we have sent them to our physiologist.—A. GREENWOOD: The errors have been corrected: J. E. (Shrewsbury): Riddle's.—JAMES WINNING (Hamilton Farm): The answers to the arithmetical exercises shall be given.—A COLLIER: His queries shall be inserted.—J. R. (Bristol): A wedge is defined to be a *prism*; now a *cone* is not a prism.—H. LEE (Brighton): Why not?—R. P. (Redruth): Yes.—A. J. C. (London): Yes. Memory is improved by exercising it. Begin.—MASSA (Neilston): Yes.—W. STEPHENSON, Jun. (Bramley): We shall, when algebra comes up. Numeration is THE fundamental rule of arithmetic. His question is good; but is he a subscriber?—To six subscribers, including SAMPSON LUDLOW (Hampstead), we say yes, as soon as possible.—We request S. C. (Hanley) and the class to study Dr. Beard's Lessons in English.—To JOSEPH WEBSTER (Bramley), we say go on, and prosper. We fear it is too soon for riddles.—NATURALIST (Manchester): Consult the annotation to No. 64, Class 18, of the "Official Illustrated Catalogue of the Great Exhibition," or Messrs. James Houldsworth and Co., Manchester.—A. M. B.: Received.—R. T. T (Thornhill) should persever in the study of Euclid.—B. P. (Brighton): Apply to Sims and Macintyre, 13, Paternoster-row, London.—H. F. (Farnham): Something will soon be done to supply the want.—AN INQUIRER (Arundel) should apply to persons connected with the customs.—B. B. (Yorkshire): Received.—SCRIBO (Preston) is right about handwriting.

J. W. (Leicester): The Latin lesson is well done; the age of the writer, 37, is no hindrance to progress, but the reverse. Dr. Beard allows two years at two hours a day as sufficient for great proficiency.—AMICUS (Bromley): We much approve of his plan of buying two copies of the POPULAR EDUCATOR, one common and one fine; and we shall be proud to see it elegantly bound and gilt.—W. H. E. (Teddington) should study English before Latin.—Z. J. (Liverpool): Orthoepy is best learned by listening to accurate public speakers and readers.—We advise WALTER K—N (Dundee) to keep his own secret, and to try and do better every time. Sheridan once electrified the House of Commons with a Greek quotation, which was pronounced by every one quite apropos; but which was merely the momentary effusion of his brain, without rhyme or reason. Our correspondent is better than this.—J. W. LOVE (Stewarton): It is right to say "the number of the years that *have* elapsed is, &c.," also "I know of no part of Scripture which *affirms*, &c." The expressions "there *is* none," and "all *is* well," are correct. It is equally right according to modern practice, to say "*if* it *is* true," and "if it *be* true;" but the latter is the more correct expression. It is clearly not right to say "the 160 page book."—JOHN WHITE (Edinburgh): Your teetotal-essay-writing acquaintances are right. Smoking tobacco, as well as drinking whiskey, or taking snuff, does unfit the mind for serious study, and is parent to a host of other evils too numerous to mention. We do not see that abstaining from tobacco, snuff, or whiskey is any self-imposed impediment to learning, because they should never have been indulged in. We hope our friend is not like the highlandman, who, when asked what three wishes he would like to have fulfilled if they were in his power, said,—1st, a Benlomond of "shnuff;" and 2nd, a Lochlomond of "whuskey." He was asked for the 3rd; but he said he wanted no more. On being pressed for an answer, howeve, he said, Well, well, a little "mhore shnuff." The German pronunciation will be elucidated.—JAMES JARMAN states that he is a believer in mesmerism, clairvoyance, &c.; all we can say is that we are not. You can very easily divide by 1, if you like, and state that the quotient is the same as the dividend. This is not such a mighty *fix* as he thinks it is. The French have a column in their multiplication table for the products of 0 by the nine digits; and we are of opinion that it is highly necessary for many students that we have had to give lessons to. But we may ask him one question in our turn; what is the answer to the question divide 0 by 0? *Vice versâ* means *conversely*; but this is best illustrated by an example, thus: "All fools are wicked;" *vice versâ* or conversely, "All the wicked are fools." The best dictionary in the English language is Dr. Johnson's *yet*; but it wants great additions.—ROBERT HENDERSON (Worksop): Calligraphy and shorthand must wait a little.—G. T. C. (Sheerness): "The Isle of Sheppey Band of Hope, and Juvenile Temperance Society" is the most expressive inscription.—A. HITT (Kirkness): We prefer Young to Bonnycastle.—A SUBSCRIBER: Walker's pronouncing Dictionary is considered the best as *yet*; but it wants many additions.—HENRY JAMES HOWARD (Crediton, Devon) is respectfully informed that the "Lessons in English Grammar" are continued under the head of "Lessons in English," in a very superior style, and we strongly recommend them to his perusal. As to Lessons in Navigation, their time is coming, along with that of many more important subjects. We advise him to study the Lessons in Geography as an introduction.—A Dublin Subscriber recommends us to begin with schools for music instead of French, and gets so much into raptures on the subject, that he actually reminded us of the music of the spheres—

> "For ever singing, as they shine,
> The hand that made us is divine."

G. R. (Paisley): The best method of calculating the solid content of unequal-sided timber is, to find the content of the solid parallelopiped it contains, and that of the rest as wedges or triangular prisms; but see Young's Mensuration.—MARCELLUS (Charles-square) should apply for a German master by advertisement.—J. F. J. (De Beauvoir Town): We hope elocution will be included in the study of the English language.—CHARLES AUSELL: There is a new edition of the "Emigrant's Handbook," which contains a Map of Australia, showing the gold regions.—LUDUS (Burton-upon-Trent): Algebra and Logarithms shall really have our best attention.—THOMAS LAMB (Hyde): The use of the table of logarithms to 20 places is explained in Dr. Hutton's Mathematical Tables; but we believe his valuable history of the invention and construction of logarithms is left out in the later editions. Our edition is London, 1801; and at page 127 will be found the explanation required. This table is used in the construction of logarithms, not in the extraction of roots.

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LESSONS IN GEOLOGY.—No. VI.

By Thos. W. Jenkyn, D.D., F.G.S.

CHAPTER I.

VOLCANIC ACTION ON THE EARTH'S CRUST.

SECTION II.

ON THE UPHEAVAL OF VOLCANIC MOUNTAINS.

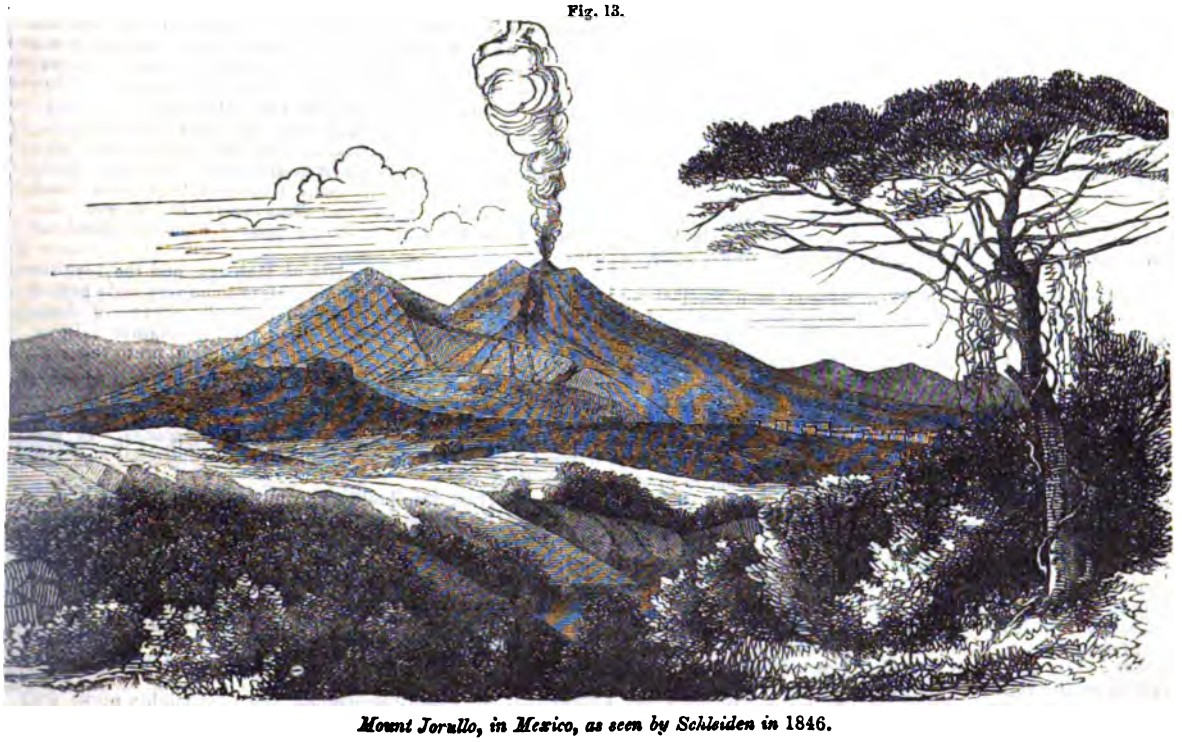
Volcanoes are in many cases mountains of great elevation, and one of the lessons taught by geology is a knowledge of the circumstances which raised such enormous masses.

To assist your conception of this subject, take in your hand a map of Italy, and blot out the entire island of Sicily. Suppose the whole space now occupied by that island, more than a hundred miles round, to be mere sea. Let your imagination be first a diving-bell, in which you will descend to the bottom of the sea, where you find a calcareous stratum or a bed of limestone, on which the same shells and animals live, which now exist in the surrounding portions of the Mediterranean.

Fig. 12.

Mount Ætna, from the south-east, with a few of its conical vents on the left.

Fig. 13.



Mount Jorullo, in Mexico, as seen by Schleiden in 1846.

Your imagination must now turn miner, and you must dig a shaft deep into the rocks beneath. You dig through a series

of limestone rock, 800 feet deep, all of which are tertiary, like those of Hampshire, Middlesex, Suffolk, and Norfolk. You at once infer that these rocks were deposited, after the period when the Mediterranean fish were created; for the rocks contain very few shells of extinct species.

At the bottom of this limestone you dig into a calcareous bed of different structure, the bed is slaty, and the limestone is sandy, imbedding pebbles of limestone. You now come to a bed of lava. How is this? This proves that long, long ago, when the whole space was under water, a submarine volcano had been in action, and had thrown up lava before the upper beds were deposited. As your shaft descends you come to a blue marl crammed with shells. The Sicilians call this marl creta. You dig through this till you come to another blue bed, but that is clay. This clay has no shells, but it contains beautiful crystals of gypsum, sulphur, &c.

For the present you need not dig any lower, for this blue clay is the lowest bed found in Sicily. It is the stratum of the Val di Noto, and may be traced all round Mount Ætna, north, east, and south.

Suppose that at no very early period in the earth's history, you had a boat safely moored at a respectable distance from the spot now occupied by Sicily and its tremendous volcano. The sea becomes disturbed and agitated, land appears, it swells up and comes higher and higher. First, above the waters you see, perhaps, the series of limestone beds heaving up; then the slaty layers of pebbly limestone rise to view; anon the blue marl called creta is in sight; and finally the blue clay with gypsum is far above the level of the sea. Up, and still up, the enormous mass is rising till it stands at an elevation of some thousand feet. The mountain of Ætna, as at present constituted, is 10,874 feet above the sea, a height about three times that of Snowdon, in Wales, or Ben Nevis, in Scotland. Its outline is represented in fig. 12.

The great limestone deposit is found as high as 3,000 feet, the height of Cader Idris in north Wales. The fossils in that limestone can be identified with species now existing in spaces of the Mediterranean which have not been heaved up. It is from this fact that geologists deduce the inference, already mentioned, that Sicily has been raised from the Mediterranean since the present fish had been created.

Between these limestones, and the beds of blue marls and clays, layers of hard and compact lava, with a mixture of volcanic ashes and limestone, are found. This mixture is called by the Sicilians, Tufo, and Peperino. This proves that, after the low beds of marl and clay had been deposited, a volcano beneath the sea came into action and covered much of the Sicilian district with volcanic materials.

That no doubt might remain of the very modern origin of Sicily and Mount Ætna, Sir Charles Lyell found near Vizzini, a town twenty-five miles inland, a bed of oysters, in a rock twenty feet thick, identifiable with the oysters which are now eaten.

After the whole mass of these rocks had been swelled up and raised to 3,000 feet, the beds violently burst, and cracked into several fissures, which, afterwards became filled up with basaltic lava. The lava imbedded in these cracks formed hard rocks and are called by geologists dikes.

The height of Mount Ætna is 10,874 feet above the level of the sea. The first three thousand feet upward from the sea is formed by the calcareous beds, and their associated lavas and clays as already mentioned. The remaining 7,000 or 8,000 feet upwards have been formed by successive eruptions from the volcano. The upper or the last 1,100 feet consist of the cone of the crater, which rises from an irregular plain, about nine miles in circumference. In the summit of this cone is the grand crater which is perpetually sending forth sulphureous vapours.

It is an unsettled point among geologists, whether the prodigious masses which now lie above the limestone 3,000 feet high, were produced since the island of Sicily rose above the sea, or whether a large portion of them had not been thrown up and scattered by the volcano while under the sea. The balance of probability is in favour of the hypothesis, that the volcanic rocks which lie over the tertiary limestones were formed before the island arose from the water, and that those masses rose with the upheaval of the limestones and clays. It is supposed that the first appearance of Sicily would be like a cone above the reach of the waves, which would, at every eruption, vomit forth volcanic matter into the sea on all sides, as the mountain was in the process of being heaved up.

There is one phenomenon very remarkable in the structure of the lower beds in the stratification of this vast mountain. The inferior clay beds of which we have spoken are found on the north, the east, and the south of Ætna, to dip inwards towards the mountain. This looks as if they had fallen in from the sudden and free escape of the melted matter that had heaved them up, rather than they had fallen outward as if they had cracked from being heaved up. They appear as if they had first of all been heaved up by an enormous power of melted matter from below, which by suddenly and freely escaping caused a cavity, into which these horisontal beds fell at the sides with a dip inward.

Since these lower beds of clay dip inward towards the mountain, and not outward from it, and since this inward dipping is found all round Ætna, except to the west, where it is not in sight, it is evident that these clay strata were once continuous; were a horisontal rock occupying the space now covered by the volcanic mountain; and were penetrated by the eruptive forces of the volcano. They, therefore, lie under the whole mountain, and may be said to be sub-Ætnean. In some places, even these lower beds appear in hills a thousand feet high; though in others much lower. Their beds appear in some instances 300 feet thick, and without any mixture of lava. Elsewhere they appear in cliffs 600 or 800 feet high as if they had been composed of volcanic Tufo thinly laminated.

In the hypothesis which has thus been presented to you, the characters which are found inscribed in the beds, the lavas and the dikes, may seem to you rather as occult hieroglyphics than as an alphabet which you can spell and read for yourself. Nevertheless, in the geological argumentation, the grounds of conjecture are not extravagant, nor are the inferences improbable or improbable. Amid these cases of difficult interpretation a beginner, you will be interested in the phenomena of the heaval of a volcano which has taken place almost within the memory of the present generation.

You must now take a voyage across the Atlantic to South America, in the direction of Mexico, a region lying between the 18th and 22nd degrees of north latitude. Instead of the voyage, perhaps your map will do. Look at these latitudes, and between them you will find a high table-land from 7,000 to 3,000 feet above the level of the sea. How came that table-land to be formed? It is surrounded by mountains of granite which, after their first appearance on the earth's crust, were attended with a large system of deep valleys. But now these valleys, originally many thousand feet deep, have been filled up with volcanic materials, until every valley was exalted to form the surface of the present high table-land of Mexico.

This region is called the Plain of Malpays, and the basaltic hills of the neighbourhood show that, at some very early period in geological time, the district had been the theatre of volcanic eruptions which had filled up the original valleys. But, from the time of the discovery of America, up to the year 1759, it was never suspected that either in, or under, the neighbourhood there was a volcano. It was not only firm ground and undisturbed, but it was a country of picturesque beauty, cultivated for fields of sugar, indigo, and bananas. It was watered by two purling streams called Rio Cutimbo, and the de San Pedro.

In June, 1759, deep hollow murmurings began to be heard, and from that time to September, earthquakes followed each other in rapid succession. The surface soil, at last, swelled up like the surface of a large bladder, three or four miles square. The soil cracked, and flames issued forth, and the burning fragments of rock were hurled up to great heights in the air. In various parts of the area, six different vents appeared, which were in the form of cones formed by cinders and lava. The lowest of these cones was 300 feet high.

Towards the close of September, the next mighty move was made. The vast mountain, Jorullo itself, was pushed up in few days, to the elevation of 1682 feet above what was a plain before June, 1759. From the crater of Jorullo immense streams of basaltic lava issued forth, and continued

to flow till February, 1760. Fig. 13 represents the volcano of Jorullo, as seen by Herr Schleiden, a German geologist, in 1846.

After 1760 the district seemed to have attained its former stability. When the Indians saw that tranquillity was restored, they tried to occupy the land, but they found that the soil was far too hot to be habitable. When Humboldt visited Jorullo, in 1803, he found around the base of the great cone, and spreading from the cone as from a centre to the extent of four square miles, a mass of matter of convex form, about 500 feet high near the cone, but sloping gradually as it receded from it. This mass, partially represented in the foreground, fig. 13, was still in a heated state, though more than 40 years after the eruption. The temperature had been decreasing every year, but Humboldt says that, in 1780, twenty years after the outburst, the heat was sufficient to light a cigar. About the year 1825, forty-four years later, Mr. Bullock found the cones still smoking. When Schleiden visited it in 1846, eighty-seven years after the upheaval, the aspect of the mountain was as he has represented it in fig. 13.

In connexion with this sudden upheaval of a volcano in modern times, is the remarkable fact that the two rivers Cutimbo and San Pedro ran into the crater, and lost themselves below at the *eastern* limit of the plain, but afterwards reappeared on the *western* limit as hot springs.

The instances of such volcanoes as Ætna in Europe and Jorullo in South America, have been selected to assist your conception of the geological principles implied in the theory of craters of elevation, as presented to you in Lesson V.

LESSONS IN ENGLISH.—No. VIII.

By JOHN R. BEARD, D.D.

DERIVATION; I. PREFIXES.

THE Saxon may be called the native English stock. The Latin portion of our language is of foreign growth, it is an exotic. As being of foreign growth its elements are not easily understood, and must, therefore, receive the greater attention. In entering on the necessary course of instruction, I am met by a distinction already spoken of,—namely, the distinction of simple and compound words. Compound words are made up of parts. Those parts are either simple words or particles, that is, fragments of simple words. *Country-house* is a compound term consisting of two simple words, namely, *country* and *house*. *Departure* is a compound word which comprises these three particles, namely, *de-part-ure*,—that is,

de	part (pars)	and ure
from	*part*	*a termination*

Of these three particles, *part* is the most important, inasmuch as it determines the specific meaning; as you may learn by comparing with *departure* a word exactly the same in the first and third particle:—

de	part	ure
de	bent	ure

In the second word the substitution of *bent* for *part* has entirely changed the meaning. The reason is that *part* and *bent* are the roots of the two words. Every word has a root. Sometimes the word, especially in Saxon terms, is its own root, at least in the actual state of the language, as *heart*, *think*, *wise*. The root is not always the middle portion as it is in *departure* and *debenture*. In *contradict* the root (dictum) is at the end, and in *mental* the root is at the beginning. It is, however, clear that in compound words three things have to be considered,—namely, 1, the root; 2, that which is put before the root; 3, that which comes after the root. That which is put before the root is in grammar called a *prefix* (from the Latin præ, *before*; and figo, *I fix*), and that which is put after the root is called a *suffix* (from the Latin sub, *under*; and figo, *I fix*). Here then are three subjects to be considered,—namely, *roots*, *prefixes*, and *suffixes*. *Suffixes* are sometimes called *affixes* (ad, *to*; and figo, *I fix*). They may also be designated *terminations*, especially when they are not so much fragments of words as *letter-endings*, or additions forming the specific parts of speech in each case. Thus *right* becomes right*eous*, and righteous becomes righteous*ness*, and righteous*ly*; where *eous*, *ness*, and *ly* are terminations; the first modifying the adjective, the third converting the adjective into an adverb, and the second changing the adjective into a noun.

Of these three classes, the roots are by far the most numerous. The roots also undergo very various modifications from the prefixes and the suffixes. On these accounts, it seems desirable to study the prefixes and suffixes before we study the roots.

Before entering into the requisite details, I wish to make another distinction.

Take the word *truthfulness*. Analyse the word. Obviously it consists of three elements: 1, *truth*; 2, *full*; 3, *ness*. *Truth* is the primitive word. By the addition of *full* (or *ful*), *truth* becomes *truthful*, an adjective; and the adjective *truthful* is made into a noun by the annexation of the syllable *ness*. Instead of a noun, I might have formed an adverb by subjoining *ly*; thus, *truthfully*. I have said that *truth* is the *primitive* word. *Primitive* is here used in opposition to the word *derivative*. In relation to its derivatives *truthful*, *truthfully*, and *truthfulness*, the word *truth* is a *primitive* word, for it is their source. It is another question, whether *truth* may not be reduced to a simpler form. In the same way, *truthful* is a primitive term when viewed in relation to its derivative *truthfully*. As with human beings, each word is in turn, child and parent. Still there must be a common stock. But, genealogies in language, are scarcely less obscure than other genealogies. In linguistical genealogies, authority must receive great deference. Now the word *truth* can be reduced to a simpler form, and yet remain a word. From *truth*, take *th*, and you have *tru*—that is, *true*. So from *strength* take *th*, and you have *streng*, an old form of *strong*. But *fowl* is not a derivative word, because you cannot reduce it to another word in a simpler form; for, if you remove the *l* or the *wl*, the remainder is no word at all. Words, then, which appear to be *primitive*, may be *derivative*; and the rule by which to ascertain whether a noun is primitive or derivative is this: words which, on the removal of one or more of their letters, have a distinct meaning, are *derivatives*; and words which, on the removal of one or more of their letters, have no distinct meaning, are *primitives*. By the application of this rule, we learn that *king|dom* is a derivative, and *ad|dition* a derivative; while *pea* and *head* are primitives.

The *prefixes* and the *affixes* in the English language are numerous. Without a correct acquaintance with their import, the exact force of words can scarcely be understood. But these prefixes and affixes are of Latin and of Saxon origin. Consequently, in our attempt to ascertain their meaning, we must borrow aid from the Latin and from the Saxon. A few prefixes come from the Greek; the signification of which is to be found in the Greek. I shall treat first of prefixes, and for the sake of facility of reference, take them up in alphabetical order.

PREFIXES IN THE ENGLISH LANGUAGE.

A (an) of Saxon origin has the force of *in* or *on*; as *along*, *alongside*; *aback*; *ahead*; *abed*. In this sense, it is used in connexion with present participles; as, *a hunting*; that is, *in* or *at hunting*. The form occurs in our common version of the Scriptures, in John xxi. 3, being a relic of the language in its older state, such as in part it is now found in colloquial diction. The phrase may be exemplified, and its meaning shown by comparing together the renderings of different versions of this passage:

Common Version. Simon Peter saith unto them, I go a fishing.
Wiclif (1380). Symount Petir seith to hem, I go to fische.
Tyndale (1534). Simon Peter sayde vnto them, I goo a fyshinge.
Cranmer (1539). Simon Peter sayeth vnto them, I will go a fishinge.
Geneva (1557). Simon Peter sayd vnto them, I go a fyshing.
Rheims (1582). Simon Peter saith to them, I goe to fish.
Authorised (1611). Simon Peter saith vnto them, I goe a fishing.

Not only are these instances curious as exhibiting varieties of spelling, but they seem to show how thoroughly a part of the language is this prefix in the sense now illustrated. Yet, is the usage disallowed, and by some regarded as a vulgarism. I trust that the healthful sympathies of the people will do something to restore the original idioms of the English tongue.

A, of Saxon origin, is also used as an intensive. An intensive (in, *on*, and tendo, *I stretch*) is that which increases the force of a word, expanding, as it were, its essential power. A, as an intensive, is of frequent use, and is exemplified in these words, *a*shamed, *a*fraid (old form *a*feared), *a*rise, *a*main (a and mogen, to *be able*, macht, *power* in the German); compare the Latin magnus, *great* Thus Dryden:

"She said; her brim full eyes that ready stood,
And only wanted will to weep a flood,
Released their wat'ry store, and pour'd *amain*,
Like clouds, low-hung, a sober show'r of rain."

A, of Latin origin, meaning *from*, is found in the forms *a, ab, abs*; e. g.—abatement (French, abattre, *to beat down*), *a beating from or down; ab*breviation (brevis, Lat. *short*), a shortening; *abs*traction (traho, Lat. *I draw*), *a drawing from*, or *away*.

"——— But man the *abstract*
Of all perfection which the workmanship
Of Heaven hath modell'd, in himself contains
Passions of several qualities." *Ford.*

A, of Greek origin, found chiefly in scientific words, has a negative or *privative* force; that is, it reverses the meaning, or denies what is implied in the term, as *a*cephalous (Greek, kephalé, *head*) *without head*; a term applied in anatomy to the young of any animal born from original defect of organisation, *without a head*. To avoid an hiatus (Lat. *gaping*), *a* becomes *an* before a vowel; as, *an*archy, the absence of government; government in Greek being *archê* (ché pronounced as key).

Ad, of Latin origin, *to*, passes into the forms *ac, af, ag, al, an, ap, ar, as, at*;—that is, the terminating consonant of the prefix is, for the sake of ease in pronunciation, changed into the initial (Lat. initium, *beginning*) consonant of the noun; e. g.—

Ad. "An *ad*journment is no more than a continuance of the session from one day to another, as the word (jour, French, *day*) itself signifies."—*Blackstone.*

Ac. "The greatness of sins is by extension and *ac*cumulation."—*Jeremy Taylor.*

Af. "'Tis most true
That musing meditation most *af*fects
The pensive secrecy of desert-cell
Far from the cheerful haunts of men and herds."—*Milton.*

Ag. "Corporations *ag*gregate consist of many persons united together into one society, and are kept up by a perpetual succession of members, so as to continue for ever."—*Blackstone.*

Al. "Then by libel (libellus, *a little book*), or by articles drawn out in a formal *al*legation, set forth the complainant's ground of complaint."—*Blackstone.*

An. "This god-like act
*An*nuls thy doom." *Milton.*

Ap. "God desires that in his church, knowledge and piety, peace and charity, and good order should grow and flourish; to which purposes he hath *ap*pointed teachers to instruct and governors to watch over his people."—*Barrow.*

Ar. "*Ar*rogant is he that thinketh he hath those beauties in him that he hath not."—*Chaucer.*

As. "Are you discontent
With laws to which you gave your own *assent*?"—*Pope.*

At. "The most wise God hath so *at*tempered the blood and bodies of fishes that a small degree of heat is sufficient to preserve their due consistency and motion, and to maintain life."—*Ray.*

Amb, of Latin or rather Greek (amphi) origin, found in the Latin ambo, *both*, signifies *on both sides*, as *ambidextrous* (L. dextera, a *right hand*), literally, *having a right hand on both sides*; that is, one who uses his left hand equally well with the right.

"Should I that am a man of law
Make use of such a subtile claw,
In London or in Exeter;
And *be of both sides*, as you were,
People would count me then, I fear,
A knavish *ambo*dexter." *Brome.*

Amb is found in the form of *amph*, as *amphitheatre*, a theatre of two sides or circus; *amphibious*, double-lived; that is, living in land and in water.

Ana, of Greek origin, *up, back*, as in *anachronism* (Gr. chronos, *time*), an error in date by which an event is placed too high up or too far back; generally a deviation from the order of time.

"The dresses and buildings of the time are preserved, though by frequent *ana*chronisms."—*Walpole.*

The *ana* is found also in *anagram* (Gr. gramma, *a letter*), which is a word produced by the transposition of its letters, having a meaning different from the original.

"And see where Juno, whose great name
Is Unio in the *ana*gram,
Displays her glittering state and chair."—*Ben Jonson.*

Ante, of Latin origin, *before*, as *antedate*, to date before time, to anticipate:

"Andromache, my soul's far better part,
Why with untimely sorrows heaves thy heart?
No hostile hand can *ante*date my doom,
Till fate condemns me to the silent tomb."—*Pope's Homer*

Anti, of Greek origin, *in opposition to*, as in antichrist, *opposed to Christ*:

"If once that *anti*christian crew,
Be crush'd and overthrown,
We'll teach the nobles how to crouch,
And keep the gentry down!"—*Quarles.*

In theology, *antitype* stands correlatively over against *type*, as the counter pattern to the pattern, the corresponding and completing form.

"The Mosaic law was intended for a single people only, who were to be shut in, as it were, from the rest of the world, by a fence of legal rites and *typical* ceremonies; and to be kept by that means separate and unmixed until the great *antitype*, the Messiah, should appear, and break down this fence and lay open this inclosure."—*Atterbury.*

The *i* in anti is sometimes dropped before a vowel as in *antarctic*.

LESSONS IN GERMAN.—No. VII.

Section XVI.

THE PLURAL NUMBER.

In the *plural* the adjective, when *not* preceded by a declinable word (the personal pronouns excepted) is inflected according to

THE OLD DECLENSION.

Nom.	Gute, good;	ſchöne, fine;	alte, old;	rothe, red;
Gen.	Guter, of good;	ſchöner, of fine;	alter, of old;	rother, of red
Dat.	Guten, to good;	ſchönen, to fine;	alten, to old;	rothen, to red
Acc.	Gute, good;	ſchöne, fine;	alte, old;	rothe, red.

I. The definite article, the demonstrative and possessive pronouns, have, in the plural, the same form for all genders, and are declined like adjectives of the Old Declension.

Adjectives, when preceded by the definite article, a demonstrative, possessive, or relative pronoun, end in all cases of the plural, in en, and are of the New Declension.

DECLENSION OF THE DEFINITE ARTICLE, DEMONSTRATIVE AND POSSESSIVE PRONOUNS IN THE PLURAL.

N.	Die, the;	dieſe, these;	meine, my;
G.	Der, of the;	dieſer, of these;	meiner, of my;
D.	Den, to, or for the;	dieſen, to, or for these;	meinen, to, or for my;
A.	Die, the;	dieſe, these;	meine, my.

NEW DECLENSION OF ADJECTIVES IN THE PLURAL.

N.	Jene guten, those good;	ſeine guten, his good;
G.	Jener guten, of those good;	ſeiner guten, of his good;
D.	Jenen guten, to, or for those good;	ſeinen guten, to, or for his good;
A.	Jene guten, those good;	ſeine guten, his good.

RULES FOR THE FORMATION OF THE PLURAL OF NOUNS.

Old Declension.

Rule I. Masculine nouns, ending in el, en, er, have the same form in the plural. Ex.: Der Maler, the painter; die Maler, the painters. Der Morgen, the morning; die Morgen, the mornings. Der Strudel, the whirlpool; die Strudel, the whirlpools.

The following masculine nouns take the Umlaut. (To take the „Umlaut" means to change or modify the vowel: i.e., to change a into ä, o into ö, u into ü; the diphthong au is modified into äu) Apfel, apple; Hammel, wether; Handel, trade; Mangel, want; Mantel, cloak; Nabel, navel; Nagel, nail; Sattel, saddle; Schnabel, beak; Vogel, bird; Faden, thread; Garten, garden; Graben, ditch; Hafen, harbour; Ofen, stove, oven; Schaden injury; Acker, field; Bruder, brother; Hammer, hammer; Schwager, brother-in-law; Vater, father; as, also, the feminine nouns Mutter, mother, and Tochter, daughter.

	Singular.	*Plural.*
N.	Der Mantel.	die Mäntel.
	Der Vogel.	die Vögel.
	Der Bruder.	die Brüder.

RULE II. Masculine nouns of other terminations add e (in a few words er), and assume the Umlaut. Ex.: Zahn, tooth; Zähne, teeth. Baum, tree; Bäume, trees. Rock, coat; Röcke, coats. Hut, hat; Hüte, hats. Thus also are declined the feminine nouns Angst, Art, &c.

The following do not assume the Umlaut: Aal, eel; Aar, eagle; Amboß, anvil; Anwalt, attorney; Arm, arm; Docht, wick; Dolch, dagger; Dorsch, haddock; Eidam, son-in-law; Gemahl, husband; Halm, stalk (Halmen when used in a collective sense); Hauch, breath; Herzog, duke; Huf, hoof; Hund, dog; Kobold, hobgoblin; Laut, sound; Leichnam, corpse; Luchs, lynx; Molch, lizard; Mond, moon; Monath, month; Mord, murder; Pfad, path; Salm, salmon; Schaft, shaft; Schuh, shoe; Staar, starling; Stoff, material; Tag, day; Trunkenbold, drunkard; Unhold, monster; Vielfraß, glutton; Wiedehopf, hoopoo; Zoll, inch (Zoll, *pl.* Zölle, custom, tax). Ex.:

Singular.	Der Gemahl.	*Plural.*	die Gemahle.
	Der Mond.		die Monde
	Der Unhold.		die Unholde.

RULE III. Neuter nouns ending in e, el, en, er, chen and lein, have the same form in the plural. Ex.: Das Mittel, the means; die Mittel, the means. Das Wasser, the water; die Wasser, the waters. Das Gebäude, the building; die Gebäude, the buildings. Das Mädchen, the girl; die Mädchen, the girls. *Singular.* Das Männlein, the little man. *Plural.* Die Männlein, the little men.

Exception. Kloster, cloister, takes the Umlaut.

RULE IV. Neuter nouns of other terminations add e (or er). Ex.: Jahr, year; Jahre, years. Schiff, ship; Schiffe, ships. Boot, boat; Boote (sometimes written Böte), boats. *Singular.* Das Bild the image. *Plural.* Die Bilder, the images.

Floß, raft, and Rohr, pipe, take the Umlaut.

NEW DECLENSION.

RULE V. Masculine nouns of the new declension which end in e, or unaccented el, er, en, add n in the *oblique* cases of the ingular, and retain this form in *all* cases of the plural. Ex.: Der Knabe, the boy; des Knaben; die Knaben. Der Ungar, the Hungarian; des Ungarn; die Ungarn. Der Baier, the Bavarian; des Baiern; die Baiern. Herr has Herrn in the ob ique cases of the singular, and Herren in all cases of the plural. There are some words ending in or which take en: e. g., N. Der Barber, the barbarian. G. Des Barbaren. *Plural.* Die Barbaren.

RULE VI. Masculine nouns of other terminations add en. Ex.: Der Graf, the count; des Grafen, die Grafen. Der Bär, the bear; des Bären, die Bären. Der Ochs, the ox; des Ochsen, die Ochsen.

RULE VII. Feminine nouns ending in e, el, er, form the plural by adding n. Ex.: Narbe, scar; Narben. Gabel, fork; Gabeln. Feder, pen; Federn.

RULE VIII. Feminine nouns of other termination add en. Ex.: Frau, woman; Frauen. Uhr, watch; Uhren. Freundin, friend. Nouns terminating in „in" (which formerly used to be spelt „inn") double the n in the plural, before they take „en". Ex.: Die Freundin. *Plural.* Die Freundinnen. See § 14, 1.

RULE IX. Nouns which in the nominative plural end in n, have all cases alike; those of other terminations add n in the dative, and have all other cases alike.

Note. The masculine nouns Ahn, ancestor; Dorn, thorn; Flitter, spangle; Forst, forest; Gau, province; Gevatter, godfather; Lorbeer, laurel; Mast, mast; Nachbar, neighbour; Pfau, peacock; See, lake; Sporn, spur; Staat, state; Stachel, sting; Strahl, ray; Strauß, ostrich; Vetter, cousin; Unterthan, subject; Zierat or Zierath, ornament; and the neuters Auge, eye; Bett, bed; Ende, end; Hemd, shirt; and Ohr, ear; form the singular according to the old, and the plural according to the new declension. Hemd and Bett have also the forms Hemder and Bette; the masculine nouns Fels, rock; Friede, pea e; Funke, spark; Gedanke, thought; Glaube, faith; Haufe, heap; Name, name; Saame, seed; Schade, injury; Wille, will; follow the new declension, and also take s in the genitive singular. Ex.: Der Fels; des Felsens; dem Felsen. They, however, often end in the nominative singular in en, and are regularly inflected according to the old declension. Ex.: Der Felsen; der Fricten, &c. A few examples will explain the former part of this note:

Sing.	N. Der Dorn	Gen. Des Dornes.	*Plur.*	Die Dornen (also Dörner.)
	N. Der Stachel.	Gen. Des Stachels.		Die Stacheln.

Der Schmerz, the pain, forms the genitive, and das Herz, the heart, the genitive and dative singular, in the same way, and both form the plural according to the new declension.

OLD DECLENSION OF THE ADJECTIVE, PLURAL. (See Sect. 15.)

Nom.	Gut-e (Wein-e,) good (wines);	(Seide-n,) (silks;)	(Wasser,) (waters;)
Gen.	Gut-er (Weine,) of good (wines);	(Seide-n,) (silks;)	(Wasser,) (waters;)
Dat.	Gut-en (Wein-en,) to good (wines);	(Seide-n,) (silks;)	(Wasser-n,) (waters;)
Acc.	Gut-e (Wein-e,) good (wines);	(Seide-n,) (silks;)	(Wasser,) (waters).

DECLENSION OF THE ARTICLE AND ADJECTIVE IN THE PLURAL.

	Masculine.	*Feminine.*	*Neuter.*
N.	Die guten (Hüt-e,) the good (hats);	(Frau-en,) (women;)	(Häus-er,) (houses;)
G.	Der guten (Hüt-e,) of the good (hats);	(Frau-en,) (women;)	(Häus-er,) (houses;)
D.	Den guten (Hüt-en,) to the good (hats);	(Frau-en,) (women;)	(Häus-ern,) (houses;)
A.	Die guten (Hüt-e,) the good (hats;)	(Frau-en,) (women;)	(Häus-er,) (houses.)

DECLENSION OF A POSSESSIVE PRONOUN AND AN ADJECTIVE IN THE PLURAL.

	Masculine.	*Feminine.*	*Neuter.*
N.	Meine guten (Nägel,) my good (nails);	(Nadel-n,) (needles;)	(Messer,) (knives;)
G.	Meiner guten (Nägel,) of my good (nails);	(Nadel-n,) (needles;)	(Messer,) (knives;)
D.	Meinen guten (Nägel-n,) to my good (nails);	(Nadel-n,) (needles;)	(Messer-n,) (knives;)
A.	Meine guten (Nägel,) my good (nails);	(Nadel-n,) (needles;)	(Messer,) (knives.)

When several consecutive adjectives precede and qualify the same noun, they must, in termination, be all alike. Ex.: Er hat gutes feines blaues Tuch. Er hat das gute feine blaue Tuch. Sie haben gute neue schöne Hüte. Sie haben die guten neuen schönen Hüte. § 34, 2. The pupil's attention is directed to the changes which the adjectives undergo according as the article is absent or present, of which more will be said hereafter.

NEW DECLENSION OF NOUNS PLURAL.

N.	Die Ochse-n, the oxen;	die Fürst-en, the princes;
G.	Der Ochse-n, of the oxen;	der Fürst-en, of the princes;
D.	Den Ochse-n, to, for the oxen;	den Fürst-en, to, for the princes;
A.	Die Ochse-n, the oxen;	die Fürst-en, the princes.

CONJUGATION OF THE PRESENT TENSE OF „haben" AND „sein" IN THE PLURAL.

Wir haben, we have;	wir sind, we are;
Ihr (§ 57. 6) habt, you have;	ihr seid, you are;
Sie haben, they have;	sie sind they are.

EXERCISE 16.

Auf'gabe, *f.* exercise; Baum, *m.* tree; Beide, both; Birne, *f.* pear; Blatt, *n.* leaf; Denn, for, because; Ehrlich, *adj.* honest, honestly; *adv.* Fin'gerhut, *m.* thimble; Freude, *f.* joy, delight; Fußvolk, *n.* infantry; Gabel, *f.* fork; Gast, *m.* guest; Gelb, *adj.* yellow; Gemäl'de, *n.* painting, picture; Gleich, like, equal; Hoch, *adj.* high (predicate form); Hoher, hohe, hohes, (attributive form); Kanzel, *f.* pulpit; Kanzler, *m.* chancellor; Kirche, *f.* church; König, *m.* king; Lang, *adj.* long; Lästig, *adj.* burdensome; Lieblich, *adj.* lovely; Liebling, *m.* darling, favourite; Löffel, *m.* spoon; Louise, *f.* Louisa; Marktfrau, *f.* marketwoman; Maler, *m.* painter; Malerei', *f.* (art of) painting; Messerschmied, *m.* cutler; Musik'lehrer, *m.* music-teacher; Nachbarin, *f.* neighbour; Pre'diger, *m.* preacher; Ratte, *f.* rat; Re'genschirm, *m.* umbrella;

Reichthum, *m.* wealth, riches;
Reinlich, *adj.* neat, cleanly;
Reiterei', *f* cavalry;
Schmackhaft, *adj.* palatable;
Sonnenschirm, *m.* parasol;
Stolz, *adj.* proud, haughty;
Tochter, *f.* daughter;
Unwohl, *adj. and adv.* unwell;
Volk, *n.* people;
Zu (pr.) to;
Zu (adv.) too.

Fehler sind unvermeid'lich. Mistakes are unavoidable.

Sie suchen auf den Schiffen ihres Feindes Sätt'igung ihrer Rache und ihres Hungers. They seek upon the ships of their enemy gratification (satiation) of their rage and of their hunger.

Dieses schöne Geschenk' ist von meiner Schwester. This beautiful present is from my sister.

Dieses Haus, diese Wiesen und jene Wein'gärten sind das Eigenthum eines reichen Kaufmannes. This house, these meadows, and those vineyards are the property of a rich merchant.

1. Diese neuen Tische sind groß. 2. Die weißen Hüte sind schön. 3. Diese Gabeln sind von Silber. 4. Haben Sie silberne oder goldene Messer und Löffel? 5. Wir haben silberne. 6. Die guten Knaben haben schöne Birnen. 7. Fleißige Schüler haben lange Aufgaben. 8. Diese alten Soldaten haben alte Bücher. 9. Der Messerschmied hat schöne neue Messer. 10. Die Freuden dieses Mannes sind seine lieblichen Kinder. 11. Die Kanzeln in diesen Kirchen sind hoch. 12. Die Nichten der alten Dame sind fleißig. 13. Die Mädchen des Predigers sind gute Kinder. 14. Die Holländer sind reinlich und ehrlich. 15. Diese Marktfrau hat die großen reifen Birnen des Bauers. 16. Die großen reifen Birnen dieser Marktfrau sind schmackhaft. 17. Hat diese Dame den Fingerhut ihrer guten Freundin? 18. Nein, sie hat den Fingerhut ihres guten Freundes. 19. Hat Fräulein Louise den neuen Sonnenschirm ihrer guten Mutter? 20. Nein, sie hat den Regenschirm ihres guten Bruders. 21. Hat die kleine Tochter dieser Dame einen Musiklehrer? 22. Nein, denn sie ist noch zu jung; aber ihre Schwester hat nicht nur einen Musiklehrer, sondern auch einen Lehrer der Malerei. 23. Wer hat die Bücher Ihres Bruders? 24. Die Schwester seiner Freundin hat die Bücher. 25. Hat die Tochter Ihres alten Nachbarn die goldene Uhr meiner jungen Freundin? 26. Nein, sie hat die silberne Uhr ihrer Nachbarin. 27. Die Blätter dieser Bäume sind gelb, aber ihr Obst ist reif und gut. 28. Die Ratten sind lästige Gäste. 29. Dieser alte Kaufmann hat große Reichthümer. 30. Diese Reiterei und jenes Fußvolk sind beide gleich gut. 31. Der kleine Sohn des Kanzlers ist der Liebling des Königs. 32. Diese Freundin des Malers hat sehr schöne Gemälde.

Questions. 1. How is the adjective declined in the plural, when not influenced by a preceding word? 2. What is said of the *definite article*, the *demonstrative* and *possessive pronouns* in the plural? 3. How are they inflected? 4. What is the ending of adjectives, when preceded by the definite article, a demonstrative, possessive, or personal pronoun? 5. And of what declension are they? 6. What is said of adjectives when consecutively preceding and qualifying a noun? 7. Have adjectives and nouns of the New Declension the same form in the plural? 8. What cases of nouns are alike in the plural? 9. What is the final letter of the dative plural? 10. What is meant by the modification of a vowel? 11. How is it called in German?

LESSONS IN FRENCH.—No. XVI.

By Professor Louis Fasquelle, LL.D.

Section XXXIV.

1. The indefinite pronoun *on* has no exact equivalent in English. It may be rendered by *one*, *we*, *they*, *people*, &c., according to the context. *On* has, of course, no antecedent, and seldom refers to a particular person [§ 41 (4) (5), § 113].

On doit honorer la vertu. *We should honour virtue.*
On nous apporte de l'argent. *Money is brought to us.*

2. As may be seen in the last example, *on* is often the nominative of an active verb, which is best rendered in English by the passive [§ 113 (1)]:—

On dit que votre épouse est ici. *It is said that your wife is here.*
On raconte des histoires singulières. *Singular histories are related.*
On récolte beaucoup de blé en France. *Much wheat is harvested (grown) in France.*

3. Avoir lieu, answers to the English expression, *to take place*:—

Cela a lieu tous les jours. *That takes place every day.*

4. Au lieu de, answers to the English, *instead of*. The verb which follows it must, according to Rule 2, Sect. 20, be put in the infinitive:—

Au lieu d'étudier, il joue. *Instead of studying he plays.*

5. Devoir, *to owe*, is used before an infinitive, like the English verb *to be*, to express obligation:—

Je dois lui écrire demain. *I am to write to him to-morrow.*
Nous devons y aller demain. *We are to go there to-morrow.*

6. Recevoir des nouvelles, means, *to hear from*:—

Devez vous recevoir des nouvelles de votre sœur. *Are you to hear from your sister?*

7. Entendre parler answers to the English phrase, *to hear of* or *about*:—

Entendez vous souvent parler de vos amis? *Do you often hear of your friends?*

Résumé of Examples.

Que dit on de nous dans la ville?	*What do they say of us in the city?*
On ne parle pas de vous.	*People do not speak of you.*
Ne mange-t-on pas tous les jours?	*Do not people eat every day?*
On mange quand on a faim.	*People eat when they are hungry.*
On trouve beaucoup d'or en Californie.	*Much gold is found in California.*
Dit on quelque chose de nouveau?	*Do they (people) say anything new?*
On ne dit rien de nouveau.	*Nothing new is said.*
A-t-on reçu de nouvelles de George?	*Has anything been heard from George?*
On n'a point entendu parler de lui.	*Nothing has been heard of him.*
On n'a point reçu de ses nouvelles.	*They have not heard from him.*
Devez vous écrire à notre ami?	*Are you to write to our friend?*
Je dois lui écrire demain.	*I am to write to him to-morrow.*
Le concert doit il avoir lieu ce soir?	*Is the concert to take place this evening?*
Il doit avoir lieu ce matin.	*It is to take place this morning.*
Je viens au lieu de mon frère.	*I come instead of my brother.*
Il danse au lieu de marcher.	*He dances instead of walking.*

Exercise 67.

Afrique, *f. Africa.*	Fourn-ir, *v. to furnish.*	Part-ir, *v. to depart, to set out, to start*
Alger, *Algiers.*	Habits, *m p. clothes.*	Prochain, *e, next*
Apport-er, *v. to bring.*	Malade, *sick.*	Sav-oir, *v. irr. to know*
Demain, *to-morrow.*	Mois, *m month.*	Voyage, *m. journey*
Diamant, *m. diamond.*	Or, *m gold.*	

1. Vous apporte-t-on de l'argent tous les jours? 2. On m'en apporte pas tous les jours. 3. Vous fournit on des habits quand vous en avez besoin? [Sect. 21.] 4. On m'en fournit toutes les fois (*every time*) que j'en ai besoin. 5. A-t-on besoin d'argent quand on est malade? 6. Quand on est malade on en a grand besoin. 7. Avez vous reçu des nouvelles de votre fils? 8. Je n'ai point reçu de ses nouvelles. 9. Ne sait pas qu'il est en Afrique? 10. On dit qu'il doit partir pour Alger. 11. Quand doit il commencer son voyage? 12. On dit qu'il doit le commencer le mois prochain. 13. Ce matin a-t-il lieu aujourd'hui ou demain? 14. On nous dit qu'il doit avoir lieu cette après-midi. 15. Il aura lieu à cinq heures et demie. 16. Avez vous envie de venir au lieu de votre cousin? 17. Mon frère doit venir au lieu de notre cousin. Est-ce vous l'intention de lui dire ce qu'il doit faire? 19. Je lui dis qu'il doit faire. 20. Savez vous ce qu'on dit de nouveau? 21. On ne dit rien de nouveau. 22. Trouve-t-on beaucoup d'or en Californie? 23. On y en trouve beaucoup. 24. Y trouve-t-on aussi des diamants? 25. On n'y en trouve pas; on n'y trouve que de l'or.

Exercise 68.

1. What do people say of me? 2. People say that you are not very attentive to your lessons. 3. Is it said that much gold is found in Africa? 4. It is said that much gold is found in California. 5. Do they bring you books every day? 6. Books are brought to me [R. 2] every day, but I have no time to read them. 7. What should one do (*doit on faire*) when one is sick? 8. One should send for a physician. 9. Do you send for my brother? 10. I am to send for him this morning.

Do you hear from your son every day? 12. I hear from him every time that your brother comes. 13. Does the sale (*vente*, f.) take place to-day? 14. It takes place this afternoon. 15. At what time (*heure*) does it take place? 16. It takes place at half after three. 17. I have a wish to go there, but my brother is sick. 18. What am I to do? 19. You are to write to your brother, who, it is said (*dit on*), is very sick. 20. Is he to leave for Africa? 21. He is to leave for Algiers. 22. Do you come instead of your father? 23. I am to write instead of him. 24. Does the concert take place this morning? 25. It is to take place this afternoon. 26. Do you know at what hour? 27. At a quarter before five. 28. Is your brother coming? 29. My brother is not coming, he has no time. 30. Are you angry with your brother? 31. I am not angry with him. 32. Is anything new said? (Is there anything new?) 33. There is nothing new. 34. What is said of him? 35. Nothing is said of him.

Section XXXV.

Reflective verbs (§ 48 (6), § 56).

1. A verb is called reflective or pronominal, when it is conjugated with two pronouns of the same person, i. e. the usual nominative pronoun and the pronouns me, te, se, &c. [§ 56.] In these verbs the subject is represented as acting upon itself:—

Je m'applique à l'étude.	*I apply (myself) to study.*
Je me propose de voyager.	*I propose (to myself) to travel, i.e. it is my intention to travel.*

In these verbs, the second pronoun is in fact only the objective pronoun direct or indirect, which, according to Rules 1 and 2, Sect. 26, is placed before the verb.

2. The reflective form of the verb, which is much more frequently used in French than in English, often answers to the passive form so common in the latter language:—

Cela se voit tous les jours.	*That is seen every day*—literally, *That sees itself every day.*
Cette marchandise se vend facilement.	*That merchandise is easily sold.* *That merchandise sells itself easily.*
Cela se fait ainsi.	*That is done thus.* *That does itself so.*

3. The verb se porter, literally *to carry one's self*, is used idiomatically for *to do* or *to be* in speaking of health:—

Comment vous portez vous?	*How do you do?*
Je me porte très bien.	*I am very well.*

4. S'asseoir [4 ir. see § 62], *to sit down*, is also a reflective verb:—

Votre frère s'assied.	*Your brother sits down.*

5. Se promener, means, *to walk*, *to ride*, &c., for pleasure, or health:—

Je me promène tous les jours.	*I take a walk every day.*
Je me promène à cheval.	*I take a ride.*

6. Marcher, aller à cheval, aller en voiture, signify *to walk* or *to ride*, when we wish to express simply the manner of progressing:—

Marchez vous beaucoup tous les jours?	*Do you walk much every day?*
Je vais à cheval et en voiture.	*I ride on horseback and in a carriage.*

7. Conjugation of the Present of the Indicative of the Reflective Verbs.

Se port-er, 1. *to be* or *do*:	Se promen-er, 1. *to walk* or *ride*:	S'asse-oir, 3 ir. *to sit down*:
Je me porte, *I am* or *do*;	Je me promène, *I take a walk* or *ride*;	Je m'assieds, *I sit down* or *am sitting down*;
Tu te portes,	Tu te promènes [§ 49],	Tu t'assieds,
Il se porte,	Il se promène,	Il s'assied,
Nous nous portons,	Nous nous promenons,	Nous nous asseyons,
Vous vous portez,	Vous vous promenez,	Vous vous asseyez,
Ils se portent.	Ils se promènent.	Ils s'asseient.

8. The reflective pronouns in the imperative of reflective verbs follow Rule 4 of Sect. 26, and Rules 3, 4, of Sect. 27, and also § 100 (2) (3):—

Asseyons nous, asseyez vous.	*Let us sit down, sit down.*
Ne nous asseyons pas.	*Let us not sit down.*

Résumé of Examples.

A quoi vous appliquez vous?	*To what do you apply yourself?*
Je m'occupe de mes affaires.	*I occupy myself with my affairs.*
Je m'adresse à mes amis.	*I apply to my friends.*
Vous adressez vous à votre père?	*Do you apply to your father?*
Je m'adresse à lui [§ 100 (4)].	*I apply to him.*
Comment se porte Monsieur votre père?	*How is your father?*
Il se porte passablement bien.	*He is tolerably well.*
Pourquoi ne vous asseyez vous pas?	*Why do you not sit down?*
Je m'assieds quand je suis fatigué.	*I sit down when I am weary.*
Je n'ai pas les temps de m'asseoir.	*I have no time to sit down.*
Vous promenez vous tous les jours?	*Do you take a walk every day?*
Je me promène en voiture aujourd'hui.	*I take a ride to-day (in a carriage).*
Nos amis se promènent ils à cheval?	*Do your friends take a ride to-day*
N'aimez vous pas à marcher?	*Do you not like walking?*
J'aime beaucoup à aller à cheval.	*I like riding much.*
Aimez vous à vous promener?	*Do you like walking (for pleasure)?*
Asseyons nous, s'il vous plait.	*Let us sit down, if you please.*
Ne nous asseyons nous pas?	*Do we not sit down?*
Ne nous asseyons pas, il est trop tard.	*Let us not sit down, it is too late.*
Combien ce drap se vend il la* verge.	*How much is that cloth sold a yard.*
Il se vend vingt-cinq francs le mètre.	*It is sold twenty-five francs the metre.*
Comment cela s'appelle-t-il?	*How is that called? What is the name of that?*
Comment vous appelez [§ 49 (4)] vous?	*What is your name? How do you call yourself?*

Exercise 69.

Banquier, m. *banker.*	Magnifique, *magnificent.*	Pied, m. *foot.*
Comment, *how.*	Matin, m. *morning.*	Port-er, *to carry, wear.*
Cheval, m. *horse.*	Mieux, *better.*	Quelquefois, *sometimes.*
Drap, m. *cloth.*	Obligé, e, *obliged.*	Quitt-er, 1. *to leave.*
Fatigué, e, *weary, tired.*	Part-ir, 2. *to set out.*	Voiture, f. *carriage.*

1. Comment ce monsieur s'appelle-t-il? 2. Je ne sais comment il s'appelle. 3. Cette dame ne s'appelle-t-elle pas L.? 4. Non, Madame, elle s'appelle M. 5. Monsieur votre père se porte-il bien ce matin? 6. Il se porte beaucoup mieux. 7. Fait il beau temps aujourd'hui? 8. Il fait un temps magnifique, n'allez vous pas vous promener? 9. Nous n'avons ni cheval ni voiture. 10. Ne pouvez vous marcher? 11. Je suis trop fatigué pour marcher. 12. N'allez vous pas à cheval tous les matins? 13. Je me promène tous les matins. 14. Comment vous promenez vous? 15. Quelquefois à pied et quelquefois en voiture. 16. A qui vous adressez vous quand vous avez besoin d'argent? 17. Je m'adresse à mon banquier? 18. Ne voulez vous pas vous asseoir? 19. Nous vous sommes bien obligés. 20. Ce drap se vend il fort bien? 21. Il se vend fort cher. 22. Ne devez vous pas aller à la campagne, s'il fait beau temps? 23. Votre frère doit il quitter la ville aujourd'hui? 24. Il doit partir demain matin? 25. Ma sœur se promène tous les matins.

Exercise 70.

1. Does your sister walk every day? 2. She takes a walk every morning. 3. She likes riding on horseback and in a carriage. 4. What is that little girl called? 5. She is called L. 6. Is not that gentleman called L.? 7. No, Sir, he is called G. and his cousin is called H. 8. How is your brother? 9. My brother is very well, but my sister is not well. 10. How are your two daughters? 11. They are tolerably well to-day. 12. Will you not sit down, gentlemen? 13. We are much obliged to you, Madam, we have not time. 14. Does that book sell well? 15. It sells very well. 16. How is that silk sold an ell (*l'aune*)? 17. It is sold six francs an ell. 18. Is it fine weather to-day? 19. It is very fine weather, will you not take a walk? 20. I have no time to walk. 21. To whom does your brother apply? 22. He applies to his brother. 23. Is his brother at home? 24. No, Sir, he is at Paris. 25. When does he intend to go to France? 26. He intends to go to France in one month. 27. Is your sister to leave to-morrow morning? 28. She is to leave to-day if (*s'il*) it is fine weather. 29. What do people say of this? 30. Nothing is said about it [Sect. 34]. 31. Are you too much fatigued to walk? 32. I am not too much fatigued, but I have no wish to walk. 33. Do you like walking or riding? 34. I like riding, when I have a good horse? 35. I do not like walking.

* The English a or an before a measure is rendered into French by the article le, or la, &c.

[illegible] IN NATURAL HISTORY.—No. VI.

THE SPANIELS.

The spaniels are remarkable for docility and an affectionate disposition, and these good qualities, combined with their beauty, render them general favourites. The fur is long and silky, sometimes crisped or curled, the ears are large and pendent, and the expression of the countenance sagacious and pleasing. This race of dogs was known to the Romans, for it appears clearly figured on some of their ancient monuments. Of it there are many varieties; black, brown, pied, liver-coloured and white, and black and white.

BLENHEIMS AND COCKERS.

The following is an interesting instance of the attachment of one of these creatures. It was reared by the gamekeeper of a gentleman, and constantly attended its master by night and day. Wherever the gamekeeper appeared, Dash was never far distant; and in his nightly excursions to detect poachers, his dog was of especial service. At such times, Dash entirely neglected the game, and many a depredator was caught through his sagacity. During the last stage of a consumption, that carried his master to his grave, Dash unweariedly watched at the foot of the bed; and, when death came, the dog would not quit the body, but lay by its side on the bed. With great difficulty he was induced to eat any food; and although after the funeral, he was taken to the mansion of his master's employer, and caressed with the tenderness naturally excited by so fond an attachment, he took every opportunity to steal back to the room in the cottage where the gamekeeper expired, and there he would remain for hours. From thence, for fourteen days, he constantly visited the grave, and at the end of that time died.

The smallest of the land spaniels is the cocker, which is chiefly used in flushing woodcocks and pheasants in thickets and copses into which the setter and the springer can scarcely enter. The Blenheim spaniel is a breed cultivated by one of the dukes of Marlborough. From its beauty and occasional gaiety, it is more frequently an inhabitant of the drawing-room than the field, but it occasionally breaks out, and shows what it is prepared to do.

The water-spaniel belongs to this group; its utility to persons engaged in the pursuit of water-fowl is extremely great; it trims well, does readily what is required, and is an excellent retriever, bringing the birds which have been shot on the w to its master.

The rough water-dog is a most valuable and intell animal. It is robustly made, and covered throughout deep curly hair. It exceeds the water-spaniel in size strength, but has the same aquatic habits and docility. much used as a retriever by the shooters of water-fow remarkable instance of this is given by Dr. William Ham

THE WATER-SPANIEL.

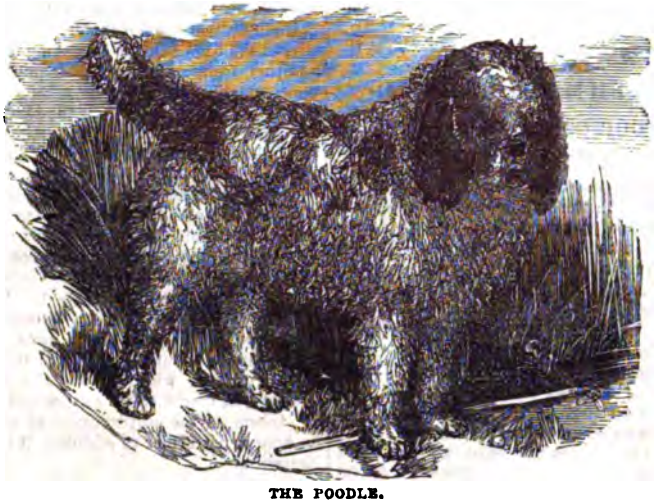
In riding from rush to the G Causeway, with company, they occasion to fo river Bush, ne sea; and as the men were go haul their net, stopped to se success. As s the dog perceiv men to move, down the river own accord, s post in the mi it, on some sh where he could sionally run o and in this pos placed himself all the eagern attention so s observable in a dog which s game. The part for some time at a loss to apprehend his scheme, but th soon satisfied them, and amply justified the prudence animal; for the fish, when they feel the net, always end to make directly out to sea.

Accordingly one of the salmon, escaping from the net, down the stream with great velocity, towards the ford the dog stood to receive him at an advantage. A chas commenced, in from the shallow the water, the d on could see the track of the fish all its rapid t and windings. smart pursuit, found himself le siderably behin consequence o water deepens which he had b duced to the ne of swimming; instead of fo his desperate ga longer he reali it over, and ra all his speed d down the river. was sure of being seaward of the s where he took t before in his p attitude. Here a second time m and a fresh ensued, in which various attempts salmon at last made his way out to the sea, notwithstandi the ingenious and vigorous exertions of his pursuer.

Though the dog did not succeed at this time, Dr. Ha was informed that it was no unusual thing for him to ru his game, and the fishermen assured him he was of gre vantage to them, by turning the salmon towards the During the whole of the chase, this sagacious animal s

plainly to have two objects in view; one, to seize his game, if possible; and the other, to drive it towards the net when the former failed; each of which he managed with a degree of address and ingenuity extremely interesting and amusing.

Very nearly allied to the rough water-dog is the poodle.



THE POODLE.

The poodle is a very sagacious specimen of the spaniel tribe, if the following fact, related to Mr. Jesse, by a gentleman on whose veracity he could place the most implicit reliance, may be taken as an example. A friend of this gentleman, an officer in the Forty-fourth Regiment, who had occasion when in Paris, to pass one of the bridges across the Seine, had his boots, which had been previously well polished, dirtied by a poodle-dog rubbing against them. He, in consequence, went to a man who was stationed on the bridge, and had them cleaned. The same circumstance having occurred more than once, his curiosity was excited, and he watched the dog. He saw him roll himself in the mud of the river, and then watch for a person with well-polished boots, against which he contrived to rub himself. Finding that the shoeblack was the owner of the dog, he taxed him with the artifice; and after a little hesitation, he confessed that he had taught the dog the trick, in order to procure customers for himself. The officer, being much struck with the dog's sagacity, purchased him at a high price, and brought him to London, where he was tied up for a time and then released. After a day or two, the dog made his escape; and in about a fortnight he was found with his former master, pursuing his old trade on the bridge.

THE ALPINE SPANIEL.

Another dog, sometimes called the Alpine spaniel, but more commonly known as the dog of St. Bernard, is a very remarkable creature. Some years ago, Mr. Edwin Landseer painted a picture of two of these animals which excited, as it must still do, in the mind of all its spectators, great interest. One of these sagacious dogs is represented clearing away the snow from an unfortunate traveller, who has been overtaken by one of those sudden avalanches so common in the Alps; the other, with his loud voice appears giving the alarm to the monks at the Hospice of St. Bernard, who are hastening onwards to convey the sufferer to their hospitable shelter, and restore, if possible, suspended animation.

The number of monks connected with the Hospice varies from time to time, but usually consists of twenty or twenty-five, all natives of the countries north of the Alps. They are enjoined to board and lodge all travellers at all seasons, and assist them with guides, in traversing the mountains. In winter their rules require them to send every day, whatever may be the weather, two able men called *Maroniers*, who are accustomed to the mountains, one towards the Italian side, the other towards Valais. These persons traverse the path during the whole day, attended by one of the great dogs, keeping a path open in the snow, and watching for passengers. If the Maronier meets with any person bewildered or exhausted, or his sagacious companion indicates by his movements that any unfortunate person is under the snow, he immediately gives his aid, or hurries to the Hospice to gain assistance. Cold water, with ice immersed in it, is prepared there as the most efficacious remedy, and the body is placed in it. If this fails in restoring animation, all hope is at an end.

The dogs originally came from Spain. One of them named Barry saved a great number of lives. Another, called Jupiter, was also very successful. In the year 1827, it appears, he knew some person had passed the Hospice, and he set out alone immediately to follow them. After some time his absence was remarked; and one of the Maroniers, by pursuing his track, found him posted over a drift of snow, where a poor woman and her child were about to perish; both of whom he was thus the instrument of rescuing from death.

In confirmation of the sagacity of the water-dog, we may here state what we ourselves know to be a fact. A water-dog, or water-spaniel, which belonged to a gentleman who lived at Gartness, on the small river called the "water of Endrick," near Killearn, in the parish of Strathblane, in Scotland, was accustomed to watch under a waterfall upon that river, of the height of about twenty feet, at the place just mentioned, for the "leaping of the salmon" which takes place at certain seasons of the year. For the salmon are known to ascend rivers and to leap waterfalls in the ascent,

in order to deposit their spawn, or to follow some other remarkable arrangement of nature. Accordingly, when the salmon, in leaping, failed to ascend the fall, this dog was accustomed to seize the exhausted fish in his teeth, and carry it to his master; thus, supplying him for many a day, with fresh fish for dinner without the trouble of going to catch it.

LESSONS IN ARITHMETIC.—No. XIII.

PROOF OF THE FOUR COMMON RULES,

"By casting out the Nines."

The method of proving the four common rules "by casting out the nines," has been delayed till the present lesson, in consequence of a wish to explain the principle of the operation, and this explanation could not have been given in intelligible terms to a learner until he had made himself acquainted with the very rules to which they are to be applied; that is, with all the four operations which can be performed with numbers. As numbers are composed of units, tens, hundreds, &c., let us inquire first what remainders will arise by dividing the digits in each of these ranks by 9. As to units, it is plain that no number less than 9 itself can be divided by 9, hence the remainder in dividing any number as 1, 2, 3, &c. less than 9, by 9, will always be that number itself, for the quotient is in each case 0; that is, the remainders will be 1, 2, 3, &c. As to tens, it is plain that 10 divided by 9 gives the remainder 1, 2 times 10 or 20 divided by 9 gives the remainder 2, 3 times 10 or 30 divided by 9 gives the remainder 3, 4 times 10 or 40 divided by 9 gives the remainder 4, and so on; so that any *number of tens* divided by 9 always gives for a remainder that *number itself*. As to hundreds, it is equally plain that 100 divided by 9 gives the remainder 1, 2 times 100 or 200 divided by 9 gives the remainder 2, 3 times 100 or 300 divided by 9 gives the remainder 3, 4 times 100 or 400 divided by 9 gives the remainder 4, and so on; so that any *number of hundreds* divided by 9 always gives for a remainder *that number itself*. In the same way it may be shown that in dividing the digits of every rank of numbers in the decimal scale of notation by 9, the remainders will always be those digits themselves. So that, for instance, if we take any number, say 7654, which is composed of 7 thousands, 6 hundreds, 5 tens, and 4 units, the remainders which arise from dividing each of these numbers successively by 9 are no other than the digits 7, 6, 5, and 4 themselves.

From these considerations it is evident that the *sum of the digits* or figures in any number will be the *sum of the remainders* which arise from dividing the parts of which the number is composed by 9, and if the *sum of the digits* be *exactly divisible* by 9, the *sum of these remainders* will be *exactly divisible* by 9, and consequently *the number itself* will be *exactly divisible* by 9.

Moreover, the sum of these remainders, when not exactly divisible by 9, will give, when divided by 9, the same remainder as the number itself gives, when divided by 9; and for this reason that in the division of the number itself by 9, the remainders are successively added in the operation, and divided by 9 till the last remainder is obtained; whereas in the division of the sum of the remainders by 9, the operation is performed at once, and the last remainder obtained as before. To exemplify this observation, take the same number 7654; here the sum of the digits, or 7+6+5+4, is 22; which divided by 9 gives 4 for a remainder. But 7654 divided by 9 gives 4 also for a remainder; and in the operation we see the same remainders successively accumulating; thus, the first part 76 divided by 9 gives remainder 4; carrying 4 to the next figure 5, makes 45, which divided by 9 gives remainder 0; carrying 0 to 4, makes 4, which divided by 9 gives remainder 4. Now this is obtained by merely adding the digits and dividing their sum successively by 9; thus, 7+6 gives 13, which divided by 9, gives remainder 4; next, 4+5 gives 9, which divided by 9, gives remainder 0; lastly, 0+4 gives 4, which divided by 9, gives remainder 4, the same as above. To find the remainder, then, of the division of any number by 9, add the figures or digits of which the number is composed successively together, dividing by 9, whenever the sum of the figures exceeds 9; in other words, taking 9 away from this sum, and adding the remainder to the next figure in succession, and so on, repeating this operation until the last remainder is obtained; this remainder is the remainder arising from the division of the number by 9; and *this process is called casting out the nines.*

To apply the process just described to the purpose of proving the accuracy of the results obtained in the rule of simple addition, it will be necessary to observe that the sum of the quotients arising from dividing the parts of any number by 9, is equal to the quotient arising from dividing the number itself by 9; and that the remainder resulting from the two divisions must be the same, as we have seen in the rules of division, that the remainder, under a particular view, is an essential part of the quotient. So in finding the sum of any set of numbers in addition, we are finding the number of which the parts are given; consequently, the remainder arising from the division of the *sum* of any set of numbers by 9, is the same as the remainder arising from the division of the *numbers themselves* by 9. This principle suggests the following *rule for the proof of simple addition by casting out the nines:* add together, in succession, all the figures or digits of *the numbers* which have been added together, casting out the nines as you proceed, and note *the remainder;* then, add together in the same way all the figures or digits of the *sum* of these numbers, casting out the nines as you proceed, and note *the remainder;* if this remainder be the same as the former, the operation, in general, may be presumed to be right. We say, in general, because if there should happen to be a balance of errors by putting down a figure *too little* by so many units, and another *too much* by the same number of units, of course this process will not detect the errors; neither will it detect the misplacement of figures which are right in themselves; neither will it detect the omission of nines or ciphers, or the misplacement of either; and yet, in the hands of an honest performer of addition, it is a most useful check upon his operations.

Example.—Prove the following sum in simple addition by casting out the nines.

4682	
3496	numbers added
4327	
5634	
Sum 18139	

Here, casting out the nines of the *numbers added* the remainder is 4; and casting out the nines of the *sum*, the remainder is 4; therefore the sum is correct, according to what has been said.

Mode of Operation.

In this operation, we may begin "casting out the nines," either at the top or the bottom of the numbers added, and either at the right hand or the left. Beginning at the left of the top line, the operation proceeds thus: 4 and 6 make 10, casting out 9, 1 remains; 1 and 8 make 9, casting out 9, nothing remains; 2 and 5 make 7, and 5 and 4 make 9, casting out 9, nothing remains; the next figure being 9, nothing remains; 6 and 4 make 10, casting out 9, 1 remains; 1 and 3 make 4; 4 and 2 make 6; 6 and 7 make 13, casting out 9, 4 remains; 4 and 6 make 9, nothing remains; 6 and 3 make 9, and nothing remains; the last digit being 4, we find that 4 is the last remainder of the *numbers added*. Next, in "casting out the nines" in the *sum*, we begin at the left hand, thus: 1 and 8 make 9, and nothing remains; next, 1 and 3 make 4; to this, it is unnecessary to add 9, and then take it away; therefore, the remainder of the *sum* is 4, the same as that of the *numbers added;* therefore the sum is right. A correspondent, Mr. J. Carey, of Clapham, appears to be the only one of our numerous correspondents who has taken the same simple view that we have done of this process, or mode of proving simple addition.

The application of the same process to the proof of simple subtraction requires only this simple consideration that the sum of the remainder and the subtrahend are equal to the minuend; therefore, if the remainder and the subtrahend be treated like the *numbers added* in addition and the minuend like the *sum*, the proof will be obtained. This principle suggests the following *rule for the proof of simple subtraction by casting out the nines:* add together in succession, all the figures or digits of the *remainder and subtrahend*, casting out the nines as you proceed, and note *the remainder;* then add together in the same way, all the figures or digits of the minuend, casting out the nines as you proceed, and note *the remainder;* if this remainder be the same as the former, the operation, in general, may be presumed to be right. The reasons for saying, in general, in this case, are the same as those assigned above under the rule for proving simple addition, by the same method.

Example.—Prove the following operation in simple subtraction by casting out the nines:

Minuend	3014716
Subtrahend	1285647
Remainder	1729069

Here, casting out the nines of the *remainder and subtrahend*, the remainder is 4; and casting out the nines of the *minuend*, the remainder is 4; therefore the operation is correct, according to the previous observations.

MODE OF OPERATION.

In this operation, we may begin either with the subtrahend and proceed to the remainder, or *vice versâ*; and we may begin either at the right or the left. Beginning at the left of the subtrahend, the operation proceeds as follows:—1 and 2 make 3; 3 and 8 make 11; casting out 9, 2 remain; 2 and 5 make 7; 7 and 6 make 13, casting out 9, 4 remain; 4 and 4 make 8; 8 and 7 make 15, casting out 9, 6 remain; 6 and 1 make 7; 7 and 7 make 14, casting out 9, 5 remain; 5 and 2 make 7; 7 and 6 make 13, casting out 9, 4 remain; this number is the last remainder; for it was unnecessary to notice either 0 or 9, for reasons before mentioned under addition. Next, in casting the nines out of the minuend, we begin at the left hand; thus, 3 and 1 make 4; 4 and 4 make 8; 8 and 7 make 15, casting out 9, 6 remain; 6 and 1 make 7; 7 and 6 make 13, casting out 9, 4 remain; this remainder being the same as that of the *subtrahend and remainder*, the operation of subtraction is right. This method is preferable to that proposed by Mr. Webster, p. 64, and is not so obscurely worded as Mr. Mair's method revived by Mr. Currie, p. 96. From the consideration of this method, it is easily seen, that in the addition of the figures or digits of the subtrahend and remainder together, and the successive casting out of the nines, a nine must frequently be cast out, which would arise by the addition of their separate remainders; and this shows the reason why, in the method proposed by Mr. Webster, 9 must sometimes be borrowed. To avoid this inconvenience the preceding rule is to be preferred.

(To be continued.)

BIOGRAPHY.—No. V.

BENJAMIN FRANKLIN—HIS EARLY LIFE.

ONE of the highest seats occupied by self-educated men is that of Benjamin Franklin, who has clearly described the methods by which he contrived to surmount the great disadvantages of his original condition, in his "Letter to his Son." In the absence of instructors and of the ordinary helps to the acquisition of knowledge, he not only gained an extensive acquaintance with literature and science, but a distinguished rank among the most eminent men of his age. We proceed, therefore, to trace now the early part of his remarkable, and highly instructive career.

Franklin was born at Boston, in North America, on the 17th of January, 1706; the youngest, with the exception of two daughters, of a family of seventeen children. His family was originally from Ecton in Northamptonshire, where his ancestors possessed a small freehold. His father emigrated to New England, in consequence of the persecutions that raged in this country against the nonconformists, during the reign of Charles II., about twenty-four years before the birth of his youngest son. He followed the business of a soap-boiler and tallow-chandler, to which he had not been brought up, and by which he seems to have had great difficulty to provide for his numerous family. "He could draw prettily, and was skilled a little in music. His voice was sonorous and agreeable, so that when he played on his violin, and sung withal, as he was accustomed to do after the business of the day was over, it was extremely agreeable to hear. He had some knowledge of mechanics, and on some occasions was very handy with other tradesmen's tools. But his great excellence was his sound understanding, his solid judgment in prudential matters, both in private and public affairs."

Benjamin, as a child, had learned to read; at eight years of age he was put to the grammar school, but he had not been there quite a year, when he was removed, and placed under a teacher of writing and arithmetic. When he was ten years of age, his father took him home, to assist him in his business, and he pictures himself as employed, at that time, in cutting wicks for candles, filling the moulds of those which were cast, attending the shop, running errands, and making himself generally useful.

To his father he bears the honourable testimony: "He was fond of having at his table, as often as possible, some friends or well-informed neighbours, capable of rational conversation; and he was always careful to introduce useful or ingenious topics of discourse, which might tend to form the minds of his children. By this means, he early attracted our attention to what was just, prudent, and beneficial in the conduct of life. He never talked of the meats which appeared on the table; never discussed whether they were well or ill dressed, of a good or bad flavour, high seasoned or otherwise, preferable or inferior to this or that dish of a similar kind. Thus accustomed from my infancy, to the utmost inattention to those objects, I have since been perfectly regardless of what kind of food was before me, and I pay so little attention to it even now, that it would be a hard matter for me to recollect a few hours after I had dined of what my dinner consisted."

Benjamin showed so great a dislike to the business, that his father feared he would break loose from his fold and go to sea, as one of his brothers had done; and, after a trial of two years, he looked out for an occupation which would be preferable to his son. The next movement, therefore, was to bind him apprentice to a cousin, who was a cutler; but he had been only a few days on trial, when his father, thinking that the apprentice fee required by his relation was too large, took him home again.

A strong tendency in the mind of young Franklin began now to be regarded. From his infancy he had discovered a great fondness for reading. All the money he could obtain, was eagerly laid out in the purchase of books. His father's small collection involved little that was interesting, but he went through the greater part of it. "I was particularly pleased," he observes, "with accounts of voyages. My first acquisition was Bunyan's collection, in small, separate volumes. These I afterwards sold, in order to buy an historical collection, by R. Burton, which consisted of small, cheap volumes, amounting to forty or fifty." One work excited his special interest; he read it again and again, it was "Plutarch's Lives of the most eminent Greeks and Romans;" in which, among others, he contemplated Numa and Solon the legislators, Demosthenes and Cicero the orators, together with Alexander, Pompey, Julius Cæsar, and others, who have played a conspicious part in the drama of history. The narratives of the ancient biographer produced a great effect on his mind. Another favourite work he mentions was an "Essay on Projects," one of the numerous productions of the far-famed author of "Robinson Crusoe," which appears to have had a considerable influence upon him. And his early love of books led his parents to decide on their son's future course.

His brother James had just returned from England, and set up as a printer at Boston. To him, therefore, Benjamin was bound apprentice, on an agreement that he should continue in that capacity till he was twenty-one. In these circumstances, his love of literature acquired fresh strength. As he became acquainted with some bookseller's apprentices, they frequently lent him in the evening a volume, which he sat up all night to read, that it might be returned in the morning. Such efforts are often exceedingly injurious, an amount of health being lost which is not compensated by what is gained in knowledge; but so they did not prove to young Franklin. He speedily acquired a great proficiency in his business, and daily became more useful to his brother. And, after a time, his means of acquiring information was greatly increased: a liberal-minded merchant, who was accustomed to visit the printing-office, gave him free access to his library, and allowed him to take home what he wished to read.

It now occurred to him that he would endeavour to *write*, and like not only many a genius, but many a one who is *no* genius, he began by writing verse. His brother induced him to write two ballads, and sent him to sell them through the streets; and, as one of them was on a highly popular subject, he tells us it had a prodigious sale. But his father was a man of vigorous understanding, and accustomed to look below the surface of things; it was not enough for him, therefore, that words should jingle, he could decide as to their being sense or poetry; and satisfied that his son's was neither, he convinced him that his verses were but miserable trash, and adding the

sage remark, that "ballad-makers were generally beggars," the fit of writing poetry soon came to an end.

In prose, to which Benjamin next directed his attention, he had to submit to similar discipline. In a controversy that arose between himself and a companion, "perhaps," he says, "a little for dispute's sake," he thought that though Collins had a greater abundance of words, his own arguments were rather the stronger. On their parting without settling the point—a very common result in such cases—he wrote a summary of what he had advanced, and sent a copy to Collins. To this Collins replied; and, when three or four letters had been written on both sides, the correspondence fell into the hands of Franklin's father. This led him to show his son that though he had the advantage of Collins in correct spelling and punctuation, which he owed to his engagements at the printing-office, Collins was greatly his superior in perspicuity, in arrangement, and in elegance of expression. His son was far too sensible to pout or to be angry at this criticism; on the contrary, he received it respectfully and thankfully, and determined to spare no pains in improving his style; the means of doing which he has minutely detailed.

"About this time," he says, "I met with an odd volume of the Spectator; I had never before seen any of them. I bought it, read it over and over, and was much delighted with it. I thought the writing excellent; and wished, if possible, to imitate it. With that view, I took some of the papers, and making short hints of the sentiments in each sentence, laid them by for a few days; and then, without looking at the book, tried to complete the papers again, by expressing each hinted sentiment at length, and as fully as it had been expressed before, in any suitable words that should occur to me. Then I compared my Spectator with the original, discovered some of my faults, and corrected them. But I found I wanted a stock of words, or a readiness in recollecting and using them, which I thought I should have acquired before that time if I had gone on making verses; since the continual search for words of the same import, but of different length, to suit the measure, or of different sound for the rhyme, would have laid me under a constant necessity of searching for variety, and also have tended to fix that variety in my mind and make me master of it. Therefore, I took some of the tales in the Spectator, and turned them into verse; and after a time, when I had pretty well forgotten the prose, turned them back again. I also sometimes jumbled my collection of hints into confusion; and after some weeks, endeavoured to reduce them into the best order, before I began to form the full sentences and complete the subject. This was to teach me method in the arrangement of my thoughts. By comparing my work with the original, I discovered many faults and corrected them; but I sometimes had the pleasure to fancy, that in certain particulars of small consequence, I had been fortunate enough to improve the method or the language; and this encouraged me to think that I might, in time, come to be a tolerable English writer, of which I was extremely ambitious."

At the age of sixteen, he met with a book recommending a vegetable diet, and immediately impressed by the idea of its cheapness, he determined on adopting that mode of living. He proposed to his brother that he should give him only one half of what his board cost, and his offer was immediately accepted. He soon found, that by what is now called vegetarianism, he could save the half of what he received from his brother. "This," he says, "was an additional fund for buying books; but I had another advantage in it. My brother and the rest going from the printing-house to their meals, I remained there alone; and despatching presently my light repast (which was often no more than a biscuit, or a slice of bread, a handful of raisins, or a tart from the pastrycooks, and a glass of water), had the rest of the time till their return for study; in which I made the greater progress from that greater clearness of head, and quicker apprehension, which generally attend temperance in eating and drinking."

About this time it was that, though he had twice attempted in vain while at school to master arithmetic, he now succeeded in doing so by the aid of Cocker's well-known book. A treatise on navigation gave him also some acquaintance with the elements of geometry. Other important subjects were opened to him by the perusal of Locke "On the Human Understanding," and the "Port-Royal Art of Thinking." And two little sketches on the arts of logic and rhetoric, which he found at the end of an English grammar, set him diligently a-reasoning. The mode recommended was the *Socratic*, a method suggested by the Grecian sage. It was one of interrogatives. Instead of laying down a proposition authoritatively, it led the disciple or antagonist to acknowledge it himself by dint of a series of questions put to him. Of this, Franklin says, he was excessively fond, as safe for himself, and embarrassing to those with whom he entered into conflict; but after a time he discontinued it, considering it less adapted to inform or convince than to gain a triumph. It should, however, be mentioned to the honour of Socrates that it was not his object to establish any perfectly evolved system of doctrine, so much as to awaken by his discourses a new and more comprehensive pursuit of science, which should direct itself to all that can be known.

Prior to the period at which we have now arrived in Franklin's history, his brother had begun to issue a newspaper, the second that had been published in America. This gave a new impulse to his mind; for as most of the literary people in Boston now visited the printing-office, he heard their remarks on various articles which appeared, their praises as well as their censures, and his ambition was kindled to see if, in this way, he could achieve any fame. Writing a paper in a disguised hand, he put it at night under the door of the printing-office, where it was found in the morning, and duly examined by the critics. "They read it," he says, "commented on it in my hearing, and I had the exquisite pleasure of finding that it met with their approbation; and that in their different guesses at the author none were named but men of some character among us for learning and ingenuity." He modestly adds, "I suppose that I was rather lucky in my judges, and that they were not really so very good as I then believed them to be." Several other pieces were sent in the same way, till he says all his fund of sense for such efforts was exhausted. He now avowed his authorship, and found that he was regarded by his brother's literary acquaintances as a person of some consequence.

The publication of an article offensive to the native government, led to his brother being sentenced to a month's imprisonment, and prohibited from continuing to print the journal. It was therefore determined that, in future, it should appear in the name of Benjamin, who had conducted the paper during his brother's imprisonment. Valuable as he had been, James had treated him with severity, but his indentures were now cancelled, to prevent its being alleged that the former proprietor of the journal was shielded by his apprentice. New indentures were however signed, which were to be kept private. "A very flimsy scheme it was," adds Franklin, "but it was immediately executed; and the paper was printed accordingly under my name, for several months. At length, a fresh difference arising between my brother and me, I took upon me to assert my freedom, presuming that he would not venture to produce the new indentures. It was not fair in me to take this advantage; and this, I therefore reckon, to be one of the first *errata* of my life; but the unfairness weighed little with me, when under the impressions of resentment for the blows his passion too often urged him to bestow on me, though he was otherwise not an ill-natured man: perhaps I was too saucy and provoking."

However this might be, more fault than he alleges appears to have been chargeable on James, for he gave such a character of Benjamin to all in his own way of business at Boston, as to prevent him obtaining any employment in that town. Selling his books to raise a little money, he therefore embarked on board a vessel bound for New York, without telling his friends who, he knew, would be opposed to his going. He was now only seventeen, and at the end of his voyage of three days, he found himself a stranger in a strange place, nearly three hundred miles from home; and with very little money in his pocket. What was worse still, the only printer had no employment for him, and could give him nothing more than a recommendation to his son at Philadelphia, to which city he now proceeded.

After describing his voyage, he says, "I have been more particular in this description of my journey, and shall be so of my first entry into that city, that you may, in your mind, compare such unlikely beginnings with the figure I have since made there. I was in my working dress, my best clothes coming round by sea. I was dirty, from my being so long in the

boat; my pockets were stuffed out with shirts and stockings; and I knew no one, nor where to look for lodging. Fatigued with walking, rowing, and the want of sleep, I was very hungry; and my whole stock of cash consisted of a single dollar, and about a shilling in copper coin, which I gave to the boatmen for my passage. At first they refused it, on account of my having rowed; but I insisted on their taking it. Man is sometimes more generous when he has little money than when he has plenty; perhaps to prevent his being thought to have but little. I walked towards the top of the street, gazing about till near Market-street, where I met a boy with bread. I had often made a meal of dry bread, and inquiring where he had bought it, I went immediately to the baker's he directed me to. I asked for biscuits, meaning such as we had at Boston; that sort, it seems, was not made in Philadelphia. I then asked for a threepenny loaf, and was told they had none. Not knowing the different prices, nor the names of the different sorts of bread, I told him to give me three pennyworth of any sort; he gave me, accordingly, three great puffy rolls. I was surprised at the quantity, but took it; and having no room in my pockets, walked off with a roll under each arm, and eating the other.

"Thus I went up Market-street, as far as Fourth-street, passing by the door of Mr. Read, my future wife's father, when she, standing at the door, saw me, and thought I made, as I certainly did, a most awkward and ridiculous appearance. Then I turned and went down Chestnut-street and part of Walnut-street, eating my roll all the way; and coming round, found myself again at Market-street wharf, near the boat I came in, to which I went for a draught of the river water; and being filled with one of my rolls, gave the other two to a woman and her child that came down the river in the boat with us, and were waiting to go farther. Thus refreshed I walked again up the street, which by this time had many clean-dressed people in it, who were all walking the same way. I joined them, and thereby was led into the great meeting-house of the Quakers, near the market. I sat down among them, and after looking round a while, and hearing nothing said, being very drowsy, through labour and want of rest the preceding night, I fell fast asleep, and continued so till the meeting broke up, and somebody was kind enough to rouse me." He soon after found a lodging, and there passed his first night in Philadelphia.

THE COLLECTION AND PRESERVATION OF PLANTS.

An *herbarium*, or collection of dried plants, often called a *hortus siccus*, was regarded by Linnæus as of especial value, and as absolutely essential to every botanist. The use of such a collection is obvious; here are the plants themselves—the original handiworks of Nature—ready to be consulted, examined, and compared with others whose species it may be desirable to ascertain. They are, also, always at hand, even during those dull and dreary months when it is impossible to obtain the living plants, or at least, to procure them in their best array.

> "Here spring perpetual leads the laughing hours,
> And winter wears a wreath of summer flowers."

But, it has been asked by some of the students of our Botanical Lessons, "How can such delicate and perishable things as flowers—the very emblems of short-lived, fading beauty—be preserved, so as to retain even a faint semblance of their original comeliness?" And to this inquiry it is that with great pleasure we now offer a reply.

To preserve flowers in all their freshness and bloom, is not possible. Dried specimens, deprived of their juice, and flattened by pressure, must be impaired in form, texture, and colour, by the very means employed for their partial preservation. But, if they may be so treated and arranged as not only to please the eye, but greatly to assist the student in his survey of the vegetable kingdom, then an acquaintance with these processes is desirable and valuable; and these, we therefore proceed to describe.

Specimens of plants should be collected, whenever it is possible, in *dry* weather. On no account should they be put in water in order to keep them fresh after they are gathered. As the object is to *dry* them, whatever tends to render it difficult to do so, should obviously be avoided.

Resolved on forming a collection, procure a quantity of *red* blotting-paper, and a press of some kind or other. A linen-press will do; or one may be easily made, with three boards, and four large wooden screws inserted at the corners; one board being for the top, another for the bottom; and the third to be placed between the two. Thus provided, a little skill will do all that is required for *drying* the specimens.

When a plant is gathered lay it on two or three sheets of blotting-paper, previously heated at the fire, till they become as hot as they can well be made without being scorched. Arrange its leaves as naturally as you can, pressing your thumb on any stubborn stalks, and dispersing the flowers with the greatest care. The petals of some plants, as poppies, are best dried separately. Over the plant, when duly arranged, lay half a dozen sheets of blotting-paper, then insert another plant, and so proceed with similar and successive layers. Put them then in the press, and screw it up. At the end of about three days, the plants should be taken out of the paper, which will be found quite damp; fresh paper should be substituted, and the damp paper dried, till it is fit for further use. *Whole* plants should be dried, whenever possible, including the roots, these should be washed, and then dried in the open air. The specimens, if not very robust or fleshy, will generally be sufficiently dried in the course of a week, or even in less time.

According to the process now described, the plants will be more thoroughly and quickly dried, and, therefore, they will generally retain the colours of their flowers and leaves much more perfectly, and be less likely to decay and become mouldy, than would be the case were any slower process adopted. Due pressure and adequate heat are, consequently, the two essentials. If the specimens are small and slight, they may, when gathered, be placed between the leaves of a *blank* book, and the warmth of the pocket will have a similar effect to heating the paper. The great rule is to *dry* the plants *thoroughly* and *quickly*, and from its observance such as have been preserved in hot climates have, generally, a peculiar colour and beauty of appearance.

There is, of course, a diversity in the adaptation of plants to the process now described. Ferns, grasses, and more especially the mosses, dry readily, and lose little of their original beauty; while the houseleek, the stonecrops, and other succulent and fleshy plants, sustain a greater loss. The foliage and stalks of some species, will almost invariably turn black in drying. The colours of flowers will often undergo considerable alteration: the yellow appear to be generally the most permanent; blue and purple are more liable to fade; and white is very apt to become brown. There are, however, exceptions to these rules.

The plants thus prepared, have now to be *arranged*. For this purpose, the collector has to procure a quantity of good stout writing or printing paper of large size, folded in folio, which is to be stitched in coloured covers, making bundles of books, of five or six sheets each. Some *finer* paper, of folio size, in half-sheets, cut round the edges, should also be at hand. Cut a number of narrow slips, of different lengths, from a piece of the same paper, and let there be some prepared isinglass, or dissolved gum tragacanth, or gum arabic, and also a camel-hair pencil.

Take now a dried plant, lay it upon a leaf of the fine-cut paper, then fasten it down by means of a few of the slips of paper, to which isinglass or gum has been applied, laid across the stem and some of the branches. Two or three slips are generally sufficient for a plant or specimen. In this manner, all the plants for an herbarium should be treated. Should paste be used for fastening the plants, it should have a very small portion of the rank poison *corrosive sublimate*, to prevent its becoming mouldy, and also as a defence from the attacks of insects. Some persons consider paste, so prepared, preferable to gum.

A little management will often be acquired in the arrangement of plants. Thus, the taller ones may be divided in two, and the halves placed side by side to bring them within the compass of the page. The stems of some plants, as the grasses, may be crankled, or bent, so as to reduce their height, without actually depriving them of their natural dimensions, or they may be placed diagonally,—that is, from corner to corner of the page.

Write the name of each species on the top of the leaf, and at the bottom the place where, and the time when, it was gathered. Then arrange the plants according to system, and lay one between every two pages. The books, as we have called them, are formed into bundles, by being laid alternately up and down upon each other, because the stalks and roots are thicker than the flowers. The bundles may be covered with pieces of pasteboard tied with strings. The collection should be kept in a dry and well-ventilated place, and a piece of sponge soaked full of rectified oil of turpentine, will be an effectual defence from the assaults of insects.

More summary methods may of course be adopted. Some persons keep their dried specimens loose, within sheets of paper. Others fasten the specimens to leaves of stout paper of uniform size, then arrange the species in order, while all those of the same genus are placed within one or more sheets of paper, on the outside of which the generic name is written. The bundles of genera have the names of the classes and orders.

LESSONS IN LATIN.—No. XVI.

By John R. Beard, D.D.

THE LATIN VERB: ITS SEVERAL TERMINATIONS.

The student is already familiar with case-endings and the way in which they modify the signification of nouns. He must now pass on to consider certain endings in the verbs which in a similar manner affect their import. Referring him back to what has already been said respecting the verb, we here take up the subject, and ask his attention to voice-endings, person-endings, tense-endings, and mood-endings. These are grave matters, and we must move slowly in order to move surely.

As preliminary to the whole we must recall to mind what has been said respecting the stem of words. Having reviewed in his thoughts what has gone before, the reader will find our present statements easy. The endings, then, to which we have just adverted, are added to the stem of the verb, and being so added, vary the meaning. The stem of a verb is that part to which these endings are added. If the endings have been already made they must be removed. When you have gone through these instructions you will know what they are. Take lego, *I read*, as an instance. You are already aware that the *o* at the end is the sign of the first person singular, indicative mood, present tense, active voice. Cut off that *o* and you have *leg*; *leg* is the stem. Now in English if we want to make *I read* passive, we insert another word, and say I *am* read. Instead of inserting another word the Romans added an *r* to the active form, making the verb stand thus, lego*r*, *I am read*. Hence *r* you see is here the sign of the passive. In verbs, *r* at or near the end is generally the sign of the passive voice; thus in lega*r*, *I may be read*; and legere*r*, *I might be read*, the *r* is the sign of the passive; for the corresponding active forms are legam, *I may read*; legerem, *I might read*. The voice-endings vary with the persons; thus, as the active endings are *o*, *is*, *it*, so the passive endings are *or*, *ĕris*, *ĭtur*. Thus voice-endings and person-endings combine, as you see, in this example of

The Voice-endings and Person-endings of the Present Tense, Indicative Mood.

Active,	lego,	legis,	legit,	legimus,	legitis,	legunt
Passive,	legor,	legĕris,	legĭtur,	legimur,	legimini,	leguntur

To the voice-endings and person-endings must be added the tense-endings. In English we form the past tense, for instance, of the verb *I love*, by adding to *love* the consonant *d*, *I loved*. Something like this takes place in Latin. Thus as amo is *I love*, ama*bam* is *I loved*; the *bam* performing in Latin the part which the *d* performs in English. This *bam*, in the active voice, is made passive by being changed into *bar*, *r* taking the place of *m*. Putting these three endings together we have an example of

Voice-endings, Person-endings, and Tense-endings of the Imperfect Indicative.

Active,	legeba*m*,	legeba*s*,	legeba*t*,	legeba*mus*,	legeba*tis*,	legeba*nt*
Passive,	legeba*r*,	legeba*ris*,	legeba*tur*,	legeba*mur*,	legeba*mini*,	legeba*ntur*

Another variation is introduced by the mood-endings. The examples given are in the indicative mood. We subjoin an instance of the change in the endings, by which the subjunctive mood is indicated. In the subjunctive mood, *rem* is added to the stem, instead of *bam*; thus:

Voice-endings, Person-endings, Tense-endings, Mood-endings of the Subjunctive Mood, Imperfect Tense.

Active,	legere*m*,	legere*s*,	legere*t*,	legere*mus*,	legere*tis*,	legere*nt*
Passive,	legere*r*,	legere*ris*,	legere*tur*,	legere*mur*,	legere*mini*,	legere*ntur*

The endings will be more clearly seen, if they stand by themselves, as in the following example:

Voice-endings, Person-endings, Tense-endings, Mood-endings, Active and Passive.

	Singular Number.					
	Act.	*Pass.*	*Act.*	*Pass.*	*Act.*	*Pass.*
Present Indicative,	o	or	is	ĕris	it	itur
Present Subjunctive,	am	ar	as	aris	at	atur
Imperfect Indicative,	bam	bar	bas	baris	bat	batur
Imperfect Subjunctive,	rem	rer	res	reris	ret	retur

Some tenses in the passive voice are formed as in English, by the addition not of an ending, but of another word. Thus as we say, *I have been loved*, so the Latins say, amatus sum. Amatus sum is a form made up of parts of two separate words, namely, amatus, the passive participle of amo; and sum, the indicative mood present tense, first person singular of the verb *to be*. This is, in effect, to declare that the Romans cannot be said to have a perfect tense of the passive voice. The sense which that tense conveys, they express by combining part of the verb sum with the passive participle. In this way, however, the perfect passive has peculiarities of its own. We subjoin an example of

Endings of the Perfect Tense, Indicative Active and Passive.

Active,	legi,	legisti,	legit,	legimus,	legistis,	legerunt, or legere
Passive,	lectus sum,	lectus es,	lectus est,	lecti sumus,	lecti estis,	lecti sunt

Where observe, that instead of *bam*, *bas*, *bat*, &c., of the imperfect, you have *i*, *isti*, *it*, &c. Observe, also, that in the passive parts of the verb, sum, &c., denote the persons; the participle lectus undergoes, however, one change in the plural, lectus becomes lecti. Now, if you wanted to put the passive form just given into the subjunctive mood, you have only to substitute the subjunctive *sim*, *sis*, *sit*, &c., for the indicative *sum*, *es*, *est*, &c. (the forms of sum may stand in combination with the past participle as, lectus *essem*, *I had been read*; lectus *essem*, *I might have been read*; lectus ero, *I shall have been read*. Also the endings of the perfect indicative active change to suit corresponding changes in the meaning; they become, in the singular, *eram*, *eris*, *erit*, and in the plural, *erimus*, *eritis*, *erint*, in the pluperfect tense *subjunctive* mood; and in the pluperfect tense *subjunctive* they pass into *essem*, *esses*, *esset*, *essemus*, *essetis*, *essent*.

There is yet another source of variation in these endings. That source is in the conjugations. There are, you know, four conjugations, or general models for the formation of verbs. All verbs which follow these models are called regular. Such as deviate from these models are called irregular. Confining ourselves, at present, to the regular verbs, we find the endings of the present tense indicative mood active and passive to vary, as already (pp. 34 and 35) shown. We shall presently give a table, in which all these varieties are presented. In order to get the full forms, you must prefix for the first conjugation *o* or *ama*; *doc*, or *doce*, for the second; *leg* for the third, and *audi* for the fourth. *Am* is the stem to be prefixed in the present tense; *ama*, in the imperfect and future, and *amav* in the perfect; as appears in this view of the

Stems of the Chief Parts of the Four Conjugations.

Conj.	Pres.	Imp. and Fut.	Infinit.	Perf.	Supin.
1.	am	ama	ama	amav	amat
2.	doce	doce	doce	docu	doct
3.	leg	lege	lege	leg	lect
4.	aud	audie	audi	audiv	audit

These Chief Parts are commonly exhibited thus:

Conj.	Present.	Infinit.	Perfect.	Supine.
1.	amo	amare	amavi	amatum
2.	doceo	docere	docui	doctum
3.	lego	legere	legi	lectum
4.	audio	audire	audivi	auditum

A KEY TO THE EXERCISES IN THE LATIN LESSONS.

By JOHN B. BEARD, D.D.

LESSONS II. TO VII.

Page 71, col. 2—LATIN-ENGLISH.

Good men love good boys; good boys are loved by good men; a good boy loves school; the good masters of good boys are loved; hast thou a good master? the war is deadly; I have a good female friend; the boys are in school; are not the boys in school? many foreigners sail into Britain; the boar of my friend is great; there is play on the river's bank; scholars love (like) letters; there are frogs on the banks; the goat is great; there are deadly wars in the island.

Page 71, col. 2—ENGLISH-LATIN.

Bonos discipulos amo; boni discipuli a bonis viris amantur; amas ne amicum? aper est mihi; tibi est caper; capri sunt in ripâ; est in insulâ magnum et funestum bellum; in Britanniâ sunt agri multi; funesti saepe sunt apri; O viri, amatis ne pueros? amici mei peregrinos non amant; ludum amant pueri; amant ne pueri ludum? est ne tibi amica? magnus aper non est mihi; amicae epistola est in horto.

Page 72, col. 1—LATIN-ENGLISH.

The horse neighs; the horse's mane is beautiful; the flies are troublesome; are the flies troublesome? good scholars are not troublesome; long wars are troublesome; horses run quickly; a man guides the horse; a horse is guided by a man; I am delighted by a beautiful horse; the fields are fruitful; the herbs of the fields are various; the husbandman commits to the fields grains of corn; the husbandman tills the fields; how beautifully the fields flourish (*virent*); various herbs flourish in the fields.

Page 72, col. 1—ENGLISH-LATIN.

Fecundus est ager; sunt ne agri fecundi? bella fecunda non sunt; agri coluntur; deos colis; dii coluntur a Tullio; equus et equa a viro reguntur; celeriter currunt apri; currunt ne capri celeriter? in pulchro horto sunt muscae; equum agro committis; boni discipuli coluntur; O mi fili! dîis et deabus committuntur templa; O Antoni! dii deaeque in templis coluntur; O bone Deus! in fecundis agris coleris; boni viri a filiis et filiabus coluntur.

LESSON V.

Page 92, col. 1—LATIN-ENGLISH.

I have great grief; hast thou not great grief? mothers have great griefs; the colour of the cushion is beautiful; is the colour of the cushion beautiful? he has (is under) a deadly error; why has father (is under) deadly errors? I have a brother; brothers have great griefs; lightning frightens animals; does not lightning frighten mothers? lightning frightens sparrows.

Page 92, col. 1—ENGLISH-LATIN.

Est mihi calcar (*I have a spur*); est ne tibi anser? illis sunt anseres; est ne tibi agger? fulguris odor in pulvinari est; vestigalia non diligo; molesti sunt rumores; pulvinar (*pillow* or *cushion*) est ne illis? non est illis anser; tibi sunt pater, frater et mater; illis sunt dolores, *or* dolores sunt illis; tibi est magnum pulvinar.

Page 92, col. 2—LATIN-ENGLISH.

I fear charcoal; the boy strikes the peacocks; the regions are beautiful; thou hast an opportunity; we move the ashes; the hinge is moved; the becomingness of order delights mothers; there is a great dust of the ashes; peacocks are on the shore; we have not songs; there is a wound in (his) breast; the light of the region is great; he has a great name; pledges are not praised.

Page 92, col. 2—ENGLISH-LATIN.

Times ne carbonem? cur puerum ferit mater? decus non (*not*) est filis; vulnus est tibi; tuis patribus sunt vulnera; vulnera terrent matres; in regione florent poemata; tibi est nomen magnum; mihi non est pignus; illis est occasio; viro magna est occasio.

Page 93—LATIN-ENGLISH.

Artificers ought to teach boys; the king moves (his) thumb; kings guard the laws; laws are guarded by kings; the son bites (his) thumb; the horsemen are harassed (grieved); artists adorn cities; the wages of artificers support (their) sons and daughters; the bachelor sleeps; the people are defended; the race of the artificer is praised; hast thou corn-land? the neck of the soldier is injured; the age of the bachelor is great.

Page 93—ENGLISH-LATIN.

Artifices defendo; artifices a me defenduntur; est ne illi merces? pecus non est illi; in service pungor; artifices pingunt pecora; funestae sunt regum leges; seges equitis ceditur; cur vituperatur caelebs? caelebes vituperat plebs; sunt militibus mercedes; multa docet aetas.

LESSON VI.

Page 102, col. 1—LATIN-ENGLISH.

Birds deceive bachelors; mothers are slain by fevers; I greatly like the sea; the sea is liked by sailors; husbandmen cultivate corn-fields; there are sailors in the ships; there is fire in the globe; the brothers are in the fires (flames); the goddesses have altars; have not the gods altars? the husbandmen defend the sheepfolds with a hatchet.

Page 102, col. 2—ENGLISH-LATIN.

Corporibus naves defendant nautae; in rupibus sunt aves; a nautis rupes ne amantur? nocet plebi caedes; aves feriunt nubes; secures defendunt naves; civium aves nocentur; principis sedile laudatur; vincimus principum comites.

Page 104, col. 1—LATIN-ENGLISH.

A soldier ought to fight with a brave mind; men have mortal bodies, immortal minds; have not men mortal bodies? I am delighted with the sweet voice of birds; art thou delighted with the sweet voice of birds? boys should apply to learning with an eager mind; why, O boys, do you not apply to knowledge with an earnest mind? the praise of scholars consists in good characters and severe industry; with earnest industry my father applies to literature; piety is the basis of all the virtues; thy virtues, O mother, delight me; brave men are not overcome by severe pains; we do not yield to daring enemies; every voice (sound) is well heard by thy mother; thy voices (words), O sister, are sweet to me.

Page 104, col. 1—ENGLISH-LATIN.

Fortes viri hostibus non cedunt; audax agmen non facile vincitur; alacri animo in litteras incumbit meus filius; sorores tuae amant ne litteras? avium vocibus delectantur; aves hostium suaves habent voces; bene in litteras incumbunt discipuli mei; a Julio Caesare vincitur audax agmen; hominum corpora mortalia sunt, immortales animi; matris pietas filium delectat; filia patris virtute delectatur; industriâ et bonis moribus puerorum constat virtus; matris epistola ab omnibus auditur.

LESSON VII.

Page 115, col. 2—LATIN-ENGLISH.

Play is pleasant to boys; there are various kinds of play; boys willingly indulge in play; is not play pleasant to boys? play is pleasant to me; play is exceedingly pleasant to thee; grave men avoid boyish plays (games); O play, how sweetly thou delightest boys' minds! kings are not delighted with boyish play; the senses are keen; I have keen senses; great is the power of the senses; is the power of the senses great? a brave man does not yield to feelings of pain; beasts have keen senses; O ye senses, how great pleasure you procure for (occasion) men! the animals are endowed with senses.

Page 115, col. 2—ENGLISH-LATIN.

Sensus doloris est amarus; est ne amarus tibi doloris sensus? omnibus hominibus et omnibus animalibus sensus doloris est amarus; magna est luctûs vis; sapiens vi sensuum non vincitur; fortis luctui non cedit; fortes ne vi sensuum cedunt? O luctus, quam vincis hominum animos! pueri libenter indulgent lusui; multa genera sunt lusûs; lusus omnis generis grati sunt pueris et puellis; viros non delectant pueriles lusus; viri puerili lusu non delectantur; indulgent voluptati pueri et homines; quam magnopere evitatur luctus a liberis; arcubus et sagittis delectant pueri; acubus delectant puellae.

Page 116, col. 1—LATIN-ENGLISH.

The terrible thunder greatly moves the minds of men; is not the sound of thunder terrible? the roaring of thunder is frightful; thunder is frightful; lightning precedes thunder; many men fear thunder; thunder is feared by many men; O thunder, how frightful is thy roaring! the house resounds with the thunder; men's knees are strong; the vigour of the knees indicates the strength of the body; the knees have great strength; suppliants fall on (their) knees; O knees, how much you tremble! in the knees there is great strength.

Page 116, col. 1—ENGLISH-LATIN.

Hominis genu validum est; validis genibus est vigor; sunt ne validi genua tua? silvae resonant horribili sonu tonitrûs; sonus tonitrûs animalia permovet; tonitru a validis bestiis extimescitur; sunt mihi debilia genua; sunt ne patri tuo debilia genua? Non; valida genua sunt patri meo; permoveor multo fulmine; fremitus tonitrûs supplices permovent; supplex pulchram domum indicat.

ANSWERS TO CORRESPONDENTS.

W. B. (Belfast), and ROBERTO: The German approaches the Dutch so much as to be called *High Dutch* in our language, and *Deutsch* in the German itself.—S. A. R. (Ravenfield) wishes to lift us before we fall. He might give us credit for understanding proportion.—HUMILIS ANTIPEX: Dr. Cornwall is right. If "John is the best of *his* brothers," then surely John is a brother, and *his* own brother too! Stick to Dr. Beard's lessons; you will get all you want, and more too.—UN JEUNE ECOSSAIS (Dunfermline), should send to Mr. Cassell for a copy of the "French Lessons" reprinted from the "Working Man's Friend." Enclose seven penny stamps, and you will have it by return of post.—JOHN HUNTER (Liverpool): His answer to query 3, No. 14, is not correct.—The solution of T. W., K. P. D. is right, but rather long.—C. S. R. (Belfast): A "New History of England" has been very recently published at a cheap rate by Mr. Cassell.—ROBERT GIBSON (Manchester): "*Such a* one" is the most correct phrase; because *one* is pronounced as if it spelt *wun*, and therefore it *virtually* begins with a consonant. The most useful edition of Addison's works is that contained in the series called the "British Essayists," of which there are various editions, some very cheap.—W. J. BUTTONS: The words printed in *italics* in the Bible are called *supplements* or *supplementary words*, because they are considered necessary to *complete* the sense in translating from the original tongue. Many of these words *ought not* to have been so printed. Not a few injure the sense, and some are quite erroneous. We very much want a *new translation* in this country. If this were done at the Government expense, and honestly done by a fair mixture of pious, and good, and able men of different orthodox persuasions, it would be the glory of Victoria's reign, the security of her throne, and the admiration of the world.

AMICUS VERITATIS (Manchester): The reason of taking two-thirds perpendicular rests on the geometrical theorem that in an equilateral triangle, the radius of the circumscribing circle is at this distance from the vertex of each triangle. The general expression for this radius being $R = \frac{1}{4}abc \div \sqrt{s(s-a)(s-b)(s-c)}$; when the triangle is equilateral, it becomes $R = a \div \sqrt{3}$, which is two-thirds of the perpendicular of such a triangle, a being the length of its side.—RICHARD PHILLPOTT (Bristol): To answer all letters containing exercises is impossible. A Key to the French and German exercises, similar to the Key now given to the Latin exercises, will follow.—J. F. WILSON (Halifax): His problem is good; it will be given in due time.—A. ADAMS (Leicestershire): His solution of the different ways of the Pythagorean theorem is the simplest we have seen. It will be given in the P. E.—LINCOLN: Bookkeeping by Double Entry is preparing.—SOMKINS (Norwich): $7\frac{8}{10}$ inches is the *exact length* of the *surveying chain*, being the same as 7·92 inches; and it differs by $\frac{1}{10}$ of an inch from 8 inches, this quantity being nearly $\frac{1}{12}$ of an inch.—W. D. CROCKER (Dover): To find the area of a circle, *square the diameter*, and multiply the square by the decimal .7854; the product will be the area *very nearly*. J. J. (Wood-street): DOH should be on note C, in the 1st lesson.—A STUDENT and SUBSCRIBER from the beginning, is informed that all the Physical Sciences, both theoretical and practical shall have their turn.—T. D. S. (Doncaster): Learn English before Latin, or both together if you have time; but Geometry would be a more useful interchange of study.—JAMES HEATON (Stockport) will find all his difficulties removed by studying Dr. Beard's lessons carefully.—LAZARUS should persevere; his age is no hindrance, but the reverse. By all means get Cassell's Euclid, and study the Arithmetic and Geometry in the POPULAR EDUCATOR.—T. W. ROWBOTHAM (Sutton in Ashfield) should let systems of artificial memory alone, and study the French and Latin as laid down in the Lessons contained in our pages.

A "SCHOOLGIRL" asks, "If the earth was ever in a fluid or melted state, how could the crust have cooled sufficiently for man to inhabit it on the sixth day from the creation?"—Geological divines argue that the phrase "in the beginning," does not mean "the beginning" of the six days; or indeed "the beginning" of the present form of the earth. After "the beginning" of time, the earth continued for some duration "without form and void," that is desolate and uninhabited by man. How long was it in this state before the breath of the Omnipotent moved on the face of the waters? It may be hundreds of ages, or millions of years. It was at "the beginning" of this time that the crust of the earth was cooling, and not at "the beginning" of Abp. Usher's chronology. We recommend a "Schoolgirl" to read the following works by geological ladies. Maria Hack's "Geological Sketches and Glimpses." Miss Zornlin's "Conversations on Geology," and above all, Mrs. Somerville's "Physical Geography."

T. W. GREATHEAD (London): "There *was* only 2 dozen" is incorrect; it should be "there *were*," &c. It is the same with "1½ dozen."—W. P. (Watton): The accent is on the *o* in *vocative*.—UN BOULANGER (South Shields): The grammar he speaks of may be used till the lessons appear in the P. E.—HAMLET: His system of short-hand may be good; but he should study Dr. Beard's Lessons in English first.—AN ABBREVIATOR is entitled to our thanks for his good opinion of us; but, if he were what he assumes to be, he would have been more modest in his hints. *He* does not write with a *silver pen*.—W. F. F. (London): The sun is more than a *million* times larger than the earth, because its diameter is more than a *hundred* times greater; and that the bulks of globes are to one another as the *cubes of their diameters*.—L. A. H. (Frome) must, in order to become a physician, come to London, get apprenticed, study hard, and walk the hospitals.—SEVEN STUDENTS (London) are respectfully invited to read the *biography* of Ferguson, and the *history* of the oldest matter we know of, the *earth's crust*.—W. H. EVANS (Liverpool) should study English first, and read Dr. Watts on the "Improvement of the Mind."—J. W. REDMAN (Liverpool): Received.—Z. (Bristol): One hindrance to his progress is mixing up Drawing and Phonetic Shorthand with Grammar, Writing, and Arithmetic. Stick to Dr. Beard's Lessons in English. The rhymes contain some good thoughts.

SACRÆ LITERÆ (Barnsbury): Our Band of Hope must increase to an enormous degree before Sacred Lessons are attempted.—IOTA (Glasgow): If you can "turn a square into a circle whose superficies will be EXACTLY equal (in a few minutes) *et vice versâ*;" you have accomplished the greatest problem in Mathematics! Your *vice versâ* is the problem of squaring the circle. We never heard of any "reward being offered for its discovery or solution." We rather think this is a *vulgar error*. But the Royal Society of London is the best party to whom you could apply with diagrams and proof. If you have not discovered *a mare's nest*, you will be sure to get their *gold medal*. Before sending to the Society, perhaps you would favour us with an example or two, by way of testing the accuracy of your discovery. Thus, a square is 886⅔ feet in the length of its side, what is the diameter of the equal circle? And a circle is 1128⅔ feet in diameter, what is the side of the equal square?—AN INQUIRER should apply to Highbury College if he be a Churchman, and to Homerton College if he be a Dissenter.—J. S. (Wishaw): His answer to query 3, p. 223, is wrong in principle; and his writing might be greatly improved.

ERRATA IN SOME COPIES.

page 201, col. 1, last line, *for* I see them *read* I love them.

LITERARY NOTICES.

HISTORY OF THE PAINTERS OF ALL NATIONS.—The first part of this magnificent work, in imperial quarto, containing a portrait of Murillo, and eight specimens of his choicest works, including the "Conception of the Virgin," lately in the collection of Marshal Soult, and recently purchased by the French Government for the Gallery of the Louvre, for the sum of £23,440, is now ready. The successive parts will appear on the first of every month, at 2s. each, and will be supplied through every bookseller in town or country.

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LESSONS IN ARCHITECTURE.—No. I.

ARCHITECTURE is the art of planning, constructing, and adorning public or private buildings according to their intended use. The word architecture is derived from the Greek *αρχω, archo, I command*, and *τεκτων, tecton, a workman*. This etymology (*derivation*) indicates the operatives engaged in the building on the one hand, and the leader or chief, the man of science and practical skill, putting in action all his resources in order to execute his plan on the other. Such a division as this was, no doubt, established from the beginning of the art. According, therefore, to the literal meaning of the etymology, mankind must have, at the origin of architecture, possessed a degree of civilisation sufficient for the organisation of different kinds of industrial operations, and acquired a degree of skill in the art, which enabled some men by their experience to be the leaders or directors of others. In this way, we may suppose that the art itself, or rather the symmetry, the harmony of proportions, and good taste in structures, at first began to be developed. Before arriving at this point mankind must have overleapt ages. One of the first wants of society was a covering or shelter from the inclemency of the weather, whether of heat or of cold. Simple was the art employed in constructions of this kind. Grottoes or caves hollowed square to make them more habitable, and cottages constructed of branches of trees and blocks of stone—such were the primitive constructions in wood and stone which formed the rudiments of architecture. From the simplicity of early structures men passed to the study of proportions; they then dared to attempt the grand; and, at last, reached the sublime. The origin of architecture cannot be assigned to any particular country. Every nation produced its own art, or style, by employing the various materials within its reach, and by giving to them such forms as their wants required. Proceeding at first from the high table-lands of Asia, in order to people the earth, the early fathers of our race could have but little idea of architecture, or of a well-established system of construction. As wandering and pastoral tribes, they lived in tents or wretched cottages, which had no pretensions to architecture. It was not until they became more settled that they sought the means of rendering their buildings more durable, by employing in their construction, wood or stone, and bricks baked in the sun. From the differences in the materials, and from the variety of tastes and feelings, arise the varied appearances which the monuments of different nations present, and which constitute their peculiar style of architecture. Thus the Egyptian, born in the hot climate of Africa, in a country destitute of wood fit for building, and near the mountains of the valley of the Nile, containing large blocks of freestone and granite, created for himself a vigorous style of buildings, which completely sheltered him from the burning rays of the sun. These buildings were formed of colossal masses, which were easily transported along the waters of that famous river. The Greek, inhabiting a milder climate, surrounded by forests and quarries, gave a lighter form to his edifices; and employed wood in their construction, which harmonised well with the marble—a material of which the fineness admitted of a greater delicacy of structure and arrangement. The Chinese, surrounded by rivers bordered with bamboo, had only a meagre and tortuous species of architecture, as ephemeral in its duration as it was fragile in its origin and construction. The very different character exhibited in local architecture enable us to judge of a country by its monuments, inasmuch as the buildings themselves are the expression of the various wants of the people who constructed them. It is easy to understand how their different arrangements and structures are but the reflection of the religion or the manners of the people. The general style of the monuments of a country is a durable image of the different phases of its civilisation. In these, we see it in its primitive, refined, or degraded state, as civilisation arose, approached to perfection, or decayed.

Nations naturally established great divisions in their architecture. They first built their private dwellings; then their public buildings: and these, in their numerous subdivisions, constituted *civil* architecture. Religion caused them to build temples and other edifices, attaching to them ideas of duty and moral obligation: thus arose *sacred* architecture. The fortification of their frontiers, their towns, and their conquered countries, gave birth to *military* architecture. In this hasty sketch, we see how extensive is the series of buildings which cover the face of the globe, some of which belong to the first ages of its history, and others of which are being rediscovered in our own day. The study of these will be duly appreciated by the historian, the philosopher, the archæologist, and the artist, who, each with his own particular view, knows how to find a great lesson in these silent witnesses of past civilisation, as well as in those existing in full vigour around us.

Architecture is founded upon three great principles which ought to be immutable: 1, the *useful*, without which states and private individuals would be led into superfluous and ruinous expenses; 2, the *true*, because it ought to express in all its varied forms the great principles of construction upon which it rests; 3, the *beautiful*, which is the end of all the arts depending upon design, and no less of architecture the most useful. On these principles, every style of architecture has the same value; and an artist should not curb his genius by confining himself to the study of one particular style. It is only the man of talent, to whom the construction of an edifice is entrusted, who can combine the different arrangements and forms, harmonise the various parts, and particularly express by plans, skilfully worked out, the disposition of the whole or of every part of the building. Upon these arrangements and plans rests the reputation of an architect, and science demands of him a well-grounded assurance of the good construction and durability of his work.

Architecture is not an imitative art, like her sister arts, sculpture and painting. We see nothing in nature like our buildings as a whole; or rather nothing which could serve to guide us in its applications, or in the harmony of its lines. In this art, man has done everything himself. He has employed matter; he has invented forms and proportions to produce in the minds of his fellow-creatures ideas correlative of order, harmony, grandeur, richness, and durability. He has been enabled, by the force of art, to give, as it were, thought to matter, without being indebted for his ideas to any of the external forms of nature. Like the poet and the musician, the architect can transport the spectator into an ideal world, by creating forms and effects formerly unknown; but, very different from them in results, he renders his creations palpable, and gives them durability. Moreover, the *useful*, the *true*, and the *beautiful*, must be ever present to his view; and, however fruitful his imagination may be, he cannot emancipate it from science, the eternal basis of all the productions of his art.

The architect is not, therefore, as the vulgar think—and, more unhappily still, as ignorant men who usurp the title think—simply a head workman or common decorator of miserable constructions, a species of animal always to be found. He spends his youth in the study of his art, and of the splendid examples left on the face of the old world by ancient civilisation. In conjunction with these studies he makes himself master of the *exact sciences*, in order that he may execute his plans with precision, and study the nature of their construction. He also makes himself acquainted with the *physical sciences*, in order that he may become acquainted with the nature of the materials which he must some day employ, and be able to cal-

culate their effects. In short, he devotes himself to practical experience, and to the working part of architecture, in order to render himself capable of executing public or private buildings, and to make himself responsible for the stability of edifices entrusted to him either by private individuals or by the state.

BUILDINGS OF UNHEWN STONES.

After these preliminary remarks, we may shortly trace the progress of architecture amongst the different nations of antiquity, for the purpose of reaching our own times in chronological order. Before entering into details, we may point out the particular features which characterise the grand periods of the art, and the different systems in which its resources were developed, in order to satisfy the numerous demands of the civilisation in which it originated.

Architecture, like all the productions of the human mind, presents at first only simple rudiments, quite in accordance with primitive manners. From the earliest ages we find three great divisions established amongst all nations: 1st, private buildings; 2nd, religious edifices; 3rd, military constructions.

The first care of a people, as we remarked before, would be to construct individual dwellings; but being at first hunters and shepherds, they would be necessarily wanderers, and their dwellings would be tents constructed of the skins of animals, or cottages made of branches of trees. When they dwelt on the borders of rivers they would employ reeds; Asia and Egypt present us with examples of this kind. In some exceptional cases they dwelt in caverns, or in shallow excavations. The cottages were usually circular; piles of stones and earth, arranged in a circle, constituted their foundation. This form is found amongst all nations; that of the square, requiring more complicated combinations was not adopted at first.

The simplicity of the first erections for religious purposes may be seen in the construction of the altars of early times. The first sacrifices, which the Bible and ancient tradition trace up to the creation, were made upon consecrated heaps of stones, which they collected upon high places. These first altars, called Beth-el (*the House of God*), were erected in Chaldea, in Judea, and in Egypt. They were built, according to the Scriptures, of stones without cement, if the places where they were raised afforded proper materials. In other places they were constructed of turf and earth, where the plain country presented no solid materials. Such erections or mounds are found in Asia Minor and in India; at Heliopolis, celebrated for the worship of the sun, and the great Sidereal divinity of the Syrians. Lucian describes a throne or altar to the sun composed of four great stones arranged in the form of a table. At Ortesia, in Syria, there is an edifice of this kind raised in an open enclosure, and built of stones in a square form. Strabo relates, that travelling in Egypt, he saw his road covered with temples devoted to the god Mercury, which were composed of two unhewn stones, which supported a third. Artemidorus, quoted by Strabo, mentions that in Africa, near Carthage, the god Melkart (Moloch), or the Phœnician Hercules, the worship of which was brought from Tyre, was worshipped in a similar manner, three or four stones being placed one upon another.

This simple manner of building applied to primitive altars, and to the sacred enclosures which surrounded them, after having been developed, as we have seen, in Asia and Africa, extended into Europe from the borders of the Black Sea and the Caucasus, where M. Dubois, of Neufchatel, saw a great number, even to the Atlantic Ocean and to the northern seas. Pausanias describes some of those in Argolis, and recent travellers have seen others in Greece. It is well known that they exist in France, in England, in Norway, and in Sweden, where all these works of early civilisation are known under the name of Celtic and Druidical monuments. America presents numerous examples of similar constructions, which show how rising nations exhibit the same analogies, as their arts are in the process of formation.

Simple as this system of building is, for it cannot yet be called architecture, we recognise the periods of its commencement, its progress, and its development. Thus the most ancient of these edifices, such as were erected by the most ignorant people, were built of enormous stones in the shape which nature gave them. Moreover they selected those which presented the square form, if they did not give them this form by manual labour. *Stonehenge* in England exhibits a number of square pillars supporting enormous architraves, the whole appearing to have constituted a large and well-constructed edifice. These evidences of the first attempts of past civilisation are gradually and daily disappearing under the progress of those which are being developed around them. Thus Asia has lost the most of her ancient monuments, owing to the early state of her progress in the arts. Africa, for the same reason, presents as few examples, although they are mentioned by ancient authors. Greece and Italy, and their neighbouring islands, only exhibit examples of the same kind in places nearly deserted. The northern countries of Europe alone preserve some, because that civilisation was later there; and the history of their sudden and unexpected conquests extends only to a period of about two thousand years. In America the new civilisation of the Aztecs (1196) and the Mexicans caused the primitive monuments around them to disappear, by the development of their own. This process is perfectly analogous to that which took place first in Asia, then in Greece, Africa, and in Italy, and which we see taking place in the western countries, where every day they are destroyed in order that the materials may be used for roads and private buildings.

This simple and primitive style of architecture appears to have been originally universal, if it was not simultaneous with the progress of civilisation, which marched from east to west; and has left monuments and edifices so varied, as to occasion them to be classified, and have names given to each class. These names are borrowed from the old Celtic tongue, or language of the Druids. Thus, class 1st was called *Menhirs*, or *Men-hirs*, which consisted of large stones, erect and isolated (standing erect like obelisks. (Fig. 1.) 2nd, *Cromlechs*, which were great circles, elliptical, or spiral, formed of huge stones slightly elevated. 3rd, *Dolmens*, consisting of large tables or platforms of stone, supported by several huge vertical stones. (Fig. 2.) 4th, *Rows*, or *Uncovered Alleys*, of upright stones, placed in rows like trees, and occupying a very considerable area, like those of the plain of Carnac in the department of Morbihan, or the provinces of Brittany in France. 5th, *Covered Alleys*, or long rows of parallel stones set upright, and supporting masses of stone placed horizontally so as to form a ceiling. (Fig. 3.) 6th, the same

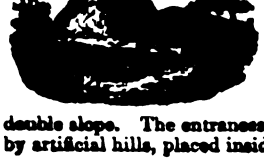
Fig. 1.

Fig. 2.

Fig. 3.

tary constructions of early times appear to have been mounds or artificial hills, at the summit of which there was a shallow excavation, of which the edges formed a rampart. It is certain that in countries, where hills naturally occurred, they fortified them in the same way as those which were raised by art. And these natural fortifications are still to be seen in the neighbourhood of Athens and the Pireus; they were of immense service in the last war of independence. Man, kind in a savage or wandering state having no instruments for raising the earth or digging ditches, made fortified enclosures with heaped stones, having a double slope. The entrances to these fortresses were defended by artificial hills, placed inside near the gates. (Fig. 4.)

Fig. 4.



QUESTIONS ON THE PRECEDING LESSON.

What is the etymology of the word Architecture?

What are the two classes of persons which the etymology indicates?

What was the simplest kind of Architecture first resorted to?

Whence did men proceed to establish them in different countries?

What was the nature of the constructions they then employed?

What is the origin of different styles of Architecture?

Describe the peculiarities of the primitive Egyptian, Grecian, and Chinese Architectures.

Describe the origin of civil, sacred, and military Architecture.

State the three great principles upon which Architecture is founded, and the necessity for attending to those principles.

What is it that constitutes a good Architect; and what sort of education should he have?

State the nature of the buildings of unhewn stones, and for what purposes they were first employed. Mention some of the countries where the Celtic and Druidical remains are found.

State the different classes of these buildings; and mention some of the Celtic names of these classes.

LESSONS IN LATIN.—No. XVII.

By JOHN R. BEARD, D.D.

THE LATIN VERB (*continued*).

Now, by comparing these tables together, you may learn that *o* is the sign of the present tense; *re*, of the infinitive mood; *i*, of the perfect tense; and *um* of the supine. In other words, by adding *o* to *am*, you form the present tense indicative mood first person singular; by adding *bam* to *ama*, you form the corresponding imperfect tense; by adding *i* to *amav*, you obtain the perfect tense; by adding *re* to *ama*, you get the infinitive mood; and finally, by adding *tum* to *ama*, you make the supine; thus:

am-o } amo *ama-bam* } amabam *amav-i* } amavi *ama-re* } amare *ama-tum* } amatum.

You thus see that there is a present stem, an imperfect stem, a perfect stem, an infinitive stem, and a supine stem. Of these, the imperfect and the infinitive are nearly the same. Properly speaking, the present stem in *amo* is the same as the imperfect and the infinitive, for the second *a* is a part of the root. Hence *amo* is a contraction for *ama o*.

We have previously seen that *a* long (ā) characterises the first conjugation to which *amo* belongs; also, that *e* long (ē) characterises the second conjugation; and *i* long (ī) the fourth. Hence only one class of verbs is characterised by a short vowel, and that is the class which bears the name of the third conjugation. This *e* short (ĕ) however does not strictly belong to the verb, but is only a connecting vowel between two consonants in this conjugation, the essence of which is that its stem is consonantal or ends in a consonant. Thus, in the infinitive mood *ĕ* is introduced for the sake of sound between the stem and the ending of the infinitive; e.g., *leg(e)re*, for *legre*; in the same way *leg(e)bam* instead of *legbam*. But the other conjugations have vowel stems, as *ama*, *doce*, *audi*. The verbs of the third conjugation are called strong, and appear to be the most ancient. The verbs with vowel stems bear the name of weak, and are of later origin.

Frequently, in order to understand a formation, you will require to know how letters are related one to another. For instance, the supine of *lego* is *lectum*. Here the *g* seems to have disappeared. It is however represented by the *c*. Thus instead of the hard *legtum* we have *lectum*. In *rexi* the perfect of *rego*, the *g* seems to have disappeared. But it has its representation in the *c* or *k* in *xi*, thus *rexi*, if written according to the sound (phonetically) would be *regsi* or *recsi* (*reksi*). The sibilant (s) is also introduced for the sake of euphony. To pursue this subject in detail would require more space than we have to give. It must suffice to have put you in the right direction. When your ear by constant practice is accustomed to the combinations of letters which the Latins were fond of, you will have received a great assistance towards correctly forming the several parts for yourself.

Let us now take up the chief parts separately, and the present stems, am(a), doce, leg, and audi. From these are formed

1. Present subj. active with the pres. ind. and subj. passive.
2. Imperf. ind. act. and pass.
3. Future ind. act. and pass.
4. Participle pres. act.; fut. pass. and the gerund.

Accordingly we have

am { 1. am *em* — am *or* — am *er*
   { 2. am *abam* — am *abar*
   { 3. am *abo* — am *abor*
   { 4. am *ans* — am *andus* — am *andum*

The future of the third and fourth conjugations have the terminations am, ar, instead of bo. The subjunctive passive of the third and fourth conjugations ends in ar instead of er.

II. From the stem of the infinitive in ā, ē, ī, and in the third conjugation from the consonantal stem with the connecting vowel ĕ; that is, from *ama*, *doce*, *lege*, and *audi*, are formed

1. The imperfect subjunctive, active and passive.
2. The imperative, active and passive.
3. The infinitive passive.

Accordingly,

ama { 1. ama *rem* — ama *rer*
    { 2. ama — ama *re*
    { 3. ama *ri*

III. Again, from the stem of the perfect active; that is, from *amav*, *docu*, *leg*, and *audiv* are formed

1. The perfect subjunctive active.
2. The pluperfect indicative and subjunctive active.
3. The second future.
4. The infinitive perfect active.

amav { 1. amav *erim*
     { 2. amav *eram* — amav *issem*
     { 3. amav *ero*
     { 4. amav *isse*

IV. Finally, from the stem of the supine in um; that is, from *amat*, *doct*, *lect*, *audit*, are formed

1. The supine in u.
2. The passive past participle.
3. The participle future active.

Accordingly,

amat { 1. amatu
     { 2. amat*us* — { 1st, er / 2d, 3d, 4th, ar
     { 3. amat*urus* — us esse

I have here confined myself to *amo* and its parts for the sake of simplicity. It will be a good exercise for you to draw out the forms of the three other conjugations according to these examples.

The forms of the verb not mentioned above are made by combination with the participles and parts of the verb esse, *to be*. Thus the perfect, pluperfect, and second future passive are formed by joining to the perfect passive participle *sum*, *sim*, *eram*, *essem*, *ero*, or *fuero*; e. g., *amatus sum*, *amatus essem*, *amatus ero*, &c. The infinitive future active is formed by adding *esse* to the participle future active as *amaturum esse*. The infinitive perfect passive is formed by joining *esse* with the participle perfect passive as *amandum esse*.

GENERAL VIEW OF THE TENSE-ENDINGS, INDICATIVE, AND CONJUNCTIVE OF THE FOUR CONJUGATIONS.

	Active.		Passive.	
Tenses.	*Indicative.*	*Subjunctive.*	*Indicative.*	*Subjunctive.*
Present.	o	{ 1st, em / 2d, 3d, 4th, am	or	{ 1st, er / 2d, 3d, 4th, ar
Imperfect.	bam	rem	bar	rer
Future.	{ bo / 3d & 4th, am		{ bor / 3rd & 4th, ar	
Perfect.	i	erim	tus sum	tus sim
Pluperfect.	eram	issem	tus eram	tus essem
Second Future.	ero		{ tus ero / or fuero	

I next lay before you a tabular view of the

PERSON-ENDINGS, INDICATIVE AND SUBJUNCTIVE OF ALL THE TENSES.

Persons.		Active.		Passive.
Sing.	1.	o, *or* m (em, am)	Perf. Ind. i	r (or, er, ar)
	2.	s	sti	ris, re
	3.	t	t	tur
Plur.	1.	mus	mus	mur
	2.	tis	stis	mini
	3.	nt	{ erunt / *or ere*	ntur

If you take from the first person of any tense the terminations *o*, *s*, *r*, and where *or* appears the syllable *or*, then you get the tense-stem which appears in all the other persons of the tense. This you may see exemplified in the ensuing

TENSE-STEMS.

amo-amao, amor-amaor } ama, Present.
amabam, amabar } amaba, Imperfect.
amabo, amabor } amab, Future.
amavi, amav, Perfect Indicative.
amaveram, amavera, Pluperfect Indicative.
amaverim, amaveri, Perfect Subjunctive.
amavissem, amavisse, Pluperfect Subjunctive.
amavero, amaver, Second Future.

So it is with the three other conjugations. To these stems are added the consonantal person-endings just given. If the tense-stem ends in a vowel (except *u*) the person-endings are made without any connecting vowel; e. g.,—

	ACTIVE.	PASSIVE.	
Stems.	*Person-endings.*	*Stems.*	*Person-endings.*
ama		ama	ris, 2nd singular.
amaba	s, 2nd singular.	amaba	tur, 3rd singular.
amavera	t, 3rd singular.		
ame	mus, 1st plural.	ame	mur, 1st plural.
amare	tis, 2nd ,,		
amaveri	nt, 3rd ,,	amare	mini, 2nd ,,
amavisse			ntur, 3rd ,,

In the third person plural indicative active and passive the connecting vowel *u* is found after *i* and *u*, as *audi(u)nt*, *audi(u)ntur*, so *acu(u)nt*.

In the future active and passive of the third and fourth conjugations the tense-stem, as in the subjunctive present, ends in *am*, *ar*; as,—

legam, *Active.* audiam, *Active.*
legar, *Passive.* audiar, *Passive.*

But the *a* of the first person is changed into *e* in the rest; as,—

Active.	*Passive.*	*Active.*	*Passive.*
legam	legor	audiam	audior
leges	legeris	audies	audiéris
leget	legetur	audiet	audietur
legemus	legemur	audiemus	audiemur
legetis	legemini	audietis	audiemini
legent	legentur	audient	audientur

But if the tense-stem ends in a consonant or in *u*, you must employ a connecting vowel; as shown thus:—

m, s, t	require *i*, e. g.	amab(i)mus	leg(i)mus	dom(i)mus
		amab(i)s	leg(i)s	dom(i)s
		amab(i)t	leg(i)t	dom(i)t
r	require *e*,	amab(e)ris	leg(e)ris, *Present.*	
n	,, *u*,	amab(u)nt	leg(u)nt	amant

The course of instruction through which you have now gone will require constant repetition. When you have made yourself master of the forms which ensue, by imprinting them on your memory, you will do well to go over and over again these instructions. With diligence combined with observation you will then make yourself familiar with the Latin verb not as a mere matter of rote, but understandingly; knowing why how the parts are formed one from the other, and how they are all connected with the common stem. I advise you, however, to question yourself very narrowly, and again and again, before you attempt to pass to the conjugation-forms which I am about to supply you with, though you will do well to refer to these forms for aid in understanding my remarks, and seeing their application.

GENERAL VIEW OF THE TENSE AND PERSON ENDINGS OF ALL FOUR CONJUGATIONS.

		ACTIVE.			PASSIVE.		
Stems.	*Conjugations*	INDICATIVE.	SUBJUNCTIVE.	IMPERATIVE.	INDICATIVE.	SUBJUNCTIVE.	IMPERATIVE.
PRESENT.	am I.	*S.* ō, ās, āt *P.* āmus, ātis, ant	em, ēs, et ēmus, ētis, ent	ā or āto, ā āto āte or ātōte, ā anto	or, āris, atur āmur, āmini, antur	er, ēris, ētur ēmur, ēmini, entur	āre or ātor, ā āto āmini or āminor, ā [anto
	doce II.	*S.* eo, ēs, et *P.* ēmus, ētis, ent	*S.* am, ās, at *P.* āmus, ātis, ant	ē or ēto, ē ēto ēte or ētōte, ē ento	eōr, ēris, ētur ēmur, ēmini, entur	ar, āris, ātur āmur, āmini, [antur	ēre or ētor, ē ēto ēmini or ēminor, ē [ento
	leg III.	*S.* o, is, it *P.* imus, itis, unt	ă or ito, ă ito ĭte or ītōte, ă unto	ĕre or ītor, ĭto imini or iminor, [unto	ĭmur, ĭmini, untur		
	aud IV.	*S.* io, is, it *P.* imus, itis, iunt	i or ito, ă ito ĭte or ītōte, ă iunto	ire or ītor, ī ito imini or iminor, iunto	iōr, īris, ītur imur, imini, iuntur		
IMPERFECT.	ama I. doce II. lege III. audie IV.	*S.* bam, bas, bat *P.* bāmus, bātis, bant	rem, res, ret rēmus, rētis, rent		bar, bāris, bātur bāmur, bāmini, bantur	rer, rēris, rētur rēmur, rēmini, [rentur	
FUTURE.	ama I. doce II.	*S.* bo, bis, bit *P.* bimus, bitis, bunt			bor, bĕris, bitur bimur, bimini, buntur		
	leg III. audi IV.	*S.* am, es, et, *P.* ēmus, ētis, ent			ar, ēris, ētur ēmur, ēmini, entur		
PERFECT.	amav I. docu II. leg III. audiv IV.	*S.* i, isti, it *P.* imus, istis, ērunt or ēre	ĕrim, eris, ĕrit ĕrimus, ĕritis, [ĕrint		us (a, um), sum, &c. i (ae, a), sumus, &c.	us (a, um), sim, [&c. i (ae, a), simus, [&c.	
PLUPERFECT.	amav I. docu II leg III. audiv IV.	*S.* ĕram, ĕrat, erat *P.* ĕrāmus, ĕrātis, ĕrant	issem, isses, isset issemus, issētis, [issent		us(a, um), eram, &c. i (ae, a), eramus, &c.		
SECOND FUTURE.	amav I. docu II. leg III. audiv IV.	*S.* ĕro, ĕris, ĕrit *P.* ĕrimus, ĕritis, erint			us (a, um), ero, &c. i (ae, a), erimus, &c.		

LESSONS IN GEOMETRY.—No. VIII.

LECTURES ON EUCLID.

HAVING in our previous lessons on geometry, given our readers some kind of insight into the practical utility of the science of geometry, and having been urged by a numerous class of readers to give them something more elementary and initiatory, something more adapted to the young or to the old beginner, something that they really can understand on this most interesting subject, we have been induced, in consequence of the publication of the "Elements of Euclid" at such a price as to reach almost every class of purchasers, to commence a series of lectures on geometry in connexion with that masterpiece of antiquity. In these lectures we propose to smooth the way to the acquisition of this most important branch of human knowledge, by explaining in familiar terms the technicalities of the science at every step, even at the expense of repetition; and to show the practical application of each proposition in succession, as far as it can be done without introducing an amount of reference to branches of knowledge which the student cannot be supposed to have yet acquired.

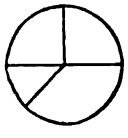
In carrying on these lectures we shall suppose ourselves addressing a class of students at a college, a people's college if you please, and we shall frequently use that colloquial style which serves to impress the mind and draw the attention pointedly to the subject in hand. One way of exciting the attention of the student will consist in amusing him with the different explanations, demonstrations, and solutions which have been given of various theorems and problems, and enabling him to judge of, or criticise if you will, each subject as it comes before him in the course of the lecture. Like all teachers who have the progress of their pupils at heart, we shall be glad to remove difficulties and give explanations when applied to by letter, for the benefit of all; but we hope that our correspondents will continue to be as they generally have been hitherto, courteous and civil in their manner of proposing their difficulties and requests, and that they will not be too positive as to the discovery of what they may fancy to be errors, lest they should turn out to be in error themselves. There is no science in which a man is more likely to be mistaken in his conceptions, especially at first, than the science of geometry, and we therefore desire to impress both ourselves and our readers with the necessity of an humble and teachable spirit, in the pursuit of this noble science.

Two thousand one hundred and fifty years have rolled away since Euclid flourished at Alexandria, and had the king of Egypt for one of his pupils; and during all that period no greater genius has risen to publish a work on Geometry, which can take the place of his. Why is this so? Because he has adopted the strictest system of pure reasoning that the world ever saw in his whole system, and in his demonstrations; and, although his work is not without faults, we do not think it will ever be supplanted in Great Britain by any better system. You will, perhaps, ask me why in Great Britain? We answer, because the British mind is like the Greek mind. It is of a noble and solid nature, and the studies of ancient Greece have ever been cherished by the inhabitants of this island, owing to the striking similarity of their minds. The French, our amusing and volatile neighbours, have greatly abandoned Euclid. They have adopted systems of their own; ingenious and useful systems, and possessing marks of great originality; but they want the vigour and solidity of the Greek master, the favourite of the British in Geometry. Even Professor de Morgan, that eminent analyst, and original but singularly obscure writer says, in his "Elements of Algebra," "In England, the Geometry studied is that of Euclid, and *I hope it will never be any other;* were it only for this reason, that so much has been written on Euclid, and all the difficulties of Geometry have so uniformly been considered with reference to the form in which they appear in Euclid, that *Euclid is a better key to a great quantity of useful reading than any other.*" Though the British, as a nation, appear to surpass the French in the practical application of the principles of Geometry, and though we believe that this is owing to their being well grounded in these principles as laid down in Euclid, yet it cannot be denied that the French have long been our masters in the higher branches of Mathematics. Of late years, indeed, there have been some evidences of a healthy attempt at original writing on these subjects, and among these, Professor de Morgan deserves credit for the share he has had in this onward progress; but we cannot refrain from strongly recommending simplicity in writing and in notation to all our original writers.

We have our own opinion, that by a more general spread of mathematical knowledge over the face of our happy island, some new lines of investigation and discovery may be struck out; and that, by the fortunate invention of some original genius, even Euclid himself, great as he is, may one day perhaps be thrown into the shade. There is the less chance, however, of this taking place when we consider the length of time that he has already maintained his ground; and when we find, upon examination that he has followed the most natural course in the study of geometry which the human mind could be supposed to follow. In fact, Euclid is simply the expression of the great human mind itself in one of its most interesting studies—the parent and the germ of the science of future ages. If Euclid had not done what he has done, some one else must have done it, and that some one else must have had the glory and the renown of the immortal work ascribed to his name.

But it is now time to enter upon the consideration of the work itself. In the lessons which we are about to give, we shall, for the sake of explicitness, and the clear distinction between what is Euclid's and what is not,—at least, as given out by his celebrated editor, Dr. Robert Simson, of the University of Glasgow,—cause to be printed in Italics, all that is really considered to belong to his Elements of Geometry. To this we shall add explanations, demonstrations, annotations, and criticisms of various kinds, all tending to elucidate the propositions in hand, and to show their practical bearing in the sciences and in the arts. We shall also add exercises for solution in a limited time, and if these be well and elegantly done by any of our pupils, we shall have much pleasure in giving the solutions a place in our work, for the instruction and encouragement of others. The question of prizes for solutions has been suggested to us; this is a grave question, and one that will depend on the continued success of this great national attempt to instruct the masses in the principles of Geometry.

Geometry, as laid down by Euclid, consists of several books, in which the properties of different geometrical figures are explained and demonstrated, in a series of short chapters called Propositions. To each book is prefixed a list of Definitions, which fixes at once, and for all future investigations, the precise meaning in which the technical terms or names of things is to be understood. From these definitions, no departure is ever allowed in Geometry; and it is to this fixity of meaning, that the superior excellence of geometrical reasoning, above all other kinds of reasoning, is to be chiefly attributed. The definitions, however, are not mere explanations of terms or words; they are, in general, something considerably more than this; for they contain the statement or announcement of some simple and obvious property of the thing defined—a property which belongs to that thing and to no other. In this view, the definitions may be considered as a series of self-evident propositions; or such, that if they are not at first self-evident, they must be taken as possessing this property, and made the foundations of our reasoning accordingly. In order to illustrate this by an example, let us take Euclid's definition of a circle: "*A circle is a plain figure contained [or bounded] by one line, which is called the circumference, and is such that all straight lines drawn from a certain point within the figure to the circumference, are equal to one another.*"



Now what is this definition but a proposition in which a certain important property of the circle is involved? viz., *that all straight lines drawn from the centre to the circumference are equal.* This is the test of circularity, if we may use the term,—the method by which we ascertain whether a given figure said to be a circle is really a circle or not. But it may be objected to this test, that no circle that ever was made by human hands, was absolutely perfect, or strictly agreed to the terms of the definition. To this we reply, that it is of no moment to the geometer whether this were ever the case or not; all that he requires for his purpose is that you will admit the existence of such a circle for the sake of argument, and then he is satisfied; then he can go on with his propositions and demonstrations, and raise you up a beautiful body of science on the strength of your admissions. Besides it is quite sufficient for the purposes, both of theory and practice, that we can make a circle so nearly true, as that no sensible difference can be discovered between the lengths of any two straight lines drawn from the centre to the circumference. Indeed, for the purposes of theory alone, this near approximation to the truth is not at all necessary; for it is enough that you admit, for the sake of argument, that any two straight

lines of this description which may be drawn are equal to another, whatever may be the difference between them. Hence it is that many an eminent geometer both in ancient and modern times, has studied geometry and made both progress and discoveries in this science, who never had a pair of compasses in his hand, and never made a circle, even approximately true, in his life. Attempts have, in fact, been made in our times to write a treatise on geometry *without any diagrams*; thus throwing the mind of the reader, and the force of the arguments, entirely on the conceptions which can be formed and retained from the definitions alone. This, of course, is carrying the purity of geometrical reasoning rather far, inasmuch as it gives an unnecessary strain to the intellect, and throws the mind too much upon its own internal resources.

It is plain, then, from these observations that the definitions in Geometry are propositions which must be admitted to be true before any reasoning can be established on them as a basis. In another view, these definitions may be considered as so many postulates (from Lat. postulo, *I demand*) or demands upon the common sense and ordinary understanding of the learner. And here, let it be observed, that there is nothing whatever in the study of Geometry which is not within the reach of every mind of the most common capacity, if that mind will only apply itself to the effort of simply endeavouring to understand the meaning of any definition or proposition placed before it. The scholastic and dogmatic style in which the simple truths of Geometry have been usually placed before the learner, is undoubtedly the chief reason why so few have studied this science. But he is not a teacher of this science who does not endeavour to remove this dogmatic appearance from the study, and to show how the simple abstraction of physical properties from the objects brought before the mind, tends to simplify the reasoning, and reduce it to the easiest form in which logic can be applied. The properties of geometrical figures are only approximately true in all cases whatsoever, in relation to the actual diagrams exhibited to the eye, or to the physical objects to which they may be referred; but they are perfectly and strictly true in relation to the definitions of the figures, because these only have their existence in the mind, and are perfectly independent of all external circumstances; this is what we call *abstraction* in logic. The mind of the attentive student very soon gets accustomed to this species of abstraction; and he learns to reason on geometrical figures and diagrams as upon ideal objects such as exist in a perfect state in his mind, according to the definitions; although the figures and diagrams themselves be very far from accurate either as to the nature of the lines or the form in which they are put together. Let us now proceed to the consideration of the Definitions prefixed to the First Book of Euclid's "Elements of Geometry."

BOOK I.

DEFINITIONS.

I.

A point is that which hath no parts, or which hath no magnitude. "A point is" more clearly defined to be "the beginning of magnitude;" as, for instance, the beginning of a line.

II.

A line is length without breadth. A line is extension in any one direction, uniform or variable; as, the unbroken contour or outline of any given surface.

III.

The extremities of a line are points. By the extremities of a line, are here meant, the beginning and the end of the line.

IV.

A straight line is that which lies evenly between its extreme points. "A straight line is" more clearly defined to be "that in which, if any two points be taken, the part intercepted between them is the shortest that can be drawn." This shows that every straight line in the Elements is considered to be of indefinite length, unless otherwise expressed.

V.

A superficies is that which hath only length and breadth. A superficies or surface, is extension in any two directions, uniform or variable; as, the continuous boundary of any given solid. Def. I. Book XI.

VI.

The extremities of a superficies are lines. By the extremities of a superficies or surface, are here meant, the boundaries or edges of the surface.

VII.

A plane superficies is that in which any two points being taken, the straight line between them lies wholly in that superficies. A plane superficies, or simply, a plane, is a surface in which a straight line can anywhere be drawn. This shows that every plane in the Elements is considered to be of indefinite extent, unless otherwise expressed.

With regard to the first definition,—viz., that of a point,—we once had a student of rather a sharp and intelligent turn of mind, who when he read under our instructions, the statement that "a point is that which hath no parts," for this was all the explanation of a point that was in the edition put into his hands, declared it was complete nonsense, and said that if Geometry had no better foundation than this, at its commencement, he for his part would abandon the study altogether. He stuck to his word; and from that day to this, which is now thirty years ago, he has to our certain knowledge never studied Geometry, although by no means deficient in ability, being one of our oldest and most learned scholar-bred *friends*. But there is an essential defect in this definition. It defines not what a point *is* or *has*; but what it *is not* or *has not*. This is definition by negatives, not by positives. We want to know really what a thing is; not, what it is not. The addition made by Dr. Simson, that "a point is that which hath no magnitude," does not remove the difficulty; for that which hath no magnitude, if it really exist, must be referred to the properties of mind, and not to those of matter. But let us hear what others say about this definition. In one of the most popular and much-used editions of Euclid, we are told that "a notion being obtained by the sense of the smallest magnitude distinctly perceptible, this is called a *physical point*. If this point were indivisible even in idea, it would be strictly what is called a *mathematical point*. But this is not the case. No material substance can assume a magnitude so small that a smaller may not be imagined. The mind, however, having obtained the notion of an extremely minute [physical] magnitude, may proceed without limit in a mental diminution of it; and that state at which it would arrive if this diminution were intinitely continued is a *mathematical point*." Now we hear some of our intelligent readers and even learners say, what is the use of all this talk about a point? Surely a point is a point, and there is an end of the matter. Everybody knows what a point is! But gentle readers, a little; everybody does not know what a point is in Geometry and it is of some importance to your future progress to know what it is, as well as what it is not. To compare *mathematical points*, or rather, *geometrical points*, which is the more accurate phrase, with *physical* or *material points*, as is done in the preceding extract, is simply an absurdity. Not the slightest notion can be gained from this comparison. A *geometrical point* is a pure abstraction, and the idea of it must be reached by other means. Dr. Thomson, in his useful edition of Euclid, makes the following remarks on this subject, but they are not much more to the purpose:—"In geometrical figures, or, as they are called, diagrams, we are obliged instead of mathematical points and lines, to employ physical ones; that is, dots, instead of mathematical points, and lines of some perceptible breadth, instead of mathematical ones; as the finest line that we can make has breadth, and the finest point, both length and breadth. Our reasoning, however, is not vitiated on this account, as it is conducted on the supposition that the point has no magnitude, and the line no breadth, and nothing in it depends on the magnitude of the point, or the breadth of the line in the diagram." We have already shown that all our reasoning in geometry is wholly independent of the actual figures or diagrams before, and we have shown the reason why; so that this argument about mathematical or geometrical points is perfectly useless, and not to the point. Professor Playfair, in his edition of the "Elements," defined "a point" as "that which has position but not magnitude." If by position here is meant *physical position*, then the difficulty is as great as ever, for how can that which has no *physical magnitude* have any *physical position*?" This definition is nearly as wise as the ancient scholastic inquiry, "whether it be possible for a thousand angels to dance on the point of a needle?" But we must stop here for the present, and finish this important subject in our next lecture.

QUESTIONS ON THE PRECEDING LESSON.

What is Euclid's definition of a point? of a line? of the extremities of a line? of a straight line? of a superficies? of the extremities of a superficies? of a plane superficies?

What are the additional explanations which are given of a point? of a line? of the extremities of a line? of a straight line? of a superficies? of the extremities of a superficies? of a plane superficies?

LESSONS IN GERMAN.—No. VIII.

Section XVII.

The plural of Mann is Männer; except in compounds, where it is generally Leute (§ 15. Note). Ex.: Landmann, countryman; Landleute, country-people. Zimmermann, carpenter; Zimmerleute, carpenters. Hauptmann, captain; Hauptleute, captains. Kaufmann, merchant; Kaufleute, merchants.

Volk corresponds mainly to our word people. Unlike this, however, it has different forms for the two numbers. Ex.: Die Franzosen sind ein lebhaftes Volk; the French are a lively people. Die Fürsten schwelgen, und das Volk leidet; the princes revel and the people suffer. Alle Völker auf Erden, 1. Moses 18, 18; all the nations of the earth, Genesis 18. 18.

The word one, as a pronoun, is, in English, often inserted after an adjective, to avoid the repetition of the noun; in German, however, the adjective in such a case, stands *alone*. Ex.: Er hat einen guten Hut und ich habe einen schlechten; he has a good hat and I have a bad (one). Ich habe gute Hüte und er hat schlechte; I have good hats and he has bad (ones). Er hat guten Wein und ich habe schlechten; he has good wine and I have bad (wine).

The adjective and participle preceded by an article are often used substantively, as well in the singular as in the plural. Ex.: Der Zufriedene ist glücklich; the contented (man) is happy. Die Zufriedene ist glücklich; the contented (woman) is happy. Die Zufriedenen sind glücklich; the contented are happy. Ein Zufriedener ist glücklich; a contented (man) is happy. Der Sterbende, die Sterbende; the dying (man), the dying (woman). Die Lebenden; the living.

I. Adjectives in German are often, by means of the definite article, converted into abstract nouns. Ex.: Er verehrt das Schöne; he adores the beautiful.

II. The use of the definite article before nouns taken in a general sense is much more frequent than in English. Ex.: Der Tiger ist flink; the tiger is agile. Der Diamant ist ein Edelstein; the diamond is a precious stone. Das Gold ist ein edles Metall; (the) gold is a precious metal. Die Luft ist ein Element; the air is an element. Das Wasser ist ein Element; (the) water is an element. Die Seele ist unsterblich; the soul is immortal. Der Mensch ist sterblich; (the) man is mortal. Die Faulheit ist ein Laster; (the) idleness is a vice.

The plural is used in the same manner. Ex.: Die Tiger sind flink; (the) tigers are agile.

III. The definite article is sometimes used instead of the possessive pronouns. Ex.: Er hat ein Buch in der Hand; he has a book in *the* (his) hand. Das Kind ist bei dem Vater; the child is with *the* (its) father.

IV. Proper names and titles are often preceded by the definite article. Ex.: Wo ist der Heinrich? where is (the) Henry? Der Kaiser Heinrich; the emperor Henry. Der König Heinrich; (the) king Henry.

The definite article likewise commonly precedes the adjective qualifying a proper name. Ex.: Die schöne Helene; the beautiful Helen. Der arme Richard; (the) poor Richard.

The article is also generally used before the word Schule, Kirche, Markt, Mühle, &c. Ex.: Er ist in der Schule; he is (in) at (the) school. Er ist in der Kirche; he is (in) at (the) church. Er ist auf dem Markt; he is at the market. Er ist in der Mühle; he is in the mill. Er geht nach der Mühle; he is going to (the) mill.

V. The word Herr, when placed before a proper name, answers to our Mr. Ex.: Ist Herr N. hier? is Mr. N. here? Frau in the like position signifies Mrs. Ex.: Wo ist Frau N? where is Mrs. N.? Fräulein thus placed answers to our word Miss. Ex.: Fräulein N. ist hier; Miss N. is here. Guten Morgen Herr N., Frau N., Fräulein N.; good morning Mr. N., Mrs. N., Miss N.

Instead of Frau the French Madam is often used. Ex.: Madam N.; Mrs. N.

In address, when the name is omitted, the possessive pronoun precedes the words Herr and Fräulein. Ex.: Guten Morgen mein Herr, mein Fräulein; good morning, Sir, Miss.

In the plural the form of address is: Meine Herren! Gentlemen! Meine Damen! Ladies! Meine Fräulein! Young ladies!

The word Fräulein, when connected with the name, is used like its corresponding word in English. Ex.: Sind die Fräulein N. zu Hause? Are the Misses N. at home?

In ceremonious address the word Herr is prefixed to titles. Ex.: Herr Präsident; Mr. President. Herr Sprecher; Mr. Speaker. Herr Pastor; (Mr.) Pastor. Herr Oberst; (Mr.) Colonel. Herr Professor; (Mr.) Professor. Herr Lehrer; (Mr.) Teacher. Herr Ritter; Sir Knight.

Herr, preceded by the definite article, is applied to these titles as well in the third person as in the second. Ex.: Wo ist der Herr Präsident? Where is the (Mr.) president? Wissen Sie, wo der Herr Oberst ist? Do you know where the (Mr.) colonel is?

Note. The words in brackets are the literal translations of the German; they are given that the pupil may clearly perceive the different modes of expression of the two languages. Peculiarities of this kind are called "the idiom of a language," and the differences "differences of idiom."

The word Frau is prefixed to titles or appellations of *women*. Ex.: Frau Gönnerin; Lady patroness. Frau Aebtissin; Lady Abbess. Frau Gemahlin; Lady consort.

These words are also prefixed to designations of relationship. Wo ist Ihr Herr Vater? Where is your (Mr.) father? Sein Herr Bruder ist hier. His (Mr.) brother is here. Ist Ihre Frau Mutter zu Hause? Is your (Mrs.) mother at home? Ihre Fräulein Schwester war da, &c. Your (Miss) sister was there, &c.

Exercise 17.

Abend, *m.* evening; Arbeiten, to work; Bedauern, to pity; Beneiden, to envy; Bergmann, *m.* miner; Bettler, *m.* beggar; Concert', *n.* concert; Damengesellschaft, *f.* society of ladies. (See Sect. 9). Dort, there, yonder; Ebenfalls, likewise; Erde, *f.* earth; Erhaben, sublime; Frau, *f.* Mrs., woman, wife; Gelehrt', adj. learned; Gemahlin, *f.* consort, wife; Gesandtin, *f.* ambassadress; Gestern, yesterday; Glücklich, adj. happy, fortunate; Handwerker, *m.* mechanic; Herr, *m.* Mr., Sir, Lord; Hofräthin, *f.* wife of a counsellor of the court (Sect. IX. I.); Lächerlich, adj. ludicrous, ridiculous; Laster, *n.* vice; Madam', *f.* Mrs., madam;* Maurer, *m.* mason; Minister, *m.* minister; Mit, with; Morgen, *m.* morning; Muster, *n.* sample; Munter, adj. lively; Nützlich, adj. useful; Professor, *m.* professor; Schauen, to view; Scheuen, to shun; Schlecht, adj. bad, base; Schreiner, *m.* joiner; Schritt, *m.* step, stride; Sehen, to see, perceive; Theater, *n.* theatre; Tiefe, *f.* depth; Trauer, *f.* mourning, sorrow; Tugendhaft, virtuous; Ungelehrt, unlearned, illiterate; Unglücklich, unhappy, unfortunate; Verdienen, to earn deserve; Viel, adj. and adv. much, many; Wünschen, to wish, desire.

Die Hüttenleute haben schwere Arbeiten.
The furnace-men have severe labour.

Die meisten Völker Asiens haben noch Götzen.
(The) most nations of Asia have still idols.

Der Vater hat einen schwarzen Hut und der Sohn einen weißen.
The father has a black hat and the son a white (one).

Das Schöne ist lieblich, aber nur das Gute achtungswerth.
The beautiful is lovely, but only the good (is) worthy of respect.

Der Herr Gesandte ist so eben mit seiner Frau Gemahlin abgereist.
The (Mr.) ambassador, with his lady consort, has just now departed.

Nehmen Sie auf dem Sopha gefälligst Platz, meine Damen, meine Fräulein oder meine Herren.
Take (you) seats upon the sofa, if you please, (my) ladies, (my) young ladies, of (my) gentlemen.

Frau N., ihre Fräulein Tochter und ihr Herr Sohn sind in Ihrem Zimmer.
Mrs. N., her (Miss) daughter, and her (Mr.) son are in your room.

1. Die Zimmerleute, Schreiner, Schneider und Maurer sind Handwerker. 2. Die Bergleute arbeiten in der Tiefe der Erde. 3. Die Engländer sind ein ruhiges Volk. 4. Fleißige Handwerksleute verdienen in America viel Geld. 5. Der Reiche hat einen guten Rock, und der Bettler einen schlechten. 6. Der Tugendhafte scheut das Laster. 7. Der Glückliche bedauert den Unglücklichen. 8. Die Ungelehrte beneidet die Gelehrte. 9. Das Gelehrte ist nicht immer das Nützliche. 10. Herr N. ist in dem Zimmer. 11. Frau

* Madam is the same as the French "*Madame*" (my lady), but never spelt with the *e* as is the French word.

R. ist in dem Theater. 12. Ich gehe mit Ihnen, mein Herr. 13. Ich wünsche Ihnen einen guten Morgen, mein Fräulein. 14. Ich war gestern in einer Damengesellschaft. 15. Frau R. ist sehr munter. 16. Ich sehe die Frau Gesandtin nicht. 17. Der Herr Minister ist ebenfalls dort. 18. Die Frau Hofräthin hat Trauer. 19. Guten Abend Herr Professor. 20. Wo ist Ihre Frau Gemahlin, Ihr Herr Sohn und Ihre Fräulein Tochter? 21. Sie sind in dem Concert. 22. Vom (§ 4. 2) Erhabenen zum Lächerlichen ist nur ein Schritt. 23. Der Reiche hat zwei* Häuser, drei Knechte, vier Pferde, zwölf Ochsen und achtzig Schafe. 24. Dieser Jäger hat fünf Hunde und jener hat acht.

1. The Germans are a diligent people. 2. My father knows a learned professor and an unfortunate (one). 3. The unlearned avoids the learned. 4. The dying (man) has a book in his hand. 5. He adores the beautiful and the sublime. 6. Gold is a precious metal, silver is likewise, but copper and iron are not. 7. Have you seen poor Henry and little Helen? 8. Your friend the CAPTAIN was in the theatre. 9. I see the COLONEL yonder in the garden. 10. Good morning, president. 11. Is your mother at home? 12. Good evening, Sir; where is your sister and your brother?

QUESTIONS. 1. What is the plural of Mann? 2. In what respect do Volk and *people* differ? 3. How would you express such a phrase as "a good one" in German? 4. How are adjectives in German often converted into abstract nouns? 5. Example? 6. Wherein is the use of the article more common in German than in English? 7. Instead of what is the definite article sometimes used? 8. Example? 9. What of proper names and titles? 10. What of the article preceding adjectives? 11. What of the word Herr? 12. Frau? 13. Fräulein? 14. Examples?

LESSONS IN BOTANY.—No. IX.

CLASS XI.—DODECANDRIA.

Plants bearing flowers with *Twelve* Stamens.

ORDER I.—MONOGYNIA.

IN this order stand the purple loosestrifes. According to Linnæus, the germs were first named from Lysimachus, king of Sicily, and our word loosestrife is simply a translation of the old Greek name. It originated in the absurd idea entertained by the ancients, that, when these plants were put on the yokes of restive oxen, these animals became gentle and submissive. The spiked purple loosestrife has an erect stem, from two to four feet high, a cylindrical cup of one leaf, with twelve teeth, enclosing the germ, and a corolla of six petals, which is beautiful and showy. It grows in watery places, and flowers in July and August.

Of the loosestrifes, it may be remarked by the way, there are many varieties, with which it becomes the botanist to make an acquaintance. In the time of Gerard, the wood species was called *serpentaria*, from the notion that, "if serpents be wounded, they do heal themselves with this herb." This kind, like some others, bears yellow flowers. The Great yellow loosestrife, for example, often found in England, by the roadside, on moist meadows, or in bogs, during the month of July, is sometimes two or three feet high, and adorned with large clusters of golden blossoms.

DIGYNIA.

Agrimony is a wild plant, well known to the ancients, which is said to derive its name from a Greek word, meaning the web or pearl of the eye, to which it was thought to be applicable with advantage. The stem, which is generally simple, varies from one to two feet high, its yellow flowers are very numerous in a close, tapering spike. It is common by roadsides, in hedges, and the margins of fields, and flowers in June and July yield, some think, an odour like an apricot. A decc agrimony has had the reputation of keeping old age av those ladies who persevere in its use. At least, it merit of being harmless, which cannot be said of all and it would probably form a good kind of diet-drink slightly tonic properties.

TRIGYNIA.

On walls, or barren ground, we find the dyer's weed three, four, five, and six jagged petals; it flowers The flowers blow in a nodding spike, which follows th of the sun, turning towards it when it rises, and bend it till it sinks beneath the western horizon. This plan a most beautiful yellow dye for cotton, woollen, silk, The yellow hue of the paint called Dutch pink, is from the stems and roots of this plant, with the juice the ancient Britons are said to have stained their bod

DODECAGYNIA.

This name denotes *twelve* pistils, of which the hou an example, growing on walls and house-tops, and flo July and August. It has several dense tufts and s oblong, acute, fringed, and very thick and succulen It contains malic acid, combined with lime, and its le frequently applied to bruises and old ulcers. They sidered to be cooling when applied externally and fr renewed.

CLASS XII. ICOSANDRIA.

Plants bearing flowers with *Twenty* or more Stamens, an the inner edge of the calyx.

The stamens of plants in this class are not, therefo considered so much in reference to *number* as to *situat* special mark that distinguishes them alike from the p and following classes is this, that the stamens proceed from the sides of the cup, or are united with the blos not, as is common in other instances, from the recep little careful observation will soon render this differen perceptible.

ORDER I. MONOGYNIA.

Here are arranged some vegetable products of no terest. The bird cherry is a small tree with smooth b doubly serrate or saw-toothed leaves, beautiful cl white flowers, which appear in May, and small blac drupes; the name *drupe* being applied to all those fru have but one cell, containing a nut or stone with a k which there are many examples, as the plum, the ap peach, the almond, and the olive.

The Olive.

To the bird cherry must be added, as belonging to th order, the wild cherry, a tree with very smooth bark, p serrated leaves, white flowers, which appear in May, our woods and hedges, and black sweet drupes. Th

* Zwei, two; drei, three; vier, four; zwölf, twelve; achtzig, eighty; fünf, five; acht, eight.

bullace, a small tree, with spreading round branches, which grows in woods, thickets, and hedges, puts forth its white petals in April, and yields a globular, austere, and black fruit, with blue blossom. We are often struck by what culture can effect. We take, for example, a wild pink, and compare it with the carnation; or the original hearts-ease, and compare it with the

The Carnation.

pansy of our gardens, and the difference is visibly great; but we are apt to overlook the fact that the bullace growing in the hedge is our wild plum-tree, from which the cultivated plums have been obtained.

The Pansy.

Great, indeed, is the difference between the acid and ungrateful taste of the wild plum, and the rich juiciness of the fruit with which we are familiar as growing in our orchards. To the same order must be added the blackthorn, or sloe-tree, a sort of bush, with irregularly spreading round branches, leaves serrate, numerous flowers, which appear in March and April, with pure white petals. It is this tree which William Howitt thus addresses:

"All other trees are wont to wear,
First, leaves—then, flowers—and last,
Their burden of rich fruit to bear
When summer's pride is past:
But thou, so prompt thy flowers to show,
Bear'st but the harsh, unwelcome sloe.
"So oft young genius at its birth,
In confidence untried,
Spreads its bright blossoms o'er the earth,
And revels in its pride;
But when we look its fruit to see,
It stands a fair, but barren tree."

PENTAGYNIA.

Plants of this order have *Five* Pistils.

The whitethorn is a small tree or shrub, with smooth bark, and very hard wood, growing in thickets, and by rivers. Its flowers appear in May and June; they are white, but sometimes pink, and emit a very agreeable odour. The fruit is of a deep-red, and mealy, and the berries, which remain during the winter, are eaten by numerous species of small birds. The value of this tree for hedges is well known. The common medlar, a small tree which grows in hedges, and flowers in May, and the dwarf quince-leaved medlar, a small, stemless bush, whose drooping flowers may be seen in July, and which yield a mealy, red fruit, are placed in the same order.

To these, however, must be added a series of trees: as the wild pear-tree, which rises high in woods and hedges, with its thorny branches, and flowers in April and May; the wild apple-tree, often called the crab-tree—the origin of all the varieties of the apple, which grows in the same situation, and flowers in May; the wild service-tree, whose white flowers appear in April and May, growing in large downy panicles; and the mountain-ash, a tree remarkable for its beauty, growing in mountainous woods, flowering in May and June, and yielding a scarlet fruit, on which several species of small birds, especially thrushes, freely regale themselves.

Nor must we omit the meadow-sweet, which has been said to have a flower of "lace-like embroidery," waving so beautifully and gracefully in the gentlest wind. It flowers in June and July, not only in meadows, but about the edges of rivers and ditches. Its odour is very fragrant, but in a close apartment, it becomes injurious from its containing prussic acid.

POLYGYNIA.

The term *polygynia* properly means *Many* Pistils.

Here are assembled the roses, so various in size, hue, and fragrance, that a description of them would require a very ex-

The Rhododendron.

tensive space. The following details must, therefore, suffice:—The wilding rose, often called dog's-rose, and dog's-thorn, be-

cause dogs are said to eat the tips, is one of the sweetest ornaments of our green lanes in June. The sweetbrier rose, called also the eglantine, is common in open bushy places, in some parts of England. It may easily be distinguished from the dog-rose by its flowers, which are smaller, and of a deeper pink, and particularly by the fragrance of its foliage. The burnet-leaved rose grows plentifully on chalky or sandy soils, bearing little white flowers, which have a tinge of cream colour, and a slight scent. Its leaves are much smaller than those of the dog-rose, they are not so glossy, and of a darker green, and its stems are thickly beset both with long and short prickles. The bush of the trailing dog-rose is seldom more than three feet high, but its long winding stems extend to the distance of several feet. The flowers grow in large bunches and are quite white. This bush is very common in Yorkshire, and the flower is said to have been the white rose of the Yorkists at the time when civil war ravaged and desolated our land. With war, horrid as it is, flowers have been sometimes connected by a strange association. "Bring flowers," it has been said, "to deck the bride, and to crown the feast, but bring them to die in the conqueror's path."

In this order, too, are the many varieties of the bramble, the strawberry, divers kinds of cinquefoil, the tormentils, the herb bennet, and the water and mountain avens. But our limits require us to pause.

We would have our readers admire all the beauties with which culture has filled our gardens, and the floral grandeurs with which they are sometimes arrayed. But while they gaze with delight on the gorgeousness of such flowers as the rhododendron, we would have them listen to the poet's appeal:

> "Despise not thou the wild-flower! small it seems,
> And of neglected growth, and its light bells
> Hang carelessly on every passing gale:
> Yet it is finely wrought, and colours there
> Might shame the Tyrian purple; and it bears
> Marks of a care eternal and divine.
> Duly the dews descend to give it food;
> The sun revives it drooping, and the showers
> Add to its beauty; and the airs of heaven
> Are round it for delight."

LESSONS IN FRENCH.—No. XVII.

By Professor Louis Fasquelle, LL.D.

Section XXXVI.

1. The reflective pronoun is often used to express possession, instead of the possessive adjective. In such cases the article takes the place of this adjective, before the noun [§ 77 (9)].

Vous chauffez vous les pieds ?	*Do you warm your feet?*
Je me chauffe les mains et les pieds.	*I warm my hands and feet.*

2. Se souvenir [2 ir. *See* § 62], se rappeler [§ 49 (4)], correspond to the English verb *to remember*. Se rappeler takes a direct object, that is, no preposition intervenes between the verb and its object, if the same be a noun or a pronoun:—

Vous rappelez vous ces demoiselles ?	*Do you remember those young ladies?*
Je ne me les rappelle pas.	*I do not remember them.*

3. Custom seems, however, to sanction the use of the preposition de between the verb se rappeler and an infinitive:—

Nous ne nous rappelons pas d'en avoir été privés (Condillac).	*We do not remember having been deprived of it.*

4. Se souvenir takes the preposition de before a noun or pronoun as well as before an infinitive:—

Vous souvenez vous de cette affaire ?	*Do you remember that affair?*
Je ne m'en souviens pas.	*I do not remember it.*
Je me souviens de lui avoir écrit.	*I remember having written to him.*

5. Se coucher, corresponds to the English verbs *to retire, to go to bed*:—

Je me couche de bonne heure.	*I retire early.*

6. Se lever [§ 49 (6) means *to rise, to get up*:—

Je me lève au point du jour.	*I rise at the break of day.*

Résumé of Examples.

Vous coupez vous les ongles ?	*Do you cut your nails?*
Je me coupe les ongles et les cheveux.	*I cut my nails and hair.*
Vous coupez vous les doigts ?	*Do you cut your fingers?*
Je me coupe souvent les doigts, quand je taille ma plume.	*I often cut my fingers, when I mend my pen.*
Vous rappelez [§ 49 (4)] vous les malheurs du frère de votre ami ?	*Do you remember the misfortunes of your friend's brother?*
Je me rappelle ses malheurs.	*I remember his misfortunes.*
Je me les rappelle distinctement.	*I recollect them distinctly.*
Je me rapelle de l'avoir vu.	*I remember having seen him.*
Vous souvenez vous de cela ?	*Do you remember that?*
Je ne m'en souviens pas du tout.	*I do not remember it at all.*
A quelle heure vous couchez vous ?	*At what hour do you retire?*
Nous nous couchons tous les jours au coucher du soleil.	*We go to bed every day at sunset.*
Nous nous levons de meilleure heure que vous,—au lever du soleil.	*We rise earlier than you,—at sunrise.*
Il se lève à cinq heures du matin, et il se couche à dix heures et demie du soir.	*He rises at five o'clock in the morning, and goes to bed at half-past ten in the evening.*

Exercise 71.

Associé, m. *partner.*	De meilleure heure, *earlier.*	Perruquier, *hairdresser.*
Bois, m. *wood.*	Doigt, m. *finger.*	Poêle, m. *stove.*
Boucher, m. *butcher.*	Fer, m. *iron.*	Pousse, m. *sprout.*
Se brûl-er, 1. *ref. to burn one's self.*	Feu, m. *fire.*	Promesse, *promise.*
Charpentier, m. *carpenter.*	Main, f. *hand.*	Se souvenir, *(see Venir).*
Se chauff-er, 1. ref. *to warm one's self.*	S'occuper, 1. *to occupy one's self.*	Travaill-er, *to work.*
	Parfaitement, *perfectly.*	

1. Le perruquier se coupe-t-il le pouce? 2. Ne il se coupe les cheveux. 3. Le charpentier ne pas la main? 4. Il ne se coupe pas la main, il 5. Ne vous rappelez vous pas cette dame? 6. Je cette dame et ces messieurs. 7. De quoi vous oc 8. Nous nous occupons de nos affaires. 9. Vo vous des fusils qu'a votre père? 10. Je ne m point du tort. 11. Cette petite fille ne se brûle 12. Elle ne se brûle pas, il n'y a pas de feu dans l Pourquoi le boucher ne se chauffe-t-il pas? 14. n'a pas froid. 15. Ces enfants se lèvent ils de mei que moi? 16. Ils se couchent de bonne heure, et tous les matins à six heures. 17. Votre associé n s'asseoir? 18. Il n'a pas le temps de s'asseoir. souvenez vous de vos promesses? 20. Je m'en s faitement. 21. Ne vous chauffez vous pas quan froid? 22. Je ne me chauffe presque jamais. couche-t-on pas, quand on a sommeil? 24. O quand on a sommeil, et on mange quand on Quand on se porte bien, se lève-t-on de bonne Quand on se porte bien, on doit (*should*) se lev heure.

Exercise 72.

1. Do you rise early when you are well? 2. well, I rise every morning at five o'clock. 3. Do ber your cousin L.? 4. I remember him perfect Do you go to bed early? 6. We go to bed at ten Does not the tailor burn his fingers? 8. He does fingers, his iron is not warm. 9. Does the carpe thumb? 10. He cuts neither his thumb nor his Why do you not warm yourself? 12. I do not w because I am not cold. 13. Is it not very cold t It is not cold to-day, it rains. 15. Does your hair- at sunrise? 16. The carpenter rises at sunrise and at sunset. 17. Do you rise earlier than I? 18. W morning at the break of day. 19. Do you cut your 20. I cut my hair and my nails every month. remember that gentleman? 22. I remember him 23. I do not remember him. 24. Do you cut y when you mend a pen? 25. I cut my hand wh 26. Do you remember what you learn? 27. I do ber all that (*tout ce que*) I learn. 28. Do you kn father is well? 29. He is very well to-day. 30. I mother well? 31. She is not very well. 32. Do y ber your friend's misfortunes? 33. I remember th remember that.

Section XXXVII.

1. The verb tromper, conjugated actively, corresponds to the English verb *to deceive*:—

Il trompe tout le monde. *He deceives everybody.*

2. Conjugated reflectively, se tromper means *to be mistaken*; literally, *to deceive one's self*:—

On se trompe bien souvent. *One is often mistaken.*

3. Ennuyer [§ 49 (2)], used actively, means *to weary the mind, to tease, to bore*:—

Cet homme ennuie ses auditeurs. *That man wearies his hearers.*

Vous nous ennuyez par vos demandes. *You tease, or weary us by your questions.*

4. S'ennuyer has no exact correspondent in English. It signifies generally, *to be*, or *to become mentally weary of any thing or place*:—

Nous nous ennuyons ici. *We are weary of being here.*

Vous ennuyez vous à la campagne? *Are you weary of being in the country?*

5. Je m'ennuie means in fact, *I am mentally weary, I want change, amusement, occupation*, &c.:—

Je m'ennuie partout. *I find no amusement anywhere.*

6. S'amuser, answers to the English expressions, *to amuse one's self, to take pleasure in, to spend one's time in, to find amusement in, to enjoy one's self*:—

Nous nous amusons à la campagne. *We enjoy ourselves in the country.*

Vous vous amusez à des bagatelles. *You spend your time in trifles.*

Résumé of Examples.

On se trompe souvent soi-même en cherchant à tromper les autres.	*We often deceive ourselves while seeking to deceive others.*
Le commis ne se trompe-t-il pas?	*Is not your clerk mistaken?*
On se trompe bien rarement.	*He is very rarely mistaken.*
Ne vous trompez vous pas fréquemment?	*Are you not frequently mistaken?*
Il est de monde est sujet à se tromper.	*Every one is apt to be mistaken.*
Le marchand trompe tout le monde.	*That merchant deceives everybody.*
Cette conversation nous ennuie.	*His conversation wearies us.*
Vous ennuyez vos amis par vos plaintes.	*You weary your friends by your complaints.*
Est-ce que je ne vous ennuie pas?	*Do I not weary you?*
Vous ennuyez vous chez nous?	*Are you weary of remaining with us?*
Je m'ennuie à la ville et je m'amuse à la campagne.	*I become weary of the city and find amusement in the country.*
En quoi vous amusez vous?	*In what do you amuse yourself?*
Je m'amuse à lire l'allemand.	*I amuse myself in reading German.*

Exercise 73.

Apprend-re, 4. irr. *to learn.*	Entend-re, 4. *to hear.*	Quand, *when.*
Attendre, *to wait.*	Ennuyer, 1. *to tire.*	Quelquefois, *sometimes.*
Banquier, m. *banker.*	Langue, f. *language.*	Rec-evoir, 3. *to receive.*
Client m. *client, customer.*	Malade, *sick.*	Rev-enir, 2 irr. *to come back.*
Chez, *at.*	Mémoire, m. *bill.*	
Demeur-er, 1. *to dwell.*	Préfér-er, 1. *to prefer.*	Tromp-er, 1. *to deceive.*

1. Aimez vous à demeurer à la campagne? 2. Je préfère la campagne à la ville. 3. Vous ennuyez vous souvent à la campagne? 4. Quand je m'ennuie à la campagne, je reviens à la ville. 5. Reçoit on des nouvelles du Général L.? 6. On n'entend pas parler de lui. 7. Vous trompez vous quelquefois? 8. Tout le monde se trompe quelquefois. 9. Le banquier trompe-t-il ses clients? 10. Il ne trompe ni ses clients ni ses amis, il ne trompe personne. 11. Ne vous trompez vous pas dans ce mémoire? 12. Je ne me trompe pas. 13. Vous amusez vous à lire ou à écrire? 14. Je m'amuse à apprendre l'allemand et le français. 15. Avez vous tort d'apprendre les langues? 16. J'ai raison de les apprendre. 17. Vous ennuyez vous souvent? 18. Je m'ennuie quand je n'ai rien à faire. 19. A quoi vous amusez vous quand vous êtes à la campagne? 20. Nous nous promenons le matin, et nous travaillons le reste de la journée. 21. Vous portez vous toujours bien? 22. Nous sommes quelquefois malades. 23. Envoyez vous chercher le médecin? 24. Nous l'envoyons chercher. 25. Je vais le chercher.

Exercise 74.

1. Are you not mistaken? 2. I am not mistaken. 3. Is the banker mistaken? 4. He is not mistaken, but his clerk is certainly (*certainement*) mistaken. 5. Does he not deceive you? 6. He does not deceive me, he deceives nobody. 7. Are you not wrong to deceive your father? 8. I do not intend to deceive him. 9. Does not the merchant make a mistake? 10. He makes a mistake in the bill which he writes. 11. Do you like the country or the city? 12. I prefer the city; I soon become weary of the country. 13. Does not that child weary you by his questions? 14. Does not that long story (*récit*, m.) weary you? 15. It does not weary me, it amuses me. 16. Do you amuse yourself when you are in the country? 17. I amuse myself, I learn French and Italian. 18. Are you not weary of remaining at your uncle's. 19. I am never weary of remaining there. 20. Is your brother often mistaken? 21. Everybody is sometimes mistaken. 22. Does his conversation weary you? 23. On the contrary, it amuses us. 24. Is your brother heard from? 25. Nothing is heard of him [Sect. 34]. 26. Is your sister well? 27. No, Sir, she is sick. 28. Do I weary you? 29. You do not weary me. 30. Am I mistaken? 31. You are not mistaken. 32. Is he often mistaken? 33. He is often mistaken. 34. Do you not rise late? 35. No, Sir, I rise early.

LESSONS IN GEOLOGY.—No. VII.

By Thomas W. Jenkyn, D.D., F.G.S.

CHAPTER I.

THE ACTION OF VOLCANOES ON THE EARTH'S CRUST.

SECTION III.

PHENOMENA OF VOLCANIC VENTS AND CONES.

In the crater of a volcano, and on the sides of a volcanic mountain, there are generally a great number of smaller vents, which emit nothing but aqueous vapours and corrosive gases. In the crater itself the lava may be burning and boiling for years, without either an eruption of scoriæ or an overflow of lava, as you will find represented in fig. 11 of a former lesson.

In this case a multitude of small conical vents are formed, which rise out of the cooled surface of the melted lava; and these vents are constantly giving out volumes of smoke and sulphuric acid gas. Such a vent is called in Europe a Fumerole, or Moffet; and in Mexico, a Hornito, or small oven.

Besides these vents which are found within the circumference of the boiling crater, there are other vents produced, sometimes on the wall of the crater, and sometimes on the sides of the mountain. These are formed by the jets of scoriæ thrown up, and which in falling accumulate around the mouth of the vent, as represented in fig. 14.

Fig. 14.

A conical vent formed by the fall of jetted cinders on Vesuvius.

You will have a better conception of these conical vents, which are formed in a lake of burning lava, if you fancy yourself upon the edge of the great crater of Mount Vesuvius, and contemplate them in their terrific perspective. Before you

reach the summit of Vesuvius from Naples, you arrive at a lofty cone. As you ascend the sloping sides of this cone, the whole appears to you to be nothing but a heap of loose materials, a mere heap of rubbish, thrown down and about in a disorderly manner. But when you reach the edge of the crater, and look on the cliffs stretching before you in the opposite walls of the chasm, you find that the volcanic materials, which have been successively thrown up, have been disposed in regular beds or strata, corresponding, first of all, with the sloping or dipping sides of the original cone, and then with the various volcanic envelopes which have mantled over the preceding bed of cooled lava. If you look to our woodcut, *Jorullo*, fig. 13, you will find, on the left of the crater how regularly these beds of lava overlap or envelop one another.

Suppose yourself to stand on a ledge of the lava rocks represented on the left of the foreground in fig. 15. Here you have a full view of the boiling crater below, and of the vents or fumeroles of different heights formed by the fall of jetted materials.

scattered blocks of lava and various heaps of cinde
bottom of this plain was penetrated by various c
fissures, through which columns of vapour and steam
were constantly escaping.

In October, 1822, a series of detonations, and of
plosions, took place, and continued for nearly a mo
force from below broke up this rocky plain of lava hi
bottom, and hurled them all into the air, so as to le
a tremendous gulph or chasm of irregular form,
three miles long, and three-fourths of a mile across,
ing from north-east to south-west. Its depth w
stupendous. It was supposed to be two thousand
half the depth of Snowdon. As, however, the wh
of the crater continued to fall in, the gulph becam
less than half that depth. When this action of t
commenced, the summit of the cone around
was 4,200 feet high; but through the powerful
the fire such prodigious masses of the lofty m

Fig. 15.

The Crater of Vesuvius, as seen by H. Abich, in 1834, *showing the Fumeroles or conical vents.*

This crater of Vesuvius is perpetually changing its form. Before the year 1631, what you now see as a burning crater was an awful dingle or cleuch, five miles in circumference, and about one thousand feet deep. On the sides of yonder cliffs, a forest of bruahwood grew luxuriantly; and, on the bottom where you now see the lake of glowing lava, there was a fine plain, furnishing grass on which cattle browsed. In this plain there were three pools of water: one hot and bitter; the second, salter than sea water; and the third, hot, but without any taste. But in December, 1631, the whole forest of brushwood on the sides, and the whole plain of grass at the bottom, were blown up into the air with fearful explosions. The volcano then rested for some years.

Again. Between 1800 and 1822, this vast crater was becoming gradually filled up by lava boiling upwards from below, and also by jets of cinders and ashes, which were falling down from the smaller vents which had been formed both in the centre of the crater, and on the sides or ledges of the cliffs. The result was, that, instead of a deep, regular cavity, there appeared once more at the bottom a rugged, rocky plain, covered with

worn down, that its elevation was reduced to
feet.

Our woodcut, fig. 15, represents Vesuvius as it
H. Abich, in 1834, after the eruption of the pr
In that year the great crater had been filled up
brim with lava, which had swelled up from
which had consolidated, and had formed a pla
unbroken, except in one spot, where a small co
thrown up by the eruption of scoriæ, and which
in the plain as a small island in a lake.

Eventually this plain of consolidated lava wa
burst into a fissure, which passed from north-e
west. Along the line of this fissure very nu
cones were formed, and which, as represented
emitted vapour and scoriæ. It was supposed,
these smaller cones began to be formed by a
below, which caused an upheaval of the beds
viously resting horizontally; and that this upheav
until the bed snapped, and allowed the gases an
escape through the vent in the centre. This sup

ot established by fact. In 1834, a great subsidence of the va that had filled the crater took place; in consequence of hich the whole formation of the central cone was brought to ght. It was then seen that the cone had not been formed by pheaval, but by the fall of cinders and ashes around the

Fig. 16.

he structure of a conical vent after volcanic activity has ceased, as seen in the crater of Vesuvius.

outh of the vent. Its structure after the volcanic fire had en withdrawn is represented in fig. 16., which may be re-arded as its skeleton.

The facts stated, and the principles involved in this Lesson, ill be found of importance, when you come to study the geo-gical theory about dikes of lava or basalt, which are discovered the masses, or in the beds, of other rocks.

You will find it a good intellectual exercise to imagine that . 16, instead of representing a small fumerole, represents a lcanic mountain itself. It was once filled with melted matter, t that is withdrawn, and the volcano has become extinct. It s once covered and enveloped by sand and scoriæ; but since en, rains and torrents have washed away the loose sand d volcanic mud, and only the more hard and the more solid aterials of the mountain is left.

Mountains of this structure are constantly met with, not ly in France and Sicily, but in England, Scotland, and Ire-nd, as you will find in the progress of these Lessons.

LESSONS IN ENGLISH.—No. IX.

By JOHN R. BEARD, D.D.

PREFIXES *(continued)*.

Apo, of Greek origin, *from*; as, apostle (apo, *from*, and stello, *send*); that is, a person sent from one to another, a messenger. *Apo* has the force of our English prefix *un*, as in *un*cover. This its exact import in the word apocalypse (apo and kalupto (Greek), *conceal*), *a revelation*; that is, according to the Latin, an *un-iling*; and according to the Greek, an *uncovering*.

> "O for that warning voice which he who saw
> Th' *apocalypse*, heard cry in heaven aloud." *Milton.*

Arch (*ch* sounded like *k*) of Greek origin (from arché, *a begin-ing*), in the forms *arch*, *archo*, and *archy*, denotes the *origin*, the *ead*, and hence *government*. It is the second syllable in mon*arch*, on*archy*; and as the letter which in Greek represents the *ch* is ronounced like *k*, *arch* thus introduces a Greek pronunciation into ur tongue. Hence you may learn the error which pronounces *rchitect* (from arché, *first*, or *head*, and tekton, a *maker* or *uilder*), as if its *arch* was pronounced like the monosyllabic word *rch*; that is, the *arch in a building*.

Besides a *type* and an *antitype* theology recognises an *archetype*, r *original type*, an original mould or model, in which, in virtue of hich, and after the likeness of which, all created beings were rmed, as was taught by the Greek philosopher Plato.

"There were other objects of the mind, universal, eternal, immutable, hich they called original ideas, all originally contained in one *archetypal* mind or understanding, and from thence participated by inferior minds and souls."—*Cudworth.*

This word *arch* (from arché) is found also pronounced in the ordinary English manner, as in *arch*bishop,—that is, a *chief* bishop, the chief bishop of a province. In its signification of *chief* it is used also to denote something questionable, bad, or humorous.

"Doggett thanked me, and after his comic manner spoke his request with so *arch* a leer that I promised," &c.—*Tatler.*

"'Come, tell us honestly, Frank,' said the squire with his usual *archness*, 'suppose the church, your present mistress, drest in lawn sleeves, on one hand, and Miss Sophia, with no lawn about her, on the other, which would you be for?'"—*Goldsmith.*

Auto, of Greek origin, equivalent to *self*, is found in autocrat (from *auto* and Gr. kratia, *power, government*), one who governs of himself and by himself; hence *autocracy* is arbitrary power, despotism.

"The divine will is absolute; t is its own reason; it is both the producer and the ground of all its acts. It moves not by the external impulse, or inclination of objects, but determines itself by an absolute *autocracy*."—*South.*

Be, of Saxon origin, in the forms *be* and *by*, connected probably with the verb *to be* and the preposition *by*, denoting the active power or agent, as a prefix, performs the part of an intensive, and increases, sometimes, in a bad sense, the inherent import of a word; e. g.—*be*loved; *be*daub; *be*smear; *be*praise. In other cases, it seems to do little more than aid in forming words; as an adverb out of an adjective; as *be*hind (hind, hinder); *be*fore; *be*low: *be*neath. The adverb *be*times (*early*) is made up of *by* and time, by-time; that is, *in time*.

"He that goes out *betimes* in the morning, is more like to dispatch his journey than he that lingers till the day be spent."—*Bishop Hall.*

By means also, *near*; as, "stand *by me*."

"And as he (Jesus) passed *by* he saw Levi" (Mark ii. 14).

Hence the phrase *by and by* denoted *immediately*, as may be seen in Mark vi. 25; in which, and in other passages of Scripture, it is the representation of a Greek word which signifies, *straightway, forthwith*. The repetition of the *by* may have had emphasis for its object. Hence is explained the word *by-stander*; that is, one who stands near. At present, *by and by* seems in conversation to intimate some little distance of time from the actual moment.

Bene, a prefix of Latin origin (from bonus, *good*, bene, *well*), is found in union with words of Latin origin; thus with facio, *I do*, and its parts facere, factum (in combination a may pass into i), it forms *bene*faction, *bene*fit, *bene*ficial, *bene*ficent; so in union with dico, *I say* (dicere, dictum), *bene* forms *bene*diction, and with volo, *I am willing*, it forms *bene*volent. Hence, one who is benevolent, is one who *wishes* well; and one who is beneficent, is one who *does* well; a benediction, is *a good word*, a blessing; and a benefaction, is *a good deed*, a gift. The opposite prefix is male, *ill* or *evil*. The contrast is well illustrated in these words, where, as in other instances, the old spelling is retained, as offering so many historical facts:

"The kyng willing to show that this *benefit* was to hym much acceptable, and not worthy to be put in oblivion, called this grant of money a *benevolence*, notwithstanding that many with grudge and *malevolence* gave great summes toward the new foūde (found) *benevolence*."—*Hall*, "Edward IV."

Bi, in the forms of *bi* and *bis*, of Latin origin (bis, *twice*), has in English the force of *two* or *twice*; *bi*ped (pes, Lat. a *foot*), *two*-footed; *bis*cuit (cuire, Fr. *to cook*), *twice-cooked*.

"The inconvenience attending the form of the year above mentioned, was in a great measure remedied by the Romans in the time of Julius Cæsar, who added one day every fourth year; which (from the place of its insertion,—viz. (namely), after the sixth of the calends of March) was called *bis*sextile or leap-year."—*Priestley*, on History.

Cata, of Greek origin (kata, Gr. *down*), properly denotes motion in a downward direction, and appears in the word *cata*ract (from Gr. kata and regnumi, *I break*), which, according to its derivation, signifies a *breaking-down*; that is, of the rock which leads to a downfall of water. This prefix is found in other words of Greek origin, as in *cata*clysm (from Gr. kata and kludsein, to *waste away*), a term applied to the deluge.

"The *catacombs* are subterranean streets or galleries from four to eight feet in height, and from two to five in breadth, extending to an immense and almost unknown length, and branching out into various walks under the city of Rome)."—*Eustace*, "Italy."

Cent, of Latin origin, from centum, a *hundred*, is found in *cent*enary, a *hundred* or hundredth; *cent*uple, a *hundred-fold*; *cent*urion, a commander of a *hundred* soldiers in the Roman army. The old Saxon word, *hundredor*, may be compared with *centurion*.

"Hundredors, aldermen, magistrates, &c."—*Spelman*.

The import of hundredor or hundredor may be learnt from the following words, describing the ancient civil division of England for the purpose of government.

"As ten families of freeholders made up a town or tithing (a tenth), so ten tithings composed a superior division, called a hundred, as consisting of ten times ten families."—*Blackstone*, "Commentaries."

Circum, of Latin origin (circus, Lat., *a circle* or *ring*), signifies around, as in *circum*stances (from circum, and sto, Latin, *I stand*), literally *the things which stand around you*; what has been called "a man's surroundings." *Circum* enters into the composition of many words; e. g., *circum*navigation, *circum*locution, *circum*spect, *circum*scribe, &c.

"The *circum*scription of a thing is nothing else but the determination or defining of its place."—*More*, "Soul."

Cis, of Latin origin, signifying *on this side of* (Rome being considered the centre), is found in *cis*alpine, *this side of the Alps*, in opposition to *trans*alpine, on *the other side of the Alps*; *Gallia cisalpina* was what we call Lombardy; *Gallia transalpina*, was Gaul or France.

Co, of Latin origin (cum, *with*), occurs in the forms *co*g, *col*, *com*, *con*, *cor*.

Co, as in *co*alesce (from co, and alco, Lat. *I grow*), to *grow together*; it is found in the derivatives *co*alescence, *co*alition.

"No *coalition* which, under the specious name of independency, carries in its bosom the unreconcilable principles of the original discord of parties, ever was or will be, a healing coalition."—*Burke*, on the Nation.

Cog, as in *cog*nate (from cog, and natus, Lat. *born*), *born with*, of the same family or kind; *cog* is found also in *cog*nition (Lat. cum, *with*, and nosco, *I know*), *knowledge*; a means of knowing, a *cog*nizance or token;

"For which cause men imagined that he gave the sunne in his full brightness for his *cognisaunce* or badge."—*Hall*, "Henry IV."

Col, as in *col*loquial (Lat. cum, *with*, and loquor, *I speak*), *relating to conversation*; as also in *col*lusion (from col, and ludo, Lat. *I play*), a *playing together*; that is, to deceive.

"Well, let us now leve the cloked *collusion* that remayned in France, and return to the open dissimulacion which now appeared in Englande."—*Hall*, "Henry VI."

Com, as in *com*memorate (from com, and memor, Lat. *mindful*), to *keep in mind*, to *recall to mind*; found in *com*mensurate, *com*minute, *com*mute, *com*pact, &c.

"A different spinning every different web
Asks from your glowing fingers; some require
The more *compact*, and some the loser wreath."
Dyer, "Fleece."

Cor, as in *cor*rect (from cor, and rego, Lat. *I rule*), and *cor*respond, *cor*rode, *cor*rupt, *cor*rugate (from cor, and ruga, Lat. *a wrinkle*).

"The full lips, the rough tongue, the *corrugate* cartilaginous palate, the broad, cutting teeth of the ox, the deer, the horse, and the sheep, qualify this tribe for browsing upon their pasture."—*Paley*, "Natural Theology."

Contra, of Latin origin (contra, *over against*), as in *contra*band (bannum, low Lat. *a decree, law*), *against the law*, smuggled; and in *contra*dict, *contra*ry. Contra appears in another form,—namely, *counter*, *counter*feit (from counter, contre, and faire, Fr. *to make*), and in *counter*pane, *a covering*.

"On which a tissue *counterpane* was cast,
Arachné's web the same did not surpass,
Wherein the story of his fortunes past,
In lively pictures neatly handled was."
Drayton, "The Barons' Wars."

CO-INSTRUCTION SOCIETIES.

It appears that societies of this kind have existed in the north of Scotland for years past. We have now lying before us the second annual report of the Aberdeen and Banffshire "Mutual Instruction Union." This union consists of a number of associated classes, in the districts which give name to the union, and its object is to cultivate friendship and co-operation among all, and to promote the establishment of struction Classes, in favourable localities. The u interfere with the management of the classes; it co gates from the classes, a committee formed fro gates, and office-bearers, who meet annually in gress. The union offers prizes for the best essays subjects, such as "Female Education and Train Importance of Provident Habits,"—or "The A Mutual Instruction."

From this report, there appears to be fourteen struction Societies in connexion with the Union numbered 530 members from the commencem career (1846), and have now 805 members on average attendance being 288. Nearly 1,000 es read since their commencement to the members and they have nearly 1,000 volumes in their li branches taught are chiefly reading, writing, a but some possess galvanic batteries and appara geological collection; and others a microscope. are chiefly of the humbler class, and it is highly them that such an amount of good seems to be them by this means.

Considering that about half of these mutual only once a week, and the other half but once seems wonderful that they have been able to manner they have done. The proportion of th the roll which consists of agriculturists is 149, an 87; the rest are various. We give the following the report of one of the societies recently adm union:—

"Soon after its commencement the number of dually increased, and, during the first summer, t were carried on with great spirit and energy. As it to the extension and influence of the Class, to affor opportunity of seeing how its proceedings were public meetings were held,—one soon after its comm the other before the harvest vacation. On both th two select Essays were read in the presence of audience, and a good deal of interest was seeming Afterwards a course of lectures was delivered, in the 'Class,' during each of the two successive wi tendance at these was sometimes upwards of two following summer, however, the 'Class,' instead with a zeal and an animation equal to that of began to manifest symptoms of decline. This ing to the removal of several of its ablest mem locality. Nevertheless, the 'Class' continued conduct its business, with the usual regularity. In a revival was experienced—the cloud which dimme seems altogether to have passed away—it now has rishing appearance ever manifested, and, what augu permanence of this state of things, is, that most of t "*residenters*" in the district. I conceive it to be sition to a Class to possess a set of chemical apparatus similar, which would tend to keep up a spirit of inter fairly established, and its benefits be fully appreciat have lately been revised, and fines introduced, with of checking irregularity of attendance. A good mat been brought forward on religious subjects, but the subjects of a scientific and a metaphysical charac opinion, that more benefit would be derived by 'C they adopt some regular system, in the order of the they took into consideration in their Essays."

The general report, which contains the above e the following just observations upon it:—

There appears to have been a period of decline, s noticed in this extract, in the history of most of the which we are acquainted. The novelty, incident on of such a society, having passed away, the ardour had connected themselves with it, partly from this partly expecting to find in it a royal road to learn intellectual California, where the pure gold of kno be had with comparative ease—their ardour (we say and their attendance at the meetings becomes irr education—the grand object of our societies—even aids which mutual instruction supplies, is not to under such conditions as these gentlemen have supp degree of mental exertion must be made—reading composition must be engaged in, to some extent who continue any length of time members of our soci is for some time, in the parties we have mentioned

going on between the innate mental inactivity, and the thirst for knowledge, excited by attendance at the meetings; and according as the one or the other of these antagonistic principles obtains the mastery, so will those who are the subjects of this contest, meet no more with their fellow-members, or *continue* to go onwards. The loss sustained in this latter case, is, to the individual withdrawing, although he may esteem it lightly, really a heavy one; to the Society which he leaves it is simply *numerical*, and ought to exercise no discouraging influence on the rest of its members. It does happen sometimes, as is noticed in the extract, that the decline is caused by the removal from the locality of some of the more active and able members; but let there be in any society, half-a-dozen young men, devoted to its interests, and determined, under every discouragement, to pursue their efforts at self and mutual improvement, and we hesitate not to affirm, that such a society WILL grow in numbers, in influence, and in usefulness.

That which seemed to be wanting to stir up these mutual instruction societies to active operation we have at length supplied. The reading of the POPULAR EDUCATOR is the very means which should be used to keep all the members together, and to excite them to active exertion. Here is at last food sufficient for every mind; and all that they have to do is to get into a regular system of mutual instruction from its pages. To read a lesson from this work to the assembled class, to discuss its merits with the class, to give your own opinion, and to hear their opinions on any given subject or question, is the way to create a lively interest in the minds of all. While this is going on in the class, you are learning something of real value, something that will be of the greatest use to you through life. We hope these societies will take these hints in good part, and act upon them at once; and, when they have made a fair trial, we have no fear of the result. We shall be glad to hear from them at a future period.

SOLUTIONS OF PROBLEMS AND QUERIES.

Query 3, *p.* 223.

THE parties in this question are to pay not in direct proportion to their distances from the church, but in *reciprocal* proportion to those distances. Now the *reciprocal* of any fraction is that fraction inverted, and of any integer or whole number is unity divided by that integer. In like manner, the reciprocal of a mixed number is unity divided by that mixed number. The numbers in question, or distances, are 2, $2\frac{1}{2}$ or $\frac{5}{2}$, and $3\frac{1}{2}$ or $\frac{7}{2}$. The reciprocals of these numbers are $\frac{1}{2}$, $\frac{2}{5}$, and $\frac{2}{7}$. It is, therefore, in the proportion of these numbers that the money, £165 5s., is to be contributed. The sum of these fractional numbers is found by reducing them to a common denominator; thus,—

$$\left.\begin{array}{ll} \frac{1\times23\times7}{2\times23\times7}=\frac{161}{322} & \\ \frac{8\times2\times7}{23\times2\times7}=\frac{112}{322} & \text{Sum } \frac{365}{322} \\ \frac{2\times2\times23}{7\times2\times23}=\frac{92}{322} & \end{array}\right\}$$

The sum of these fractions being $\frac{365}{322}$, we have these proportions, or statements, in the Rule of Three,—

$$\begin{array}{l} \frac{365}{322} : \frac{161}{322} :: £164\text{-}5 : £72\text{-}9 \\ \frac{365}{322} : \frac{112}{322} :: £164\text{-}5 : £50\text{-}8 \\ \frac{365}{322} : \frac{92}{322} :: £164\text{-}5 : £41\text{-}8 \end{array}$$

These proportions may be changed into the following, on the principle that quantities have the same ratio as their submultiples, or that if the first and second terms of a proportion have both the same denominator, it may be omitted and the proportion still holds good; thus,—

$$\begin{array}{l} 365 : 161 :: £164\text{-}5 : £72\text{-}9 \\ 365 : 112 :: £164\text{-}5 : £50\text{-}8 \\ 365 : 92 :: £164\text{-}5 : £41\text{-}8 \end{array}$$

The fourth terms in these proportions are found by multiplying their third terms by their second terms, and dividing by their first according to the usual rule. The sum of the *three* fourth terms or shares, when added together, is £164 5s., the proof of the accuracy of the work only when conducted on the right principle.

CORRESPONDENCE.

SIR,—Amongst the many who visited the Great Exhibition, I was one. Surrounded by the specimens of modern art, wonderfully beautiful and perfect, the inventive, or rather imitative, faculties were marvellously stimulated within me, and I thought within myself, *manibus pedibusque aliquid conabor, recte aut secus, facta est alea.* So, perambulating the building with these ideas pleasantly floating in my mind, I chanced to come where some large globes were exhibited, made by Newton, Fleet-street, or somebody else, which arrested my attention. Having felt the want of a pair for a long time, being deterred from buying them, owing to their high price, I determined, on my return to the country, to set about making a pair. I first began a globe three feet in diameter, and got the shell made, an agricultural labourer and country blacksmith being my only assistants; but when this shell was finished, I found it was too large, several doors refusing it admission; even the room in which it was made denied it egress. Well, I made another of 2 feet 1 inch diameter. I agreed with a cabinet-maker to make the stand and horison; and with a brass-founder and engraver to make the meridian and to engrave it. I proposed, by hiring or borrowing a globe of small dimensions, to delineate the surface myself, lay down the countries, and print all the letters with the pen; but when I came to consider the thousands of letters I should have to make, and the great draft it would make upon my time, which I could ill spare, except by detracting from the necessary hours of sleep, I abandoned this part of my undertaking. I said I will buy a printed cover, ready to my hand, and stick it upon my shell, carefully constructed in the spherical form, and made smooth to receive it. Accordingly, I deputed a friend to buy me one in London. He called on three different globe-makers; but, to my great disappointment and sorrow, they each and all respectfully declined selling the cover. They answered the inquiry by saying that they must make the whole globe themselves, otherwise they would make no part of it.

He was shown some fine specimens three feet in diameter, at thirty guineas the pair. This price is monstrous! How could a poor man ever expect to treat himself to such a costly article, however desirous he may be to enlarge the sphere of his knowledge in this direction.

Now, I will presume to state, and that presumption shall be founded in much truthfulness, that an ordinary mechanic, under the guidance of, or with a few hints from, a scientific person, could make just as good a pair, for all practical purposes, as those alluded to, at a much smaller sum, the printing of the covers alone excepted; and assuredly in these days of printing and map-making, when the art has arrived at such perfection, the arrangement of type, to print covers for globes to suit any diameters, is surely not a secret known only to a few of the trade. This is a literary monopoly that should not be allowed to maintain its selfish position.

I have written this letter to solicit your advice and assistance, and shall feel obliged and thankful by your noticing the matter in the "EDUCATOR," in the hope of its attracting the attention of some kind and skilful correspondent, whose suggestions, auxiliary with your own, may enable me to surmount my difficulty. Indeed the instruments manufactured by opticians for scientific purposes are all inordinately high priced; and why they are so it is difficult to assign a reason, sufficiently valid, unless it be to place them beyond the reach of those who are contemptuously styled the *profanum vulgus*. Their manufactured articles realise an enormous profit, say from 6 to 9 hundred per cent. It is true that the manufacture consists of nearly all manual labour; but this labour is performed by mechanics, who do not get extraordinary wages.

OPIFEX.

[We have inserted this letter because we think the author is entitled to consideration for his manly attempt to execute one of the most useful apparatus ever invented for the illustration of the science of Geography. Printed covers for globes ought to be sold with the utmost readiness to any one who chooses to take the trouble to construct them. There can be no reason in the world why they should not, except a wish to monopolise an extraordinary profit. The remarks about the instruments manufactured or sold by opticians are equally true. The progress of knowledge among the lower classes has been greatly retarded by the want of suitable apparatus at a reasonable price. The Society of Arts promised to do something to remove this difficulty; but we have not heard of the success of its attempts. We do not see why the stripes which cover the globes cannot be glyphographed like maps and printed like stereotype. We recommend our friend Mr. Hughes, of Aldine Chambers, Paternoster-row, to turn his attention to this point.]

LITERARY NOTICE.

CASSELL'S SHILLING EDITION OF EUCLID.—THE ELEMENTS OF GEOMETRY, containing the First Six, and the Eleventh and Twelfth Books of Euclid, from the text of Robert Simson, M.D., Emeritus Professor of Mathematics in the University of Glasgow; with Corrections, Annotations, and Exercises, by Robert Wallace, A.M., of the same university, and Collegiate Tutor of the University of London, will be ready with the magazines for August, price 1s. in stiff covers, or 1s. 6d. neat cloth.

ANSWERS TO CORRESPONDENTS.

WILLIAM SMITH: If you take the number of bones in the human skeleton at 198, as stated in the first Lesson on Physiology, and add two-and-thirty for the teeth, that will give you 230, and the few others would bring up the total to about 245, as stated by Dick in his "Christian Philosophy."—W. A.: The reason why the blood congeals after being taken from the body, is this: The fibrine is in a state of *perfect solution* in the circulating fluid, and in this condition it remains so long as it is in motion in the living body. Now it is not the motion that keeps it in a state of solution, for after blood has been drawn from a vein, no kind or degree of motion will prevent its coagulation. Nor does a state of rest within the living body lead to any very speedy or immediate coagulation. This state of solution depends on the vital principle; but what that vital principle is, we are not able to determine. Out of the body this vital power is no longer present with the blood, and the fibrine then passes from the fluid to the solid state.—TRUELOVE: Are you serious in putting your questions? You speak of the diameter of each air-cell in the lungs being "no more than the $\frac{1}{10}$th part of an inch," and so of reducing the whole number of these air-cells to three hundred millions, or one-half *of* what we stated. What do you mean by no more than $\frac{1}{10}$th part of an inch? That is to make each cell nearly as large again as what we asserted, and hence your reduction of the aggregate. But these cells vary from $\frac{1}{100}$th to $\frac{1}{10}$th part of an inch. Now take the mean of these two numbers added together, which is $\frac{1}{125}$th, and having thus made each cell only one-half you supposed, your aggregate will come very near to our six hundred millions.—JAMES BATES is not sufficiently read in archæology to lift himself up into an authority. Dr. Ferguson is not ignorant of the labours of the younger Champollion, and the illustrious men who have followed in his steps. Notwithstanding all that has been done during the last twenty years, we hesitate not to affirm that much more yet remains to be done before any man will be qualified perfectly to read the hieroglyphics of Egypt; and until they are perfectly read, they never can be rightly interpreted. This even Mr. Gliddon admits. Nor he alone. It is the conviction of some of the most learned men of the age.

Z. J. (Liverpool): Your drawings may be made upon common drawing paper, or upon drawing cartridge; the first is best for fine drawings, the latter where bold effect is required. The paper may be stretched on a board, or pasted on canvass or cotton, on a stretching frame, according to circumstances; either will be equally suitable for framing. Sketch your subject with a blacklead pencil, of medium hardness: the distance, trees, &c., very lightly; the buildings and other objects more in detail, and with greater firmness. These hints may suffice; it would occupy a large space to give you full directions.

J. J. H. (Bradford): Query 3, p. 228, wrong. R. YOUNG should buy a Latin Dictionary. We have purchased a very good old one ourselves for a shilling at an old-book shop.—J. GUTHRIE (Kelso): Query 3, p. 228, right in principle; but the sum is £164 5s.—R. R. L. (Lynn): We would give chemistry, but we must not leave any course unfinished; we have so many students working at our national system as it is, and working well.—W. S. BATE (Sheerness): Problems 4, 5, and 6, p. 228, all right; the first is not very correctly worded.—DISCIPULUS (Newbury): The day when the sun reaches the tropic of Cancer, is the longest day; because then the sun is longest above our horizon. This is usually on or about the 22nd of June, but not always exactly on the same day, because about six hours of the sun's annual march or periodic time is neglected every year, till leap year comes round, when 4 times 6 hours, or a day, is added in February, to bring the points of the sun's course exactly to the same days again. But this subject will be more fully and clearly treated in our lessons on astronomy. Riddle's complete Dictionary (Latin-English and English-Latin) is published by Longman, at a guinea and a half. The English-Latin is sold at the half-guinea, and the Latin-English at the guinea. There is a *diamond* Latin-English by the same at four shillings; but a good old Latin-English Dictionary, and sometimes one with both parts, may be had very cheap at an old book-stall. The Latin Key will solve all his difficulties.—R. H. (Bolton): Our lessons in bookkeeping, &c. will be quite in time; let him go on with the English as fast as possible.—A. C. (Blackburn): We think the French the easier language. A few months, hard study will make a tolerable proficient of an intelligent person.—JOHN THURLOW (Minories): Query 4, p. 228, right; but too long.—J. B. (Newcastle-on-Tyne): The difference between a *foot square* and a *square foot* is nothing; but the difference between 3 *feet square* and 3 *square feet*, is 6 square feet; and so of all similar expressions, except where unity or 1 occurs.—J. B. C. (Large): Queries 3 and 4 not rightly solved. Practise the English mode of pronunciation.—LESSUR (Glasgow): Best thanks for his interest in our work, and kind suggestions.—J. BRIDDON (Bonsall): Pronounce the Latin words as if they were English, excepting where final *e* and *es* occurs, and pronounce these as additional syllables; thus pronounce *mare*, the sea, in two syllables like *Mary;* and *dives* in two syllables, thus: *di-ves*.—F. WARNER (Kensington): Query 3, p. 228, wrong.—IRRESOLUTE (Gateshead): Try Latin again, and stick to it; then French.—W. HALSTEAD (Bury): Mere learning by heart is useless; writing out the exercise correctly is best.—ADAMS (Horsforth): Any Latin dictionary than none; see preceding answers. The fourth edition of book is best.—E. S. (Brighton): The number of hours to sleep depends greatly on the constitution; some persons and some less. On an average, seven hours is sufficient may be made six hours in summer, and eight hours in wi retire to rest at ten o'clock in the evening, or as soon after It is best to study in the morning. We quite ag Richard:—

"Early to bed, and early to rise,
Is the way to be healthy, wealthy, and wi

Study Geometry in the morning, and English in the afterno Cheerful conversation at dinner is better than reading employment; and this is a species of exercise of great v to taking exercise, your daily avocation should give enou when you can do it, take a walk in the open air wit friend.—JOHN CURTIS, and AMICUS LITERARUM: A Fr is talked of.—UNE BONNE FILLE: We always judge fo for our readers; but we cannot always give the grounds ment; she must be the reason; true etiquette requires w W. SOUTHERN (Leamington): Query 3, p. 228, not M'CREADY (Hillsborough): There is no rule for all ca Hutton's or Barlow's Mathematical Dictionary, art. Mag S. M. (Zouch): Solution right; go on and prosper; do words, search their meaning; and when you fail, ask us. (Kentish-town): An index to the volume will pr G. B. should read "Tytler's Elements of General Histo tions to the present time, or Keightley's Elements of t both are good works.—AMATOR MATHEMATICAL (Mon 5 and 6, p. 228, right.—LEARNER (Manchester) asks the tion, which our mathematical friends will be so good as A, B, and C, can do a piece of work in 8 days, which in 12 days, and B and C can do in 16 days; in what time it separately?—J. SOWDEN's solutions are all excelle (Leicester): Query 3, p. 228, not right.—H. N. and under a grievous mistake! Dr. Beard's Lessons in Engli the grammar of the language!—ALICE: The "French had by post for seven stamps are not the same as thos but they form a very useful introduction, especially as to tion. Send your address to this office, and you may rely them.—W. C. W. (Rochdale): Query 3, p. 228 wrong.— J. D. (Reading), J. B. (Hulme), JUVENIS DISCIPULUS, and (Kensington): Query 3, p. 228, all wrong.—E. C. HUGH Queries 1 and 4, p. 228, nearly right.—J. D. (Reading Latin Testament is Beza's, or the Latin vulgate.—W. B should buy the "French Lessons," for the pronunci here, price 7d., including postage. Get Tomlinson's "M want an elementary book, and Wallace's "Commercial B QUINTIN PRINGLE (Glasgow): Received.—W. H. (Colne): first.—W. W. J. (Penzance): We recommend him to pr Greville Ewing's Greek Lexicon, and to study the short fixed to it. This grammar is essentially a translation of Grammar originally written in Latin, and is decidedly and simple ever published. Thus armed, after a short begin the study of the Greek Testament, the most import placed in the hands of men, whether for time or eter edition of Ewing's Lexicon is small and cheap, but it ma had.

ONE WHO WISHES TO GET FORWARD: Study French, or English and Geometry. Get the Shilling Euch (Cardiff): *Cur occidis* and *cur occidisti* are both right; it idiom that is in fault: we say *you* when we mean *thou*.—A. (Manchester): We advise him to buy a patent-lever watc to others.—If ARCHIMEDES (Dublin) reads the answers ents, he will find his question answered long ago.—C (Southampton): The Scriptural account of the deluge ordinary reader to imply its universality; geology says proof that nature alone is not sufficient to show to us th our God, is that HE has given us the Bible. The tem Saviour was indeed real, and it was a step in the preparat a substitute and a ransom for us. The first question is an article of faith, and is, therefore, of comparatively sma The last two are highly important, and we hope that our set our readers athinking in the right direction.—G. (Camden-town), secretary to a large body of mechanics advised to study the English language, the Arithmetic, the Geography, &c., in the P. E. He and his friends will get s lessons they want in due time.—GUILLAUMES (London), (Edinburgh), should study both languages if possible.—J (Bradford): The trades and manufactures of England are the "Illustrated Exhibitor."

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LESSONS IN BOTANY.—No. X.

CLASS XIII.—POLYANDRIA.

Plants bearing flowers with *numerous* Stamens, arising from the receptacle.

The receptacle, it should be remembered, is the fleshy expanded body at the bottom of the flower, into which its different parts are inserted.

Monogynia.

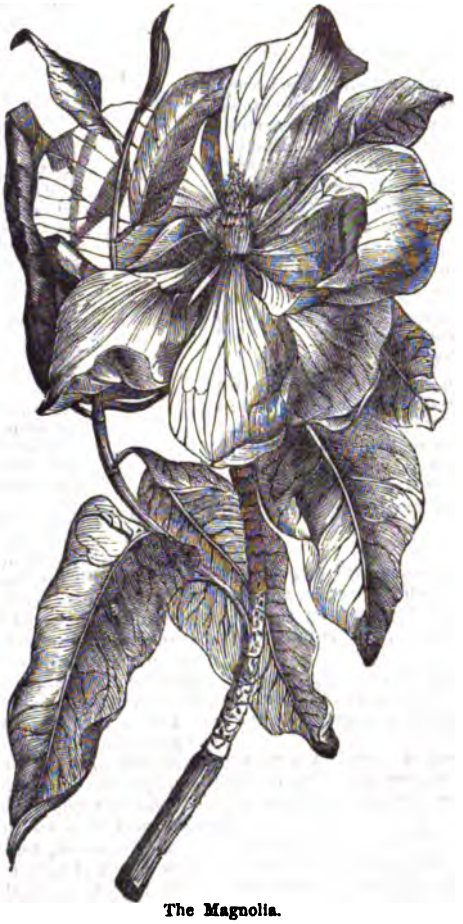
In this order are arranged very dissimilar vegetable products in certain respects, though, of course, agreeing in others, at some of which we must rapidly glance. The herb Christopher, or bane-berry, grows in woods and shady places in Yorkshire, flowers in May and June, in a close cluster, with white petals, and yields purplish black and poisonous berries. Toads are said to be attracted to this plant by its fetid odour.

The common celandine grows in thickets and waste ground, generally near houses; its flowers, in umbels, on long stalks with yellow petals, appear in May and June. The juice of every part of the plant is yellow and acrid; it removes warts, and is said to cure the itch.

Of the horned poppy there are three kinds—the yellow, the scarlet, and the violet. The first produces large flowers, with bright yellow petals, in July and August, and grows near the sea-coast. The scarlet one springs up there also, with its petals of that colour, with a black spot at its base, appearing in June and July. While the violet is found in corn-fields, in Norfolk and Cambridgeshire, and puts forth its large violet-blue petals in May and June. Still more numerous are the diversities of the common poppy. The field-poppy was named by the Greeks the corn-rose, from its growing among grain; and on this account it was considered sacred to the goddess Ceres, whose garland was formed of ears of corn and the red poppy. It was offered to her, in her rites, by pagans, and she was sometimes represented as holding poppies in her hand; and how acceptable was this plant supposed to be to this fabled divinity, that one of her names was derived from it. The name *papaver* is said to be derived from the Celtic *papa*, signifying pap,—the soft food given to infants, among which it was usual formerly to boil poppy-seeds, in order to induce sleep. We have six wild species, found sometimes on hedge-banks and road-sides; but we must look chiefly to the fields for the

> "Corn poppies, that in crimson dwell,
> Called head-aches, for their sickly smell."

The long smooth-headed poppy, with light scarlet petals, flowering in June and July, is not rare among the corn. In time, the flowers of the long prickly-headed poppy may be observed, distinguished from the other kinds by its narrow petals. Like the common scarlet poppy, it is slightly narcotic, and the foliage of both species has been used as a culinary vegetable. In England, the scarlet flowers of our wild poppies are collected and made into a syrup, which is used in soups, porridge, and gruel. *Rhœas* added as the specific name,—*papaver rhœas* is derived from the Greek word "to flow," or "fall,"—and is well suited to describe these plants, as the blossoms of all the poppies are very fragile. The round rough-headed poppy, found in some of our chalky and sandy fields, is scarce. A yellow poppy grows in rocky places in Devonshire, Wales, and Ireland; and in some of the corn-fields of England, particularly in Cumberland and Westmoreland, a white poppy may be observed.



The Magnolia.

Pliny states that the Romans made incisions in the head of the poppy, after it had done flowering, and caught the liquid on wool, unless it ran in small quantities and became a gum, in which case it was gathered by the thumb-nail. In the time of this writer, opium appears to have been much used; he says he has known many die in their sleep from taking this medicine, and he names some who, by its means, committed suicide; but he observes, moreover, that physicians had discovered in opium many valuable properties. Of its pernicious and fatal use in this country, there are, unhappily, many examples; but in China, opium is made incalculably destructive.

The white water-lily adorns slow rivers and ponds with its beautiful flowers, in the months of July and August. The calyx is composed of four large leaves, coloured on the upper surface; the petals of the corolla are numerous, often as many as fifteen, and delicately white, so that, in this respect, it has been regarded as the queen of British flowers. One provision for the increase of this plant ought not to be overlooked. As soon as these splendid water-flowers have perfected their fructification, by absorbing their pollen, their long stalks, which always grow in proportion to the depth of the water, in order to raise the corollas above it, refuse their support, and the flowers sink down many feet below the surface.—There are two other kinds of water-lily well-deserving of notice. The yellow water-lily grows in rivers and pools, and flowers in July; the blossoms, which are about two inches in diameter, and of a golden hue, having a strong smell, which has been compared to that of brandy, or some kinds of wine. The lesser yellow water-lily grows in lakes. The flowers, which are of a pale yellow, tinged with green, are scarcely more than an inch in diameter.

The lime or linden, the most beautiful, graceful, and fragrant of our native trees, was well known to the ancient Romans, and is found not only in England, but in most parts of Europe. Several species of this tree have been enumerated, but Mr. Loudon is disposed to class them all as so many varieties of the

Tilia Europea, differing only in the size of the leaves. Evelyn says in his "Sylva:"—"It is of all others the most proper and beautiful for walks, as producing an upright body, smooth and even bark, ample leaf, sweet blossom, the delight of bees, and a goodly shade at the distance of eighteen or twenty feet. Besides its unparalleled beauty for walks, its other perfections are—that it will grow in almost all gardens; that it lasts long; that it soon heals its scars; that it affects uprightness; that it resists a storm; that it seldom becomes hollow."

The flowers, which are of a greenish-white colour, in loose panicled cymes, and come forth in June and July, are very abundant, and larger than those of most other timber-trees. Cowper has alluded to

"The lime, at dewy eve diffusing odours;"

in a fine, calm summer's evening, the perfume they emit is fragrant beyond expression, which led Keats to say,—

"Grateful the incense of the lime-tree bower."

Pliny speaks of

"Lime-trees for a thousand uses sought;"

but these are far beyond our present enumeration. The honey obtained from the flowers of the lime is said to be the finest in the world. The fruit of the linden-tree, when mixed with the flowers, produces a paste not unlike that of cocoa. Evelyn says, "the berries, reduced to powder, cure dysentery, and stop bleeding at the nose. The distilled water is good against the epilepsy, apoplexy, vertigo, trembling of the heart, and gravel." Schroder recommends a mucilage of the bark for wounds; and adds that the juice of the leaves fixes colours. And to mention only one other use of this beautiful and valuable product of the vegetable kingdom:—

"——— Smooth linden best obeys
The carver's chisel; best his curious work
Displays in all its nicest touches."

The hoary dwarf rock-rose grows on elevated rocks, and in mountainous pastures in Wales and in the north of England: its petals, inversely egg-shaped, and of a bright yellow colour, appear in May and June. The common rock-rose is a shrub, growing in hilly pastures, on gravelly soil, which flowers in July and August. The white mountain rock-rose is a rare plant, sometimes found in Somersetshire and Devonshire.

PENTAGYNIA.

The entire-leaved pœony has stems about two feet high, simple, round, and smooth; flowers with crimson petals, almost four inches broad; and a knobbed root. It grows on islands in the Severn, and flowers in May and June, but is not truly wild.

The stem of the field larkspur is nearly two feet high, erect, leafy, and branched. It grows in corn-fields, and flowers in July. A good blue ink, it is said, may be obtained from the juice of the petals.

Common wolf's-bane, or monk's-hood, is found in several places in England, though not truly native, and flowers in June and July. The stem, which is erect and leafy, terminates in a cluster of dark-blue flowers.

The common columbine, with its pendulous, purple flowers, appearing in June, grows in meadows, pastures, and thickets. It has an erect stem, two or three feet in height, five capsules of a cylindrical form, and five equal nectaries, situated alternately between the petals. Cultivation frequently increases the number of these nectaries, and diminishes that of the petals. The blossoms of the wild plant are blue, but the garden exhibits them of various hues.

POLYGYNIA.

The wood anemone, though unknown in many parts of Essex, and some other counties, is generally common in England. The ancients called it *anemos*, because its delicate flowers quivered in the fierce breezes of March, and its shining seeds were carried about on the air; and from this word our English name is taken. In France, it retains its old appellation of wind-flower. Though frail when gathered, and dying quickly, the anemone continues longer in bloom than many other flowers. Its blossom is white and star-shaped, and its stem has about the middle, three dark, smooth, green leaves, very beautifully formed, having veins tinged with crimson. The flower, if bruised, will raise a blister on the skin; to cattle, it is poisonous.

There are three other species of wild anemone, blooming during April and May, all beautiful in appearance, but all possessing very acrimonious, and some even poisonous, qualities. One, the pasque-flower anemone, grows in elevated open pastures, especially in chalky soils; the stalks are four or five inches high. The blossom, which is much larger than that of the wood anemone, is very silky, and of a delicate lilac colour.

The lesser celandine, growing in shady places, and common in meadows, flowers in March, April, and May, with petals of a shining, golden yellow. Wordsworth thus expresses his feelings in reference to this humble plant:—

"Pansies, lilies, kingcups, daisies,
Let them live upon their praises;
Long as there's a sun that sets,
Primroses wild have their glory;
Long as there are violets,
They will have a place in story:
There's a flower that shall be mine,
'Tis the little celandine.

"See its varnish'd golden flowers
Peeping through the chilling showers,
Ere a leaf is on the bush,
In the time before the thrush
Has a thought about its nest,
Thou wilt come with half a call,
Spreading out thy glossy breast,
Like a careless Prodigal;
Telling tales about the sun,
When we've little warmth or none.

"Comfort have thee of thy merit,
Kindly, unassuming spirit!
Careless of thy neighbourhood,
Thou dost show thy pleasant face
On the moor, and in the wood,
In the lane,—there's not a place,
Howsoever mean it be,
But 'tis good enough for thee."

Of the crowfoots, there is a very large family, defying all present attempts at description. Among them are the buttercups, with which we are so familiar. There are two species of this plant, both very common in our fields and pastures, which the botanist can readily distinguish, while the difference is seldom noticed by the ordinary observer. The more common of the two, in the pastures near London, and near the seacoasts of Scotland, is the bulbous crowfoot, or buttercup, at once recognised on digging up the plant, from its having a bulbous root, somewhat like a leek or a small onion; while the acrid species, commonly called the upright meadow crowfoot, has a fibrous root, without any bulging. But without digging up the plants, the two sorts may be instantly distinguished by the calyx or cup, which supports the yellow petals of the blossom: this cup having its five leaves upright or nearly so in the acrid sort, and bent downwards in the bulbous species.

It is a common, but most erroneous opinion, that the fine yellow colour of butter in spring is owing to the cows feeding on the buttercups in the pastures, and hence the name borne by these flowers; while the slightest observation will show that they carefully avoid these plants. If we consider the probable intention of Divine Providence in rendering these poisonous plants so common, we infer that it may be to afford protection to the grasses, and other herbage eaten by cattle. For were the whole green sward of the field composed of nothing besides grass, it might be eaten so bare as to destroy the roots, and produce a serious scarcity of forage; whereas, by the mingling of the poisonous buttercups with the grass, the cattle are prevented from grubbing up the latter to so great an extent as to injure its subsequent productiveness as the season advances. This is a very interesting view of the ordinance of God; and might be illustrated by many similar facts.

We add only, in concluding our present Lesson, that to the order of plants now under consideration, belongs that splendid cultivated flower, the magnolia,

LESSONS IN GERMAN.—No. IX.

Section XVIII.

In English the relation of property or possession is denoted by means of PERSONAL pronouns in the possessive case, while in German the same relation is shown by means of a distinct class of words (Sect. 11), called POSSESSIVE pronouns; and these are used not merely in the corresponding case (i. e., the genitive), but in *all* the cases. The German PERSONAL pronoun, therefore, is rarely used in the GENITIVE like our PERSONAL pronoun in the possessive.

DECLENSION OF THE PERSONAL PRONOUNS.

Singular.

N. Ich, I;	Du, thou;	Sie, you;
G. Meiner, of me;	Deiner, of thee;	Ihrer, of you;
D. Mir, to, or for me;	Dir, to, or for thee;	Ihnen, to, or for you;
A. Mich, me;	Dich, thee;	Sie, you.

Plural.

N. Wir, we;	Ihr, you;	Sie, you (§ 57. 6.);
G. Unſer, of us;	Euer, of you;	Ihrer, of you;
D. Uns, to, or for us;	Euch, to, or for you;	Ihnen, to, or for you;
A. Uns, us;	Euch, you;	Sie, you.

Singular.

Masculine.	*Feminine.*	*Neuter.*
N. Er, he;	ſie, she;	es, it;
G. Seiner, of him;	ihrer, of her;	ſeiner, of it;
D. Ihm, to, or for him;	ihr, to, or for her;	ihm, to, or for it;
A. Ihn, him;	ſie, her;	es, it.

Plural of all genders.

N. Sie, they;	ſie, they;	ſie, they;
G. Ihrer, of them;	ihrer, of them;	ihrer, of them;
D. Ihnen, to, for them;	ihnen, to, for them;	ihnen, to, for them;
A. Sie, them;	ſie, them;	ſie, them.

I. The personal pronouns (in the 1st and 2nd persons) are often used reflexively; and are to be rendered by our compounds, myself, thyself, ourselves, yourselves. Ex.: Ich lobe mich; I praise myself. Du lobſt Dich; thou praisest thyself. Wir loben uns; we praise ourselves. Ihr lobt Euch, &c.

II. The reflexive form of the personal pronouns, in the *third* person *singular* and *plural*, is ſich (Latin se), and answers to our objective, himself, herself, itself, themselves; its gender and number being determined by the *subject* of the *verb*. Ex.: Er erlaubt ſich; *he* allows (to) *himself*. Sie erlaubt ſich; *she* allows (to) *herself*. Der Knabe lobt ſich; the *boy* praises *himself*. Sie alle loben ſich, THEY all praise themselves, &c. (See § 60. 4.)

III. A personal pronoun of *one* gender is frequently translated by one of *another*. Ex.: Der Tiſch iſt gut, aber er iſt nicht groß; the table is good, but *it* is not large. Das Mädchen iſt ſchön, aber ſie iſt nicht fleißig; the girl is beautiful, but *she* is not industrious. Dieſe Feder ſchreibt nicht gut, ſie iſt zu weich; this pen does not write well, *it* is too soft (limber).

Note.—This respects merely the translation. If, for instance, we were to translate the last German sentence according to the German idiom, the English for it would be, "This pen does not write well, SHE is too soft." Now such a rendering would be contrary to the English idiom, and therefore on translating German into English, we try to come as near the English idiom as possible; although it ought to be remembered, that the difference of gender, as referring to the same noun, does never take place in German.

DECLENSION OF Niemand (*with examples of each case*).

N. Niemand; nobody. (§ 59. 3.)	Niemand iſt hier; nobody is here.
G. Niemands; of nobody.	Niemands Hut iſt hier; nobody's hat is here.
D. Niemandem; to nobody.	Es iſt Niemandem nützlich; it is profitable to nobody.
A. {Niemand, or Niemanden;} nobody.	Ich ſehe Niemand; I see nobody.

IV. Verbs of the New Conjugation (See § 79. 1. 2.) form the *Imperfect* by adding to the root the suffix te, for the *first* and for the *third* person *singular*: the corresponding parts in the *plural*, being made by the addition of the letter n. The *second* person singular is formed by adding to the root the letters teſt: the *plural* of the same person taking tet.

The root is found by removing the letters en from the form of the present infinitive: thus, from loben (to praise), take en, and you get lob, which is the root.

The *Present Participle* is made by adding to the root the syllable end; as, lob-+-end, praising.

The *Perfect Participle* is produced by prefixing to the root the augment ge (§ 69. 2. 4.) and suffixing the letter t (sometimes et): thus, ge-+-lob-+-t, praised.

The *Perfect tense* is formed by combining the perfect participle with the *present* indicative of the auxiliary haben or ſein, to HAVE or to BE: as, ich habe gelobt, I have praised.

The *Pluperfect* is formed by combining the perfect participle with the *imperfect* of haben or ſein: as, ich hatte gelobt, I had praised.

The *First Future* is formed by adding to the *present* of the infinitive, the present indicative of the auxiliary werden, to BECOME: as, ich werde loben, I shall praise.

The *Second Future* is formed by adding to the *perfect* of the infinitive, the present indicative of the auxiliary werden: as, ich werde gelobt haben, I shall have praised.

CONJUGATION OF THE REGULAR VERB loben IN THE INDICATIVE.

Infinitive.	*Participles.*
PRES. Loben, to praise;	PRES. lobend, praising;
PERF. Gelobt haben, to have praised;	PERF. gelobt, praised.

PRESENT TENSE.

Singular.	*Plural.*
Ich lobe, I praise;	wir loben, we praise;
Du lobſt, thou praisest;	ihr lobet, you praise;
Er lobt, he praises;	ſie loben, they praise.

IMPERFECT TENSE.

Ich lob-te, I praised;	wir lob-ten, we praised;
Du lob-teſt, thou praisedst;	ihr lob-tet, you praised;
Er lob-te, he praised;	ſie lob-ten, they praised.

PERFECT TENSE.

Ich habe gelobt, I have praised;	wir haben gelobt, we have praised;
Du haſt gelobt, thou hast praised;	ihr habet gelobt, you have praised;
Er hat gelobt, he has praised;	ſie haben gelobt, they have praised.

PLUPERFECT TENSE.

Ich hatte gelobt, I had praised;	wir hatten gelobt, we had praised;
Du hatteſt gelobt, thou hadst praised;	ihr hattet gelobt, you had praised;
Er hatte gelobt, he had praised;	ſie hatten gelobt, they had praised.

FIRST FUTURE TENSE.

Ich werde loben, I shall praise;	wir werden loben, we shall praise;
Du wirſt loben, thou wilt praise;	ihr werdet loben, you will praise;
Er wird loben, he will praise;	ſie werden loben, they will praise.

SECOND FUTURE TENSE.

Ich werde gelobt haben, I shall have praised;	wir werden gelobt haben, we shall have praised;
Du wirſt gelobt haben, thou wilt have praised;	ihr werdet gelobt haben, you will have praised;
Er wird gelobt haben, he will have praised;	ſie werden gelobt haben, they will have praised.

IMPERATIVE.

Lobe du, praise thou;	lobet or lobt ihr, praise you;
Lobe er, let him praise;	loben ſie, let them praise.

The preceding paragraph must be well understood and the verb thoroughly mastered, before proceeding any further. The pupil will derive much benefit from working out other verbs after the above model. The vocabularies will furnish sufficient examples.

V. In compound tenses, the participle or infinitive is put at the end of the sentence, whether affirmative or interrogative. Ex.: Ich hatte den Brief gelobt, I had praised the letter; Hatte ich den Brief gelobt? had I praised the letter? Wen werden Sie loben? whom will you praise? Werden Sie ihn gelobt haben? will you have praised him?

VI. In English we have *three* forms for the present tense; he

praises, he *does praise*, he *is praising*. The German has for all these but *one* form: er *lobt*. The present, besides its ordinary use, is often used in relation to *past* time, when the period referred to is still *unfinished*. Ex.: Ich wohne ſchon ein ganzes Jahr in Berlin, I reside (have resided) already a whole year in Berlin. Ich habe das Pferd nur eine Woche, I have (had) the horse only a week. The present is moreover often used for the *future*. Ex.: Morgen gehe ich nach Wien, to morrow I am going to Vienna. Ich gebe Ihnen einen Gulden für das Buch, I (*will*) give you a florin for the book.

VII. The *imperfect* is used to denote *continuance* of being, action or passion; as, die Schlacht bei Leipzig dauerte drei Tage, the battle near Leipsic continued three days. Hence it comes, also, to be used in expressing what is customary or habitual; as, Die alten Deutſchen jagten gern, und führten oft Krieg mit den Römern, the ancient Germans were fond of hunting, and often carried on war with the Romans. Kindred to this, is its use in cases where one action or event is to be represented as simultaneous* with another: as, er ſtarb, als er auf dem Lande war, he died, while he was in the country; er ſpielte, als ich arbeitete, he played while I worked. (See § 138.)

VIII. The perfect describes an action as finished without reference to another action, and unlike the same tense in English, may be used with an adverb that denotes past as well as present time. Ex.: Er hat ihn gelobt, he has praised him. Er hat ihn geſtern gelobt, he (has) praised him yesterday. Er hat ihn heute gelobt, he has praised him to-day. (See § 139.)

IX. The *second future* is often used in reference to past time to indicate a probability. Ex.: Er wird es gehört haben, he has probably heard it; literally, he will have heard it.

Exercise 18.

Als, as, than;	Junker, *m.* young nobleman;	Seele, *f.* soul;
Arbeit, *f.* labour;	Körper, *m.* body;	Sehen, to see;
Aufenthalt, *m.* residence;	Kränken, to grieve;	Sommer, *m.* summer;
Bauen, to build;	Kühl, adj. cool;	Stadt, *f.* city;
Begleiter, *m.* attendant;	Lehren, to teach;	Stärken, to strengthen;
Betrachten, to regard;	Mond, *m.* moon;	Stroh, *n.* straw;
Bote, *m.* messenger;	Nachmittag, *m.* afternoon;	Stube, *f.* room;
Decken, to cover;	Nacht, *f.* night;	Sünde, *f.* sin;
Dorf, *n.* village;	Nähe, *f.* vicinity;	Tapfer, adj. brave, valiant.
Ehe, before;	Perſon', *f.* person;	Täuſchen, to deceive, disappoint;
Einſamkeit, *f.* solitude;	Pflücken, to pluck;	Thau, *m.* dew;
Feld, *n.* field;	Prüfen, to test, prove;	Tröſter, *m.* comforter;
Fiſch, *m.* fish;	Rein, adj. pure;	Trunk, *m.* draught;
Frömmigkeit, *f.* piety;	Roſe, *f.* rose;	Un'gerathen, ill-bred;
Ganz, adj. and adv. entire, whole;	Ruhm, *m.* fame;	Unglück, *n.* misfortune;
Geſchickt', adj. skilful;	Schenken, to present;	Vor, before, from;
Gras, *n.* grass;	Schätzen, to prize, to esteem;	Vor'ſichtig, adj. cautious;
Hören, to hear;	Schicken, to send;	Wachen, to watch;
Jagen, to hunt;	Schmerz, *m.* pain;	Warnen, to warn;
Jugend, *f.* youth;	Schimmer, *m.* glitter;	Welk, adj. withered.

Eine ſchöne Muſik' ſtimmt das Herz froh und heiter.	(A) sweet music (attunes) makes the heart glad and cheerful.
Die Freunde ſuchten mich in dem Garten.	The friends sought me in the garden.
Der Kaufmann hat den Edelſtein ſehr hoch geſchätzt.	The merchant (has) prized the precious stone very highly.
Die Freundin wird dieſen Nach'mittag nach der Stadt kommen.	The friend will come to the city this afternoon.
Er wird die Nachricht ſchon gehört' haben.	He will already have heard the news.

1. Ich liebe das Kind des Nachbars Bruder. 2. Der Vater hat mit dieſem Briefe geſchickt. 3. Ich werde den Freund warnen. 4. Ich habe die ganze Nacht bei dem kranken Bruder gewacht. 5. Die Jäger jagten geſtern Morgen in dem Walde, und werden dieſen Nachmittag in der Nähe des Dorfes jagen. 6. Mein Freund liebte den Ruhm und den Schimmer. 7. Er hat eine Roſe gepflückt und ſie ſeiner Freundin geſchenkt. 8. Ein geſchickter Maurer dieſer Stadt hat dieſes ſchöne Haus gebaut. 9. Napoleon

* Simultaneous—existing at the same time.

ſchätzte den tapferen Soldaten, und nicht den Junker mit ſeinem
Die Arbeiten in meiner Jugend haben meinen Körper geſtärkt
Gewiſſen warnt die Menſchen vor (§ 116. List.) der Sünde.

1. The teacher presented a beautiful book to the ihre
She had deceived her friend. 3. The children have den
(See No. IX. above) grieved the old father. 4.
child grieves (the) father and (the) mother. 5.
Stimme
thy voice in the room. 6. He has probably tested the
ju dem Freunde
before he sent him to the friend. 7. The peasant mit
his house with straw. 8. This misfortune has prob
geſchehen viele
him to be cautious. 9. I have seen many fishes in dem
10. A cool draught strengthens in summer the body das
the withered grass of the field. 11. (The) pain lo
als einen einen
as a comforter, (the) solitude loves it as a co
den
(the) piety as the residence of a pure soul.

Questions. 1. What peculiarities of the
stated in this Section? 2. What is said of ſich?
root of a verb obtained? 4. How are the partic
5. How are the several tenses formed? 6. Can
several participles and tenses of the verb leben?

LESSONS IN PHYSIOLOGY.—No.

MAN.

Our present lesson is to be on the nervous
one of great importance. This system includes
spinal marrow, and the sympathetic ganglia,*
cumulations of nervous substance whose influen
more particularly to the tissues contained within
the body. For a long time, the brain was regard
more than a larger development of the spinal
then the spinal marrow was held to be but a leng
the brain. The fact is, that neither proceeds fro
the two are merely connected, and form indepen
nervous power. No parts of the living body
greater interest than the study of the brain an
Till the time of Sir Charles Bell, it was taken
"that all parts of the nervous system had co
properties belonging to them in common; so tha
sidered alike in function. The brain, includi
marrow, was looked upon as a common store
certain powers—such as that of motion—were
body, and into which others—such as sensation—
the nerves being regarded as the conductors:
formity with that view, it was further supposed
of the brain, or any single nerve, had equal pow
rest of bestowing the numerous properties comm
to the nervous system." This Sir Charles dou
judgment, it was contrary to reason to suppose t
tions, so essentially distinct from each other a
sensation, could belong to the same nerve. Fo
will to move my hand;—this volition or willingnes
the brain, and the force, whatever it is, acts upon
nerve conveys it to the muscle, and the muscle
leads to the motion of the hand. In this instan
proceeds from within to without. But I prick
the impression is received by the nerve expanded
of the finger, is conveyed by that nerve to the
that part of the brain which is the seat of sensa
mind becomes conscious of pain. In this case,
the nervous agency is from without to within. Th

* From the Greek word GANGLION, swelling or tu

causes muscular contraction, passes along a nerve in one direction; and that which causes sensation, in a contrary direction. The question is, can the same nerve perform both functions at once?

It was after years of intense study and application that Sir Charles Bell answered this question. His idea is, that "the nerves of the body possess distinct and appropriate functions, corresponding with the parts of the brain and spinal marrow with which they are connected at their ROOTS; and when a nerve, which appears simple, is found to bestow more than one endowment, it is a sign that that nerve has more than one origin from the brain, and consists, in reality, of several nerves joined together." He maintained that each nerve of sense is limited to receiving a distinct and appropriate impression:—that the nerve of vision can only give ideas of light and colour; the nerve of hearing, impressions of sound; the nerve of smelling, the perception of odours, and so on; and that these special properties depended on each of the nerves of sense having its root in a distinct portion of the brain, provided and adapted for receiving its own peculiar impression. To establish his theory, he took a nerve of the arm, and, tracing it from the arm towards its origin in the spinal marrow, he found that, as it approached that origin, it subdivided into two parts or roots; that one of these roots entered a division of nervous substance distinct from the other; that the root which passed to the posterior division of the spinal marrow had a ganglion or an accumulation of nervous substance upon it, and bestowed sensation alone; while the root which went to the anterior division gave motion alone.

While the great fact was thus brought out that the nerves of sensation are distinct from those of motion, Dr. Marshall Hall laid claim to the discovery of another set of nerves, which he calls the EXCITO-MOTORY, and which have their root or origin in the true spinal marrow; whereas, according to his theory, the nerves of sensation and volition only run along the course of the spinal cord. These excitor nerves have peculiar excitabilities, and pursue their course principally from internal surfaces to the MEDULLA OBLONGATA, or termination of the true spinal marrow; while the motor nerves pursue a reflex course from that medulla to certain muscles. Hence their name. The nerves of sense may act spontaneously, but these are always excited. Besides these two grand divisions, there is a third distribution known by the name of the ganglionic or sympathetic nerves, which are peculiar to the viscera of the chest and abdomen.* Let us try and simplify this a little.

We have the spinal cord, the top of which is called THE MEDULLA OBLONGATA, or the spinal marrow lengthened in its upward course till it becomes united with the brain.

In the brain we have the CERBRUM, or that portion of it which is situated in the front and top of the skull, and which is the *seat of sensation*. We have also the CERBELLUM, or that portion which is situated in the back of the skull, which is divided into two lobes, and which is inseparable from the power of volition.

The nerves arising from these two portions of the brain, and from the spinal marrow, are called CERBERO-SPINAL NERVES. They pass off from the whole length of the spinal cord, at intervals of about an inch from each other, and go in regular succession to the back of the head, the neck, the upper extremities, the whole trunk, and the lower extremities. Each of these nerves is composed of two roots; one for motion, and the other for sensation.

In addition to these, there is THE FIFTH CERBRAL NERVE, whose larger root confers sensation on all parts of the head not supplied by the superior spinal nerves; while its lesser root gives the power of action to those muscles which we employ in mastication or the chewing of our food.

Then come THE EXCITO-MOTORY NERVES, which arise from the medulla oblongata, or true spinal marrow. The excitement passes from some internal surface to the medulla or marrow, and from thence the motive-power is conveyed to the muscles to be affected and moved.

Lastly, comes THE SYMPATHETIC SYSTEM. This consists of ganglia, or accumulations of nervous substance, scattered among the viscera of the abdomen, and intended to unite in sympathy those parts by which the various organic functions are performed; such as secretion, absorption, circulation, assimilation of the food, the growth and decay of the body, and so on. But this is a point which we leave for the present.

Sir Charles Bell was of opinion, that there are certain nerves which pass off from a circumscribed central portion of the nervous system—the medulla oblongata—and diverge to different parts of the head, neck, throat, and chest,—or those structures which together form a mechanism for respiration—that such an arrangement is not to be found in the lowest animals, but would seem to be a gradual development in the animal kingdom, until in man it becomes the organ of Voice and Expression. These he named RESPIRATORY NERVES. Of his numerous examples, we select the two following:—

"Observe the condition of a man convulsed with laughter, and consider what are the organs or system of parts affected. He draws a full breath, and throws it out in interrupted, short, and audible cachinnations; the muscles of his throat, neck, and chest, are agitated; the diaphragm is especially convulsed. He holds his sides, and, from the violent agitation, he is incapable of a voluntary act. It is impossible to avoid the conclusion, that it is the respiratory organs and their muscles which are affected during the paroxysm of laughter.

"There is no state of suffering from which we can so well infer the nature of the agitation of the frame as from hydrophobia. The patient being sensible of his condition; and calm, and aware of the experiment which is to be made upon him by his physician when he calls for a glass of water, cannot resist the influence of the disease. He shudders—his face assumes an expression of extreme horror and alarm—convulsive gulpings take place in his throat;—he flies to some support, and clings to the bedpost in an agony of suffocation. This I have witnessed in a powerful man. I have had the pain of seeing the disease in a girl of eighteen. The irritability of the skin being increased to an awful degree, so that the touch of her long hair falling on the naked body excited the paroxysms. These recurred with a sense of choking, with sudden and convulsive heavings of the chest, a shuddering, and catching of the muscles of breathing, and an appalling expression of suffering. The paroxysms in such a case becoming more frequent and severe, finally exhaust the powers of life. In these convulsions, it is the nervous and muscular systems belonging to the natural function of respiration which are affected; and as they are also the organs of expression, the condition is seen, not only in the countenance, but in the throat and chest, to be that of extreme horror."

Connected with this nervous system we have a particular structure made up in part of small vesicles, and in part of minute fibres. The vesicles are found in masses, and mingle with the fibrous structure. These masses constitute nervous centres, being the organs in which it is supposed that the nervous force is generated, and from which that force is sent forth and distributed in the body. The fibres form the nerves or cords of communication, which connect the various nervous centres. They convey nervous force to the several parts of the body in which they are distributed, and transmit to the nervous centres those impressions which are made by external stimuli.

These nerve-fibres are full of nervous matter, are arranged in parallel or interlacing bundles, and the whole nerve is enclosed in a sheath or tube, which is composed externally of a very delicate transparent membrane. Within this tube is a hollow cylinder, of a substance which differs from the matter that occupies the centre of the tube—the centre being occupied by a transparent substance, which is the essential component of the nervous fibre. The diameter of these little tubes is between $\frac{1}{80000}$th and $\frac{1}{4000}$th part of an inch. It may, however, be as much as $\frac{1}{1500}$th, and as little in some few instances as $\frac{1}{12000}$th. They are larger in the nerve-trunks than in the brain.

Now what is the purpose, design, or end of this grand nervous system? It may be that it has little to do with those operations or functions which go to make up the vegetative or organic life of the animal. For example:—it may have little to do with the reduction of food in the stomach, since that is a purely chemical operation produced by the solvent power of the gastric juice. It may have nothing more to do with the process of absorption, this being a purely vegetative operation,

*Viscera, from the Latin VISCUS, the bowels or entrails, but including the heart, liver, and lungs. ABDOMEN is also from the Latin—and signifies the belly.

by which the nutritive materials are taken into the respective vessels:—nor with the process of assimilation, which is effected by each cell taking up into itself its own appropriate element:—nor with the circulation of the blood, since the contractions of the heart result from its own inherent powers, so as to continue these contractions after it has been completely detached from the body:—nor with the act of nutrition, since, as in the case of the embryo itself, every tissue draws from the circulating blood the materials for its continued growth and development, by incorporating these with its own substance:—nor with the process of secretion, since the separation of certain products from the blood, is effected by cells situated upon free surfaces:—nor with the interchange of oxygen and carbonic acid in the function of respiration, which takes place between the external atmosphere and the venous blood when brought into mutual relation in the lungs:—nor with the function of reproduction, which is effected by the inherent powers of the parts concerned, at the expense of the materials supplied by the blood. Still, there must be in all animals various accessory changes which are requisite for their growth and development, and which can be secured only by the peculiar powers with which animals are endowed.

Thus, to commence with digestion. Dr. Carpenter says:—"This preliminary process, which the nature of the food of the plant renders unnecessary for *its* maintenance, can only be accomplished [in the animal] by the introduction of the food into a cavity or sac, in which it may be submitted to the action of the solvent fluid. The operation of *grasping* and *swallowing* the food, whenever it is performed, is accomplished through the agency of the nervous system; and if it be checked by the loss of nervous power, the digestive process must cease for want of material. So again, although interchange of gaseous ingredients between the atmosphere and the circulating fluid may take place with sufficient energy in plants and lower animals, through the mere exposure of the general surface to the atmosphere, yet we find that in all the higher animals, certain movements are requisite for the continual renewal of the air or water which are in contact with one side of the respiratory surface, and of the blood which is in relation with the other—for the direction of which movements, a NERVOUS SYSTEM is requisite. In the excretory processes, moreover, the removal of the effete matters from the body can only be accomplished, in the higher animals, by certain combined movements, the object of which is to take up the products that are separated by the action of the proper secreting cells, and to carry them to the exterior of the body, there to be set free; and those combined movements can only be effected by the agency of THE NERVOUS SYSTEM. Lastly:—in the act of reproduction, the arrangement of the sexual organs in animals requires that a certain set of movements should be adapted to set free the germ from the body of the male, and convey it to the ovule of the female; and further, that the ovum should be expelled from the body of the latter in a state of more or less advanced development. For these movements, a special arrangement is made in the construction of THE NERVOUS SYSTEM, and in the application of its peculiar powers."

This does not exhaust the purpose or end of the nervous system. But we must reserve other equally interesting and important facts for our next lesson.

QUESTIONS FOR EXAMINATION.

What are the seats or centres of the nervous system?
What is the relation of the brain and spinal marrow?
Can motion and sensation belong to the same nerve?
In what consisted Sir Charles Bell's discovery?
To what discovery did Dr. Marshall Hall lay claim?
What is meant by excito-motory nerves; and where must we look for their centre?
Whence arise the nerves of sensation and volition?
What do you mean by the ganglionic or sympathetic nerves?
What is the office of the fifth cerebral nerve?
Which nerves did Sir Charles Bell call respiratory, and why did he so name them?
Of what is the nervous system made up?
How do you distinguish between a vesicle and a fibre?
By what is the substance of the nerve protected?
What is the diameter of these sheath-tubes?
What is the purpose or design of the nervous system?
In what way does it assist in the process of digestion, or secretion, or reproduction?
Is there any physical peculiarity in man which is not found in the lowest animals?
Why has man been endowed with the organ of voice and the power of expression in so high a degree?

LESSONS IN ENGLISH.—No. X.

By JOHN R. BEARD, D.D.

PREFIXES (*continued*).

De, of Latin origin, denoting motion downward, has, in combination, the following meanings, being modifications of its original import.

1. *Down*, as in *decrease*, *develop* (Lat. volvo, *I roll*); *dethrone*, to put down a king.

"The question of *dethroning* or cashiering of kings will always be an extraordinary question of state, and wholly out of the law."—*Burke*, "French Revolution."

also, in *debase* (from *de*, and battre, Fr. *to beat*), which originally meant to lower in regard to material things; e. g.,—

"King Edward the Third, in the sixteenth year of his reign, proclaimed that no man should sell wool-fels or leather under such a price, so that these staple commodities might not be *debased*."—*State Trials*, 1606.

The application of the word debase to a moral influence is exemplified in this citation:—

"*Sam.* So let her go. God sent her to *debase* me,
And aggravate my folly, who committed
To such a viper his most sacred trust
Of secresie, my safety, and my life."
Milton, "Samson Agonistes."

2. *From*, as in *debar*, *to bar or keep from*, *to prevent*.

"His song was all a lamentable lay,
Of great unkindness, and of usage hard,
Of Cythia the lady of the sea,
Which from her presence faultless him *debarr'd*."—*Spenser*.

3. *Out*, *thoroughly*, as in *declare* (*de* and clarus, Lat. *clear*), in which the prefix has the form of an intensive; to make clear, that is, by utterance.

4. *Not*, with a force like *un* in *undo*, reversing the sense; as, *decompose*, to do the opposite of composing, that is compounding; *decollation* (*de* and collum, Lat. *the neck*) un-necking, that is beheading, *decorticate* (*de* and cortex, Lat. *bark*), to strip off the bark; *defame*, &c.

"Bless ye men that cursen you, preye ye for men that *defamen* you."—*Wiclif*, "Test. Luke vi."

Deca, of Greek origin, meaning *ten*, is found in *decade*, a period of *ten* years; in *decalogue* (*deca* and logos, Gr. *word*, *discourse*), the *ten* words or commandments of God. *Deca* is found also in the Latin form of *Decem*, as in *decemviri* (*decem* and vir, *a man*), *the Decemvirs*.

"By this time were the ambassadors returned with the Athenian lawes. And therefore the tribunes (at Rome) were so much the more earnest and urgent that once at length they would set on to describe and put down some lawes. And agreed it was that there should be created *decemvirs* above all appeale."—*Holland*, "Livy."

Demi, of Latin origin, in the forms *demi*, *semi*, *hemi*, *a half*, is found in *demy*, in *semibreve*, and in *hemisphere*.

"Thou wouldst make an absolute courtier, and the firm fixture of thy foot, would give an excellent motion to thy gait, in a *semi-circled* farthingale."—*Shakspeare*, "Merry Wives of Windsor."

A farthingale is a hooped petticoat or gown.

Dia, of Greek origin, *through* (so as to divide), is found in *dia*meter, a *measure through*, from one side of the circle to the opposite; in *dia*gonal (from *dia* and gonia, Gr. *a corner* or *angle*), a line drawn from corner to corner; in *dia*logue (from *dia* and logos, Gr. *a discourse*), &c.

Var. How dost, fool?
Ape. Dost *dialogue* with thy shadow?
Var. I speak not to thee."—*Shakspeare*, "Timon."

Dia is abbreviated into *di*, as in *di*chotomy (from *dia* and temno, Gr. *I cut*), *a twofold division*, or class.

"All things reported are reducible to this *dichotomie*: 1, the fountain of invention; 2, the channell of relation."—*Fuller*, "Worthies."

Dis, that is, *dis* in another form, may be rendered by the phrase, *in two directions*, or in different ways, as in *distract* (from *dis* and *traho*, *I draw*); to distract is to draw a person's mind in two or more directions so as to produce confusion and pain. *Dis* is found in these forms; namely, *di*, *dif*, *dis*.

Di, *dif*, &c., as in *di*verse (from *di* and *versus*, *turned*), *turned in opposite directions*, *dif*ferent, opposed;

"And for there is so great *diversitie*
In English, and in writing of our tong,
So pray I God that none miswrite thee,
Ne mysse the metre for defaut of song."
Chaucer, "Troilus."

Dif, as in *difficult*, where the *dif* (*dis*) has a reversing force; *difficult* comes from *dis* and *facilis*; facilis is the Latin for *easy*, the *a* being changed into *i* as is customary in compounds of *facio*; so that *difficult* is equivalent to our *uneasy*; that is, *not easy*.

Dir (of Latin origin), as in dirge, a sacred song, so called from the beginning of the Psalm, "Dirige nos, Domine" (*Direct us, O Lord*), and accustomed to be sung at funerals.

"The raven croak'd, and hollow shrieks of owls,
Sung *dirges* at her funeral."
Ford, "Lover's Melancholy."

Down, of Saxon origin, is the expression of *descent*; hence motion from a higher to a lower level; and hence, perhaps the application to "the downs;" that is, hillocks viewed in relation to their declivities. *Down* was formerly used as a verb.

"The hidden beauties seem'd in wait to lie,
To *doom* proud hearts that would not willing die."
Sir P. Sidney, "Arcadia."

Dun, in Saxon, signifies an elevation, a hill, and even a mountain; it may be the origin of our *ton* as in Brough*ton a fortified height*. *Downs* may be hence derived. In Webster's Dictionary *Downs* are defined as "*ridges of high land*, such as lie along the coasts of Essex and Sussex, in England; hence roads in which ships lie off these hilly coasts at anchor." What is called "Salisbury Plain" is, in the parts near the city, a chalky *down*, famous for feeding sheep.

The student will do well to continue his study of the Saxon elements of our language. For this purpose I recommend to him the poetry of Wordsworth, the simpler portions of which are pre-eminently Saxon. In order that he may have a specimen under his eyes, I transcribe a short poem for the next,

EXERCISES FOR PARSING.

LUCY GRAY.

Oft I had heard of Lucy Gray:
And, when I cross'd the wild,
I chanced to see at break of day
The solitary child.

No mate, no comrade, Lucy knew;
She dwelt on a wide moor,
The sweetest thing that ever grew
Beside a human door!

You yet may spy the fawn at play,
The hare upon the green;
But the sweet face of Lucy Gray
Will never more be seen.

"To-night will be a stormy night—
You to the town will go
And take a lantern, child, to light
Your mother through the snow."

"That, father! will I gladly do:
'Tis scarcely afternoon—
The Minster-clock has just struck two,
And yonder is the moon."

At this the father raised his hook,
And snapp'd a fagot-band;
He plied his work;—and Lucy took,
The lantern in her hand.

Not blither is the mountain roe:
With many a wanton stroke
Her feet disperse the powdery snow,
That rises up like smoke.

The storm came on before its time:
She wandered up and down;
And many a hill did Lucy climb;
But never reach'd the town.

The wretched parents all that night
Went shouting far and wide;
But there was neither sound nor sight
To serve them for a guide.

At daybreak, on a hill they stood
That overlook'd the moor;
And thence they saw the bridge of wood,
A furlong from the door.

They wept, and turning homeward, cried,
"In heaven we all shall meet:"
—When in the snow the mother spied
The print of Lucy's feet.

Half breathless from the steep hill's edge
They track'd the footmarks small;
And through the broken hawthorn-hedge
And by the long stone-wall;

And then an open field they cross'd;
The marks were still the same;
They track'd them on, nor ever lost;
And to the bridge they came.

They follow'd from the snowy bank,
Those footmarks, one by one,
Into the middle of the plank;
And further there were none!

Yet some maintain that to this day
She is a living child;
That you may see sweet Lucy Gray
Upon the lonesome wild.

O'er rough and smooth she trips along,
And never looks behind;
And sings a solitary song
That whistles in the wind.

EXERCISES IN COMPOSITION.

HISTORICAL THEME.

Jacob's Journey to Padan-aram.

Form sentences having in them the following words:—

Compound; simple; primitive; derivative; departure; substitution; suffix; prefix; distinction; ahead; amain; affection; allow; attract; ambiguity; anarchy; antichrist; antechamber; apothecary; autocrat; benefactor; malefactor; conversion; collusion; contravene; dialogue; distraction.

LESSONS IN GEOLOGY.—No. VIII.

By THOMAS W. JENKYN, D.D., F.G.S.

CHAPTER I.

THE ACTION OF VOLCANOES ON THE EARTH'S CRUST.

SECTION IV.

ON CHANGES IN THE ASPECT OF VOLCANIC MOUNTAINS.

YOUR last lesson will have taught you that, in the progress of centuries, very great changes must necessarily take place in the configuration, or in what may be called, the physiognomy of volcanic mountains. Think—how the expansive power of the heat below may be cracking the sides of the mountains into fissures through which streams of lava flow;—how the cliffs or the walls of the crater may be falling into the tremendous chasm as the result of the dilapidating action of fire;—how volumes of lava may be filling up gullies and ravines, and by this means check or change the course of rivers;—how rains, melted snow, and rivulets may be wearing away and removing to a distance, the sand, the dust, and the soil which had settled on the sides of the hill;—and, how these and other agencies may be annually and constantly changing the outward character of mountain ridges. The knowledge of these changes is an important element in the study of geology.

To assist you in the knowledge of these changes, perhaps the best way, instead of distracting you with a variety of illustrations from several volcanoes of the globe, is to fix your attention upon the changes in the aspect of one mountain—such as VESUVIUS.

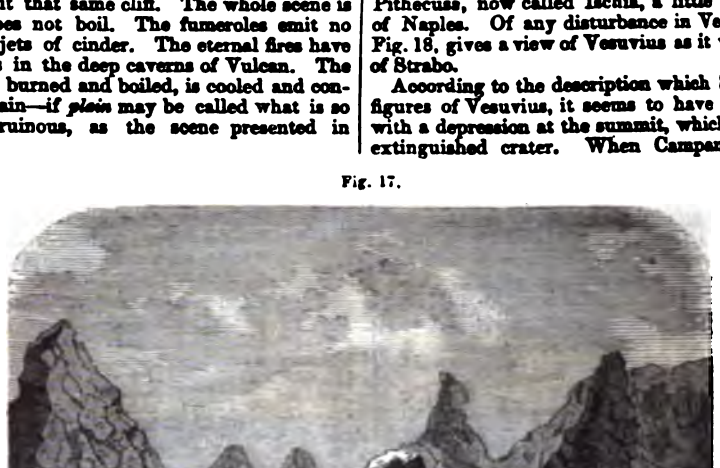
In the last lesson you were placed upon a safe ledge of volcanic rock which overhung the tremendous crater, and from which you could command a view of the burning lake, and of

the conical formation of fumeroles. In the present lesson, imagine that some years or generations shall have passed away, and that then you revisit that same cliff. The whole scene is changed. The lava does not boil. The fumeroles emit no volumes of vapour, or jets of cinder. The eternal fires have retired to their retreats in the deep caverns of Vulcan. The surface, where the lava burned and boiled, is cooled and consolidated into a firm plain—if *plain* may be called what is so jagged, rugged, and ruinous, as the scene presented in fig. 17.

This plain or bottom is everywhere covered with massive blocks of lava, and studded with the peaks of extinguished cones or fumeroles. In the foreground you have blocks of cooled lava: in the centre, the vent of a cone which has been fissured along the whole of its length; on the left an extinguished cone, with a cavernous gash near its base; and, all around, peaks of cones within the walls of the crater.

Leave that rugged scene in a state of rest. In the course of years, the volcano again stirs up deep foundries below, and awakes all its smithies into activity. Volumes of lava boil up. They fill the spaces between the conical peaks. They flow into the empty vents and hollow fissures, fill them up, become hardened into masses or dikes, and make the surface appear almost a perfect level. After many centuries or ages, a section of this part of the mountain comes, by some means or other, to be exposed to the view of a geologist; and then, the multifarious formation of the rock is accounted for, by him, on the principles of the intermittent activities of volcanoes.

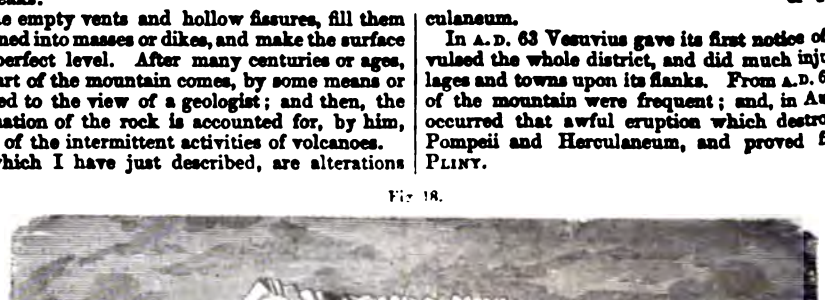
Fig. 17.



Extinguished cones of eruption in the crater of Vesuvius.

The changes which I have just described, are alterations which are produced in the internal structure of the mountain. There are also other changes which take place in a volcano's outward physiognomy, or external aspect, so as to make the mountain look different in the landscape. The character of these variations, also, will help you in the study of Geology.

Fig. 18.



The aspect of Vesuvius in Strabo's time, and the cities of Pompeii and Herculaneum.

The volcanic region best known to the ancients is that of Sicily, and Campania in Italy—but especially that of Naples; for they have handed down to us tolerably distinct and well-connected records of the history of Vesuvius, which the Italians of the present day call by the name of Somma.

Before the Christian era there is no record—there is not even a tradition or a poetical myth, of Vesuvius having been in a state of activity. If such had ever been known, Strabo would have given an account of it; for in the Fifth Book of his Geography, he narrates the terrific earthquakes a vulsions which had taken place several times in the I Pithecuss, now called Ischia, a little to the north of of Naples. Of any disturbance in Vesuvius he says Fig. 18. gives a view of Vesuvius as it was known in of Strabo.

According to the description which Strabo has giv figures of Vesuvius, it seems to have been a trunca with a depression at the summit, which was the rem extinguished crater. When Campania, or southe was first col the Greeks, afforded no volcanic char cept such a ralist, accus the examin rocks, might ferred: — a were recog Strabo. In the vast co entire mou peared regu outline, and with a roun mit, havi which enco hollow, ne up, and co wild vines. side declivi hill were cl fields high vated, and with fertil and viney the base of tain lay th and flouris of Pompei culaneum.

In A.D. 63 Vesuvius gave its first notice of action vulsed the whole district, and did much injury to lages and towns upon its flanks. From A.D. 63 to 6 of the mountain were frequent; and, in August o occurred that awful eruption which destroyed t Pompeii and Herculaneum, and proved fatal to Pliny.

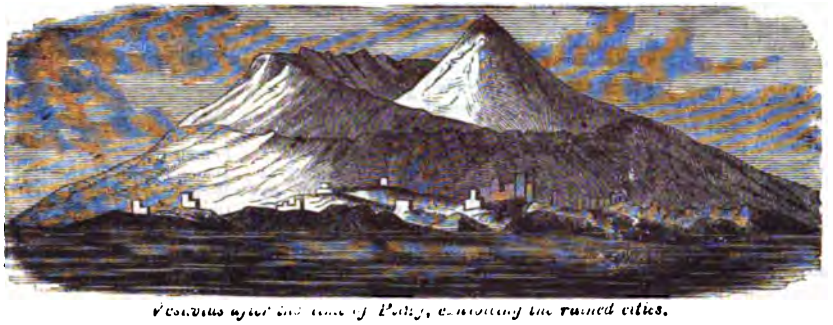
After the death of the elder Pliny, his nephew younger Pliny, wrote to the historian Tacitus, a bri account of the phenomena of this eruption. At f volume of smoke rose vertically from the ancient ruptured by elastic gases. The top of this column on all sides like the head of a wheat-sheaf, or the u of the pine-tree. It was occasionally fired by lightning, and each flash was succeeded by profou rible darkness. Ashes fell on the sea, far from land,

retreated some distance from the shore. In this eruption there is no evidence that there was any overflow of lava. The substances which were hurled into the air, were sand, dust, and shattered fragments of lava; and it was these materials that buried the cities of Pompeii, &c.

The first era of the authentic overflow of lava, is A.D. 1036, which is the seventh eruption since that of A.D. 79. The volcano produced eruptions, also, in A.D. 1049 and 1138, and then rested for one hundred and sixty-eight years. During that more than a century and a half of repose in the great crater of Vesuvius, two smaller vents were opened at distant points of the mountain. After a great eruption in A.D. 1306, and a slight one in 1500, there was another repose till A.D. 1631. Though, indeed, the crater was not active from 1500 to 1631, yet the subterranean fires were not at rest, for in 1538 a new mountain was heaved up from the sea, but close to the land, in the bay of Baiæ, a little to the north of Puzzuoli.

As this lesson is not intended to give a record of eruptions, but to show how eruptions change the aspects of volcanic mountains, I shall pass on to the present configuration of Vesuvius, as represented in fig. 20.

Fig. 19

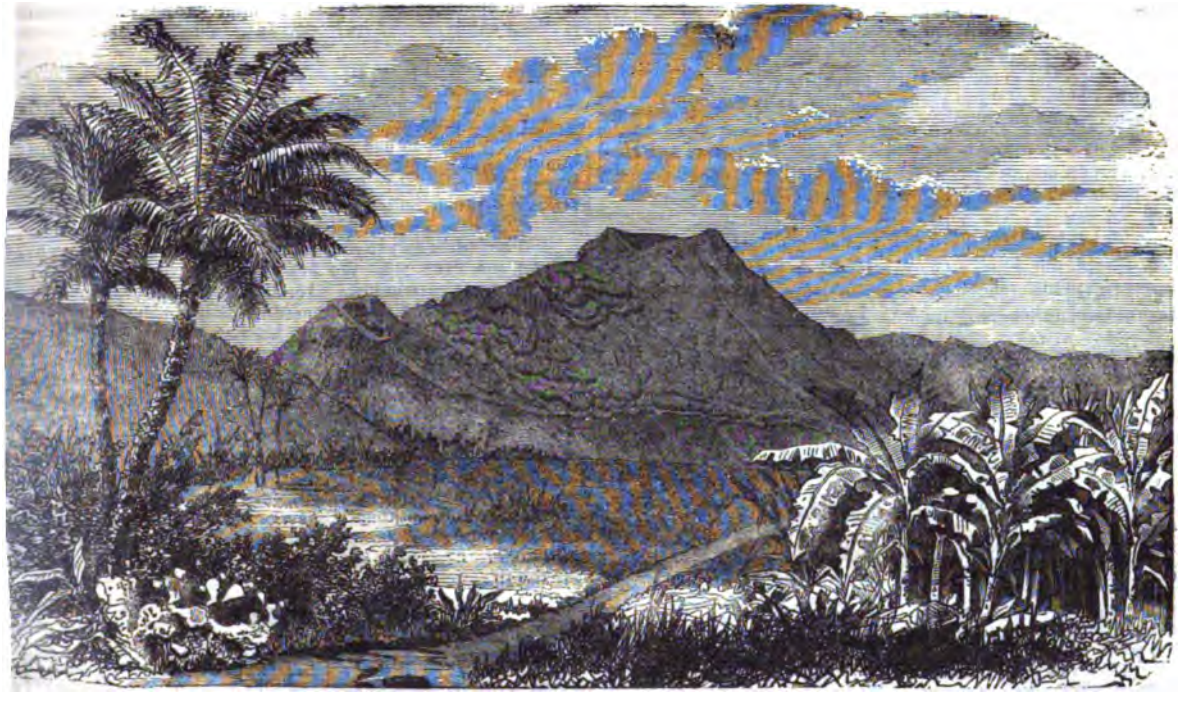


Vesuvius after the time of Pliny, exhibiting the ruined cities.

the margin of the crater on the south side, and then the two edges appeared of unequal height. In 1805 A. Von Humboldt, and L. Von Buch, and Gay-Lussac measured it again, and found that the southern edge was 479 feet lower than it was in 1773, when measured by Saussure. In 1822 A. Von Humboldt measured the mountain a second time, and found that the north-west edge was not altered at all in the 49 years since 1773, but that the southern side, which in 1794 had become 426 feet lower, had become, in 1822, 64 feet lower still.

Engravings of Vesuvius presented by landscape painters are not to be always depended upon as accurate views of the aspect of the volcano. In their picturesque views of the mountain, they confound the outlines of the margin with the cones of eruption which have been formed in the floor of the crater. In the course of 1816 to 1818 such a cone of eruption, consisting of rapilli and cinders, loosely heaped up, increased in height till it rose above the south-eastern edge of the crater. The eruption of February, 1822, elevated this cone so high as to make it appear 107 or 117 feet above even the north-west edge of the crater,—the edge called Rocca del Palo. At that time it was customary around Naples to regard this cone as being

Fig. 20.



Mount Vesuvius in the present day.

Vesuvius was measured in 1773 by the celebrated Saussure. At that time the two margins of the crater, viz., the north-western and the south-eastern appeared of equal height. Both were about 3,894 feet above the sea, nearly the height of Ben Nevis, in Scotland. In 1794 the eruption broke down the true summit of the mountain; but in the night of October 22, 1822, the whole of it fell in with a dreadful noise into the crater. The consequence of this fall is that the floor of the crater, which had been accessible since 1811, became now 800 feet lower than the northern edge, and 213 feet below the

southern margin of the volcano. These changes in the form and position of cones of eruption give to Vesuvius, at different epochs, a different appearance. In this eruption of October, 1822, in twenty-four hours after the falling in of the great cone of cinders just mentioned, and when the small but numerous streams of lava had flowed off, then a fiery eruption of ashes commenced, which continued without intermission for twelve days, and covered the sides of the mountain.

These different measurements of Vesuvius suggest grounds for a very bold theory in geology. How is it that the north margin of the volcano, that called Rocca del Palo, maintains such a uniformity of height while the other is lowered? The probable cause is that the north margin is in the process of being now raised up gradually by the upward tendencies of subterranean forces. Between the years 1816 and 1822 we are sure that that margin was from 3,970 feet to 4,022. When it was measured, thirty or forty years before, the height was from 3,875 feet to 3,894. How is this? Future investigations will, perhaps, decide how much of this difference is due to errors in measurement, and how much to the actual rise of the mountain by the expansion of heat from below. "If the lava beds of Rocca del Palo," says A. Von Humboldt, "really become higher we must assume them to be upheaved from below by volcanic forces."

LESSONS IN FRENCH.—No. XVIII.

By Professor Louis Fasquelle, LL.D.

Section XXXVIII.

1. The reflective verb, **se passer**, is used idiomatically in the sense of *to do without*. It is followed by the preposition de, when it comes before a noun or a verb:—

Vous passez vous de ce livre?	*Do you do without that book?*
Je ne puis m'en passer.	*I cannot do without it.*

2. Se servir [2 ir. *see* § 62], *to use*, also requires the preposition de before it object:—

Je me sers de votre canif.	*I use your penknife.*
Je me m'en sers pas.	*I do not use it.*

3. The second example of the two rules above, shows that, when the object of those verbs is a thing, it is represented in the sentence by the pronoun en:—

Je m'en sers, je m'en passe.	*I use it, I do without it.*

4. The pronoun* used as indirect object of a reflective verb, if representing a person, follows the verb [§ 100 (4)]:—

Je puis me passer de lui.	*I can do without him.*
Je m'adresse à vous et à elle.	*I apply to you and to her.*

5. S'endormir [2 ir. *see* § 62]; *to fall asleep*, and s'éveiller, *to awake*, are also reflective.

Je m'endors aussitôt que je me couche.	*I fall asleep as soon as I go to bed.*
Je m'éveille à six heures du matin.	*I awake at six o'clock in the morning.*

6. S'approcher, *to come near, to approach*; s'éloigner, *to draw back, to leave*, take the preposition de before a noun. Their object, when a pronoun, is subject to Rules 3 and 4 above:—

Votre fils s'approche-t-il du feu?	*Does your son draw near the fire?*
Il ne s'en approche pas.	*He does not come near it.*
Il s'éloigne de moi et de vous.	*He goes from me and from you.*

Résumé of Examples.

Vous servez vous de ce couteau?	*Do you use that knife?*
Je ne m'en sers pas, il ne coupe pas.	*I do not use it, it does not cut.*
De quels couteaux vous servez vous?	*What knives do you use?*
Nous nous servons de couteaux d'acier.	*We use steel knives.*
Pouvez vous vous passer d'argent?	*Can you do without money?*
Nous ne pouvons nous en passer.	*We cannot do without it.*
Vous passez vous de votre maître?	*Do you do without your teacher?*
Nous nous passons de lui.	*We do without him.*
Vous adressez vous à ces messieurs?	*Do you apply to those gentlemen?*
Nous nous adressons à eux et à vous.	*We apply to them and to you.*
Vous vous endormez facilement.	*You go to sleep easily.*
Je m'éveille de très bonne heure.	*I awake very early.*
Pourquoi vous approchez vous du feu?	*Why do you come near the fire?*
Je m'en approche parceque j'ai froid.	*I come near it because I am cold.*
Nous nous éloignons du feu.	*We go from the fire.*
Nous nous en éloignons.	*We go from it.*
Nous nous approchons de notre père.	*We go near our father.*
Nous nous approchons de lui.	*We go near him.*

* The rule does not apply to the reflective pronoun, which is sometimes an indirect object.

Exercise 75.

Aussi, *also.*	Encre, f. *ink.*	Ordinairement, *generally.*
Aussitôt—que, *as soon as.*	Fenêtre, f. *window.*	Plume, f. *pen.*
Canif, m. *penknife.*	Feu, m. *fire.*	Pourquoi, *why.*
Demoiselle, *young lady.*	Fourchette, f. *fork.*	Prêt-er, 1. *to lend.*
Domestique, m. *servant.*	Heure, f. *hour, o'clock.*	Quart, m. *quarter.*
	Moins, *less, before.*	Taill-er, 1. *to mend.*
	Obligé, e, *obliged.*	

1. Pouvez vous vous passer d'encre? 2. Nous pouvons nous en passer, nous n'avons rien à écrire. 3. Vous servez vous de votre plume? 4. Je ne m'en sers pas; en avez vous besoin? 5. Ne voulez vous pas vous approcher du feu? 6. Je vous suis bien obligé, je n'ai pas froid. 7. Pourquoi ces demoiselles s'éloignent elles de la fenêtre? 8. Elles s'en éloignent parcequ'il y fait trop froid. 9. Ces enfants ne s'adressent ils pas à vous? 10. Ils s'adressent à moi et à mon frère. 11. A quelle heure vous éveillez vous le matin? 12. Je m'éveille ordinairement à six heures moins un quart. 13. Vous levez vous aussitôt que vous vous éveillez? 14. Je me lève aussitôt que je m'éveille. 15. De quels livres vous servez vous? 16. Je me sers des miens et des vôtres. 17. Ne vous servez vous pas de ceux de votre frère? 18. Je m'en sers aussi. 19. Les plumes dont [Sect. 31, R. 8] vous vous servez sont elles bonnes? 20. Pourquoi votre ami s'éloigne-t-il du feu? 21. Il s'en éloigne parcequ'il a trop chaud. 22. Pourquoi votre domestique s'en approche-t-il? 23. Il s'en approche pour se chauffer. 24. Vous ennuyez vous ici? 25. Je ne m'ennuie pas.

Exercise 76.

1. Will you lend me your penknife? 2. I cannot do without it, I want it to mend my pen. 3. Do you want to use my book? 4. I want to use it, will you lend it to me? 5. What knife does your brother use? 6. He uses my father's knife and my brother's fork. 7. Will you not draw near the fire? 8. We are much obliged to you, we are warm. 9. Is that young lady warm enough? [Sect. 34, 3.] 10. She is very cold. 11. Tell her (*dites lui*) to come near the fire? 12. Why do you go from the fire? 13. We are too warm. 14. Does your brother leave the window? 15. He leaves the window because he is cold. 16. To whom does that gentleman apply? 17. He applies to me and to my brother. 18. Why does he not apply to me? 19. Because he is ashamed to speak to you. 20. Do you awake early every morning? 21. I awake early, when I go to bed early. 22. Why do you go to sleep? 23. I go to sleep because I am tired. 24. Are you afraid to go near your father? 25. I am not afraid to approach him. 26. Can you do without us? 27. We cannot do without you, but we can do without your brother. 28. Do you want my brother's horse? 29. No, Sir, we can do without it. 30. Do you intend to do without money? 31. You know very well that we cannot do without it. 32. Is your brother weary of being here? 33. He is not weary of being here. 34. Come near the fire, my child.

Section XXXIX.

1. The verb aller (1 ir. § 62), conjugated reflectively, and preceded by the word en, i. e. s'en aller, corresponds to the English expressions *to go away, to leave*:—

2. Indicative Present of the Verb s'en Aller, to Go away.

Je m'en vais,	*I go away;*	Nous nous en allons,	*We go away;*
Tut t'en vas,	*Thou art going away:*	Vous vous en allez,	*You are going away;*
Il s'en va,	*He goes away;*	Ils s'en vont,	*They go away.*

3. The same Tense Conjugated Interrogatively.

Est-ce que je m'en vais?	*Do I go away?*	Nous en allons nous?	*Do we go away?*
T'en vas tu?	*Art thou going away?*	Vous en allez vous?	*Do you go away?*
S'en va-t-il?	*Is he going away?*	S'en vont ils?	*Are they going away?*

4. Se fâcher, *to be* or *became angry*, requires the preposition contre or de before the noun or pronoun following it:—

Se fâche-t-il contre votre frère?	*Does he become angry against your brother?*
Il se fâche contre lui.	*He is angry with him.*
Vous vous fâchez d'un rien.	*You get angry at nothing.*

5. Se réjouir, *to rejoice*, is followed by the preposition de:—

Je me réjouis de votre bonheur.	*I rejoice at your happiness.*

6. Se plaire [4 ir. *see* § 62,] *to take pleasure, to delight in any thing, to like to be in a place*, takes à before its object:—

Je me plais à la campagne.	*I like to be in the country.*
Je me plais à étudier, à lire.	*I take pleasure in studying, in reading.*

7. Se dépecher, se hâter, *to make haste*, take de before their object:

Dépêchez vous de finir vos leçons.	*Make haste to finish your lessons.*
Pourquoi ne vous dépêchez vous pas?	*Why do you not make haste?*

Résumé of Examples.

Le marchand s'en va-t-il aujourd'hui?	*Does the merchant go away to-day?*
Nous nous en allons demain.	*We are going away to-morrow.*
Je m'en vais quand je suis fatigué.	*I go away when I am tired.*
Pourquoi vous fâchez vous contre lui?	*Why do you get angry with him?*
Il se plait à jouer, il n'étudie jamais.	*He takes pleasure in playing, he never studies.*
Vous plaisez vous chez vos parents?	*Do you like to be at your relations?*
De quoi vous réjouissez vous?	*At what do you rejoice?*
Nous nous réjouissons de votre succès.	*We rejoice at your success.*
Nous nous en réjouissons.	*We rejoice at it.*
Pourquoi vous dépêchez vous?	*Why do you make haste?*
Nous nous dépêchons d'écrire.	*We make haste to write.*
Nous nous plaisons en Angleterre.	*We like to be in England.*
Nous ne nous plaisons pas à Paris.	*We do not like to be in Paris.*
Nous ne nous y plaisons pas.	*We do not like to be there.*
Vous plaisez vous à New York?	*Do you like to be in New York?*
Nous nous y plaisons.	*We like to be there.*

Exercise 77.

Ambassadeur, m. *ambassador.*	Jouer, 1. *to play.*	Prochain, e, *next.*
Arrivée, *f. arrival.*	Malheur, m. *misfortune.*	Retourn-er, 1. *to return.*
Autrui, m. *others.*	Mieux, *better.*	Semaine, *f. week.*
Cour-ir, 2 ir. *to run.*	Midi, m. *noon.*	Tante, *f. aunt.*
Jamais, *never.*	Parceque, *because.*	Turc, turque, *Turkish.*

1. Vous en allez vous bientôt? 2. Je m'en vais la semaine prochaine. 3. Pourquoi vous en allez vous? 4. Parceque je ne me plais pas ici. 5. Vous plaisez vous mieux chez votre tante qu'ici? 6. Je m'y plais mieux. 7. N'avez vous pas tort de vous en aller si tôt? 8. J'ai raison de m'en aller. 9. Ne vous réjouissez vous pas des malheurs d'autrui? 10. Nous ne nous en réjouissons point. 11. Cet homme se fâche-t-il contre le jardinier? 12. Il se fâche contre lui parce qu'il ne veut pas se dépêcher. 13. Se fâche-t-il bien souvent? 14. Il se fâche à tout moment, il se fâche d'un rien. 15. Ne vous dépêchez vous jamais? 16. Je me dépêche toujours quand j'ai quelque chose à faire. 17. Ne vous plaisez vous pas à courir et à jouer? 18. Je me plais à jouer et mon frère se plait à lire. 19. Vous réjouissez vous de l'arrivée de l'ambassadeur Turc? 20. Je m'en réjouis. 21. Ne vous plaisez vous pas en Amérique? 22. Je m'y plais beaucoup mieux qu'en France. 23. Votre écolier ne se plait il pas chez vous. 24. Il se plait chez moi, mais il désire retourner chez son père. 25. Dépêchez vous, il est déjà midi.

Exercise 78.

1. At what hour does your friend go away? 2. He goes away every morning at nine o'clock. 3. Do you go away with (*avec*) him? 4. I go away with him when I have time. 5. Will you make haste to finish your letter? 6. I make haste to finish it. 7. Does the gardener get angry with his brother? 8. He gets angry against him when he does not make haste. 9. Make haste, my friend, it is ten o'clock. 10. Why do you not make haste? 11. I like to play, but I do not like to study. 12. Do you like to stay at my house? 13. I like to stay there. 14. Are you rejoiced at the arrival of your mother? 15. I rejoice at it. 16. Is not your brother wrong to go away so soon? 17. He is right to go away, he has much to do at home. 18. Do you rejoice at other people's misfortunes? 19. I do not rejoice at them. 20. I rejoice at your success. 21. Does not your brother draw near the fire? 22. He goes from the fire, he is too warm. 23. Does that young lady get angry with you? 24. She gets angry at trifles (*de rien*). 25. Do you like to be in Paris? 26. I like to be there. 27. Can you do without me to-day? 28. We cannot do without you—make haste to finish your work (*ouvrage*). 29. Do you want your penknife? 30. I want to use it. 31. Make haste to rise, it is six o'clock. 32. Is it fine weather? 33. No, Sir, it rains. 34. Is your father well this morning? 35. Yes, Sir, he is very well.

LESSONS IN ARCHITECTURE.—No. II.

After the rough sketch of the origin of architecture in our last, we must notice in proper order that system of construction, the monuments of which cover a great part of the old world. This system had its origin among the Shemitic tribes, which at the commencement of civilisation peopled the fairest part of the globe. This early system, noted for the rudeness of its form, its stability without mortar, and the great size and irregularity of its materials, is attributed to the Pelasgians, a people originally from Upper Asia, who, according to Herodotus, spread themselves over Phœnicia and Asia Minor, and colonised Greece and Italy. Examples of this style of architecture, called Pelasgic, are found extending from the borders of Persia and Armenia to the western limits of Asia. Crossing the Mediterranean, it spread over Greece, where the most remarkable monuments described by ancient authors, from the age of Hesiod and Homer, are traced, according to tradition, as far back as eighteen centuries before our era. This was the style of construction used in the heroic times of ancient Greece; and at a later period it was employed on certain important occasions.

The migrations of the Pelasgi carried this system into Italy, and we meet it at every step, particularly in the central countries. Examples are also to be seen in nearly all the western islands of the Mediterranean, in the Balearic Isles, and some even on the coasts of France and Spain. In fine, by a remarkable coincidence, travellers who have drawn and described the monuments of Palenque and Papantla, cities of Mexico destroyed long ago, and grown over by forests, exhibit constructions similar to those of the Pelasgi. The gigantic remains of the Pelasgic monuments, to this day subjected to examination by travellers, bear traces of different modes of building. Those which seem to be the most ancient are composed of blocks of stone, or rather of rocks, so rude and so immense that Pausanias, in speaking of the walls of Tyrins, built thirty-six centuries ago, describes them thus:—"These walls are constructed of unhewn stones, and are all of such dimensions that a yoke of oxen could not shake the smallest of them. The interstices are filled up with smaller stones, which serve to unite the larger ones." These walls present the same appearance now which they did in the days of Homer and of Pausanias. They are about 25 feet thick, and about 43 feet in height. Two temples, close to each other, in the island of Gozo, near Malta, are analogous in their construction to the walls of Tyrins. They are built of immense blocks of stone, forming a sort of artificial hill, in which are placed the naves and arches of the temples; but some of the rocks bear traces of masonry.

It has been proved, by careful examination, that these edifices were dedicated to the gods of Asia. To conclude; the walls of Tarragona, on the east coast of Spain, are constructed, like the preceding, of immense rocks in their natural state. The application of instruments to building, at a later period, caused the edifices of the Pelasgians to assume another form.

The stones taken from quarries, were cut into irregular polygons, and placed one upon another in such a manner as to make the different faces of the geometrical figures which they employed, coincide, the salient angles filling up the re-entrant angles formed by two adjoining stones. (Fig. 5.) This was the ordinary manner of building under this system of construction. It is met with from the lake Van, on the frontiers of Armenia, to the west of Italy, Sardinia, and the Balearic Isles; and it is found in temples and in tombs, in public and private buildings, and in innumerable military constructions. At last, a third method presents itself in the walls of these early buildings; namely, that in which the stones are fashioned in the square form; and the buildings themselves, assuming the same form, exhibit a greater degree of civilisation; and the invention and application of more exact instruments. The walls of the ancient Mycenæ were built in this manner. (Fig. 6.)

Fig. 5.

Pelasgic wall.

Fig. 6.

Walls of Mycenæ, and gate of Lions.

The continued and progressive order of these Pelasgic constructions, is one of the most interesting facts in the history of the art of building—particularly when we refer them to an antiquity which goes back to the heroic time of Greece. Doubtless the gradual improvement which is to be seen in the walls constructed by this original people, does not reveal all the revolutions of this art in early antiquity; but it enables us to perceive the progress of the greater part of the civilised world, a progress which it must necessarily follow, because it is the nature of all human inventions to pass from early and rude attempts, to successive periods of improvement and perfection. The Pelasgic monuments, sketched and studied at the present day, extend over a zone, which, comprising the breadth of Western Asia, stretches over Greece and Central Italy; and this is not the whole of the ancient world, as we have already said, in which early monuments composed of rocks in their natural state, have been seen by ancients and moderns; but they have been discovered in all the northern countries, and in Africa, from Egypt to the neighbourhood of Carthage; and we have reason to believe that in these countries, to the primitive constructions, a second period succeeded, more refined in its productions, and forming a step from the first attempts, to the more perfect examples, of which we behold the numerous ruins in India, in Central Asia, in the valley of the Nile, and in the oases of the desert. These monuments of transition, so to speak, have disappeared under early and actual civilisation, and have even escaped the investigation of travellers.

FIRST REGULAR CONSTRUCTIONS, PYRAMIDS, &c.

The Pelasgi, proceeding from the Asiatic plateaus (table-lands), directed their steps towards the west; other Shemitic tribes marched towards the south and east, and peopled India, Persia, Assyria, and Arabia, as well as Ethiopia and Egypt. The art of these tribes, like that of the western branch, passed through a rude and primitive state, as we have shown—through the BETH-EL style, or constructions in unhewn stones. It cannot be supposed that these tribes were more privileged than others, and were able, without previous attempts, to hew stones regularly, to mould and cement bricks, and to give to the union of these materials architectural forms, without going through that initiatory process which characterises the origin of all human inventions. Yet the plains of Chaldea soon exhibited constructions which had a great influence over primitive art in the east, and formed the basis of a system which extended its branches even to the west. The want of stones in Mesopotamia soon taught the inhabitants to mould bricks, and their most ancient temple mentioned in the Bible, called the tower of Babel, was an immense pyramid built of bricks piled on one another, and forming, according to report, eight stories or rows, gradually receding from each other. At the top of this building they sacrificed to Baal; at a later period the Chaldean kings placed his statue there, when their artists had made some progress in the art of sculpture. It is probable that this pyramidal-formed temple owed its origin to their remembrance of the practices of those Caucasian countries whence the Shemitic tribes derived their origin. Herodotus gave a glimpse of the truth, when he said that the Scythians made their temples or altars with a great quantity of wood heaped in the form of a pyramid. However the case may be, this very simple form, which appears to have come naturally to the mind of those men who were the first to raise large constructions, spread itself over all Asia; the ancient pagodas of India are built in this form; the most ancient monuments of Lower Egypt and Ethiopia, where the Shemitic tribes settled in Africa, are all of them pyramids. (Fig. 7.) In Asia,

Fig. 7.

Pyramids of Memphis.

whole cities, Ecbatana for example, presented numerous concentric enclosures rising one above another in such a way as to exhibit the pyramidal form. The celebrated gardens of Babylon, formed of numerous terraces, one above another, had also the same configuration. In short, this must be considered as the progress of architecture, when we see that the most ancient religious edifices of the Mexicans are immense pyramids, simple at first like those of Chaldea, and of Lower and Upper Egypt; but at a later period, ornamented with sculpture like the pagodas of India. Ancient public buildings were also found in Mexico of a pyramidal form. It is evident that these first regular constructions were thus generally established; and the greater part of the primitive world adopted them, with the exception of those countries where great political events interrupted the first movements of civilisation and suspended the march of the arts; with the exception also of those whose inhabitants, less endowed by nature, necessarily remained in the rear of civilisation, and only received a movement of this kind from their neighbours, or from an invasion of some

Fig 8.

The Palace of Luxor, in Egypt.

people, more advanced in civilisation. The first builders worthy of the name from their ability to mould bricks, and hew stones to raise their gigantic monuments, were compelled

to follow the road in which they were placed. The want of experience, the absence of instruments and machines prevented them from raising, at first, great edifices with vertical façades or fronts, such as they were enabled to construct at a later period. To form large foundations, and to raise above them materials with gradual and numerous recesses such as would prevent the fall of the upper parts of the building, was the first law of construction and of statics to which they were obliged to submit. This is so true that after having made their great steps in the art of building, the Indians, the Chaldeans, the Ethiopians, and the Egyptians, and become able builders, they still continued in the path of which the pyramid was starting-point, by raising their edifices in such a manner as to give to their façades a great inclination in order to obtain greater stability; a wise system, which was adopted by the Etruscans when they left Asia, where these principles were long established. They were also spread over a part of Italy, and traces of them are found at Norchia. The same ideas exerted their influence over the early edifices of the Greeks, and they are found in a modified form among the finest specimens of their later architecture. They are recognised, for instance, in the Parthenon, where the inclination of the jambs of the doors and windows still exists. Mexico also bears witness to this, as may be seen in our remarks on the first regular constructions of that country.

QUESTIONS ON THE PRECEDING LESSONS.

Among what early tribes had the Pelasgi style of architecture its origin?

Who were the Pelasgi; and how far back are their monuments traced?

In what countries are the Pelasgic monuments found; and in what parts of America were similar constructions discovered? How many centuries ago were the walls of Tyrins built, and what was the size of the stones? Where are examples of temples built like these walls to be found?

Where did the square form of stones first appear, and where did brick-building first commence?

LESSONS IN ARITHMETIC.—No. XIV.

THE proof of multiplication, *by casting out the nines*, proceeds on the following principle: that if two factors and their product by divided by any number, the product of the remainders of the factors, when divided by that number, will give the same remainder as the product of the factors. Thus, if 24 and 20 be the factors, 480 is their product; and if each of these factors be divided by a number, say 7 for instance, the remainders are 3 and 6, and their product 18, divided by 7, gives the remainder 4; but the product 480 divided by 7, gives the same remainder 4, as we have said. Combining this principle with what was explained in our last lesson on the subject of finding the remainder of a number divided by 9, the rule for proving multiplication, "by casting out the nines," is as follows:—Cast the nines out of the factors, i.e., the multiplicand and the multiplier, and multiply the two remainders together, cast the nines out of this product, and also out of the product of the factors; if the remainders be the same in both cases, it may be presumed that the work is right. The accuracy of the operation, as we said in our last number, cannot be depended on, for the reasons there stated, and others that might be added: thus, the arrangement of the partial products might be all wrong by the displacement of the products, of the units, or of the tens, or of the hundreds, &c., i.e., of any one by itself or of all of them together; and yet the casting out of the nines would not indicate the fact, but would give the same result as if they were all arranged in a manner perfectly correct. Hence the propriety of giving other methods of proof, as we have done in past numbers,—methods which are sure to detect the slightest inaccuracy, and put the calculator fully on his guard. For doing this, we have been found fault with by a number of individuals, who fancy that if they know any thing at all they must know arithmetic, and that they can teach us, forsooth, better than we can teach them! But true knowledge is always humble, and ready to acknowledge its own deficiencies or mistakes; it is also anxious to gain useful information from every quarter, and more willing to learn than to find fault. We hope that such persons will take these hints in good part. We assert, without fear of their displeasure, that the method of proving multiplication, or, indeed, any rule in arithmetic, by "casting out the nines," is of no practical utility, and cannot be depended upon as a satisfactory check upon the operations. One thing, however, we will admit—that where the application of this method indicates an error, *there must be an error;* but the evil is, that it does not indicate the existence of many errors when they really have been made. The misplacement of a number, or even a figure, in a sum in addition, or in a product in multiplication, is a very serious error, and might lead to very injurious consequences in business, and yet the proof *by casting out the nines* would not detect such an error! And it is on this ground that we object to its practical utility.

EXAMPLE.—Multiply 75432 by 476, and prove the operation by casting out the nines.

Factors	Multiplicand 75432	3	
	Multiplier 476	8	
	452592	24 . .	6
	528024		
	301728		
Product	35905632	6	

METHOD OF PROOF.

By casting the nines out of the multiplicand, as shown at page 266, we obtain the remainder 3; by casting the nines out of the multiplier, we obtain the remainder 8; and by multiplying these remainders together, we obtain the product 24. By casting the nines out of this product, we obtain the remainder 6. Now, by casting the nines out of the product of the factors in the above operation, we obtain also the remainder 6. Hence, it is presumed that the operation is right.

If the remainder, arising from casting the nines out of either of the factors, or of both, should be 0, the remainder arising from casting the nines out of the product should also be 0; because the product of 0 by any figure or number is 0.

The proof of division *by casting out the nines*, proceeds on the same principle as that referred to in multiplication; for the quotient is one of the factors, the divisor is the other factor, and the dividend is their product. To this principle must be added the very simple one, that if the same thing be added to equals, the wholes are equal. Accordingly, when there happens to be a remainder over in the division of one number by another, the remainder arising from the casting out of the nines from this remainder must be added to the product of the remainders of both the factors, in order to get the true remainders of the nines; because the remainder of the division is included in the dividend, or else there would have been no remainder at all. The rule for proving division by casting out the nines, then, is the following:—Cast the nines out of the divisor and the quotient, and multiply these remainders together; cast the nines out of this product, and note the remainder; cast the nines, also, out of the remainder of the division, and note this remainder: add it to the former remainder noted, and cast the nines out of their sum; the remainder of this casting out should be the same as that arising from casting the nines out of the dividend, if the work be right; this rectitude or accuracy being subject to the same limitations and restrictions, as those above explained under the rule for proving multiplication.

EXAMPLE.—Divide 7543210 by 476, and prove the operation by casting out the nines.

Divisor.	Dividend.	Quotient.
476)	7543210	(15847
	476	
	2783	
	2380	
	4032	
	3808	
	2241	
	1904	
	3370	
	3332	
	38	remainder

Divisor 476. . . .	8	
Quotient 15847 . .	7	
Product	56 . . .	2
Remainder 38		2
	Sum	4
Dividend 7543210		4

Method of Proof.

Casting the nines out of the divisor gives remainder 8, and out of the quotient gives remainder 7. The product of these remainders is 56, and casting the nines out of it gives remainder 2; also, casting the nines out of the remainder of the division gives remainder 2, and the sum of these remainders is 4. Lastly, casting the nines out of the dividend gives the same remainder 4; hence it is presumed that the work is right; but, as we have said before, this is only a presumption.

The principle of most of these operations was very well explained by some of our correspondents, among whom we must mention the following:—Robert Boland, Great Shelford, Cambridgeshire; J. L. N., Dublin (who applied it most ingeniously to other scales of notation); Charles Currie, Glasgow (who added some curious and ingenious rules for dividing by a number consisting of nines, extracted from old authors); P. G. Anderson, Birmingham; Joseph Webster, Bramley (who applied the proof of casting out the nines to involution and evolution, and gave rules for the same); J. Carey, Clapham; and others. From the review of all the correspondence we have received, we are convinced that many of the observations made on the properties of the number 9, especially in their application to the methods of proving arithmetical operations, are more curious than useful; and that their place may be fairly taken by something of much greater value.

We were reminded of a curious property of 9 and its multiples by a correspondent, Joseph Bowman, Preston,—namely, that the number 12345679 being made the multiplicand, and the multiples of 9 as far as 81 the multipliers, the products will consist of numbers all composed of the same figure, and that figure will be the number of times 9 which constitutes the multiple employed; thus:—

12345679	12345679	12345679
9	18	27
111111111	98765432	86419753
	12345679	24691358
	222222222	333333333

The young learner can perform the remainder of the operations with 36, 45, 54, &c., for himself. The reason of these curious results will be seen at once by separating the multipliers into their factors, and performing the operation as follows:—

9	12345679	12345679	9
2	9	9	3
18	111111111	111111111	27
	2	3	
	222222222	333333333	

Although we have seen these curious results many years ago, we give our correspondent full credit for his individual rediscovery.

Another correspondent, J. L. N. (Dublin), suggests the following curious operation in subtraction as an amusement for the junior classes in a school. Tell the members of a class to put down upon their slates individually any number they please, as in the margin; then, to put down under this number, the same figures written in any other order whatever, taking care that its first figure, or the figure of highest value, shall be less than the one above it; next, to subtract this number, or row of figures, from the one above, and mark out *one* of the figures of the remainder. Lastly, tell them to add together all the *rest* of the figures, and be prepared to tell you the result. Then, beginning at one end of the class, ask the number required, *subtract it in your mind* from the next multiple of 9 above it, and *tell the remainder aloud*; this remainder will be the number which each individual marked out. Thus; if in the above example 6 were marked out, the sum of the rest of the figures would be 12; now the next multiple of 9 above 12, is 18; and subtracting 12 from 18, you have 6, the number marked out. The principle of this apparent trick is fully explained in our last lesson on Arithmetic. By telling them to cast the nines out of the rest of the figures, and tell you the remainder, the process would be easier, for you would only have to subtract it from 9, and this remainder would be the figure marked out. But this process would more readily reveal your secret. It is to be noted, that when the sum of the *rest* of the figures is itself 9, or a multiple of 9, the figure *marked out may be* either 9 or 0. This renders two cases dubious, and diminishes the completeness of the artifice. Pupils *rejoice* to find their master in a mistake.

543268
438625
104643

The following is a method of interesting young pupils in the irksome rule of addition. Tell the members of a class to put down on their slates a sum in addition, a certain number of lines deep, and a certain number of figures broad, as in the margin; and to leave room enough below for *you* to add as many lines. This being done, you proceed to add as many lines to each in the following manner:—Looking at the first line, write down rapidly the difference between each figure in it and 9; do the same with the second line, then with the third, and so on. You then tell them to add up all the lines, and find the amount of the whole. But *before* they do this, you may just as well tell them the answer or sum which it will make. You do this by giving them the product of a number consisting of as many *nines* as there are figures in the *breadth*, by the figure which indicates the number of lines in the *original depth* of the sum before you added your own lines to it. This operation will be seen at once in the example placed in the margin.

34765	} numbers put down by the pupils.
27184	
36958	
47366	
65234	} numbers put down by the teacher.
72815	
63041	
52633	
399996	Sum.

In this operation it is to be observed, that, however different the numbers may be which are put down to be added, it is plain that, by the addition of your figures to them, they must all come to the same sum. Here you multiply 99999, the number composed of as many *nines* as there are figures in the *breadth*, by 4, the number of lines in the original breadth, that is, the *depth* of the numbers put down by the pupils. The reason of this process is so obvious, that we shall leave it for the consideration of those who may be interested in the subject, satisfied that they are sure to make the discovery for themselves.

99999	
4	
399996	Answer.

FRENCH EXTRACTS.

Having been frequently requested by our correspondents to recommend to the students of French, some book for reading, in order to extend their knowledge of that language, and to give them an interest in some useful study besides, we have selected for their special use, a collection of the most valuable maxims and moral sentiments which the French language affords. This collection is arranged alphabetically, and will be continued in several numbers of the Popular Educator, until complete. When this is done, our readers will be in possession of as fine a body of social morality and experience of the world, as the language of any country can afford. The names of the authors are added to the sentiments or maxims, to give them zest and authority; those of *La Rochefoucauld*, *La Bruyère*, *Bacon* (our own *Francis*), *Pascal*, *Montaigne*, *Fenelon*, *Montesquieu*, and many others, will be a sufficient guarantee of the wisdom of their sayings, and the excellence of their style.

PENSEES MORALES ET MAXIMES.

ACCIDENT.

Il n'y a point d'accidents si malheureux dont les habiles gens ne tirent quelque avantage, ni de si heureux que les imprudents ne puissent tourner à leur préjudice.—*La Rochefoucauld.*

ACTION.

C'est, en quelque sorte, participer à une bonne action que de la louer de bon cœur.—*La Rochefoucauld.*

Il faut faire comme les autres: Maxime suspecte, qui signifie presque toujours: il faut mal faire, dès qu'on l'étend au-delà de ces choses purement extérieures, qui n'ont point de suite, qui dépendent de l'usage, de la mode et des bienséances.—*La Bruyère.*

AGE.

Puisque l'âge diminue nos agréments en nous laissant nos défauts, et que la considération est la seule indemnité de la vieillesse, tâchons de devenir plus respectables à mesure que nous devenons moins aimables.—*Lévis.*

Nous arrivons tout nouveaux aux divers âges de la vie, et nous y manquons souvent d'expérience malgré le nombre des années.—*La Rochefoucauld.*

AMBITION.

L'esclave n'a qu'un maître, l'ambitieux en a autant qu'il y a de gens utiles à sa fortune.—*La Bruyère.*

Dans l'esprit de l'ambitieux, le succès couvre la hont des moyens.—*Massillon.*

Le lâche a moins d'affronts à dévorer que l'ambitieux.—*Vauvenargues.*

AMITIE.

Lorsque mon ami rit, c'est à lui à m'apprendre le sujet de sa joie; lorsqu'il pleure, c'est à moi à découvrir la cause de son chagrin.—*Desmahis.*

Vous ne chercherez pas vos amis dans un rang trop au-dessus ni trop au-dessous du vôtre.—*Barthélemy.*

Celui qui compte dix amis n'en a pas un.—*Malesherbes.*

Les épanchements de l'amitié se retiennent devant un témoin quel qu'il soit; il y a mille secrets que trois amis doivent savoir, et qu'ils ne peuvent se dire que deux à deux.—*J. J. Rousseau.*

Si nos amis nous rendent des services, nous pensons qu'à titre d'amis ils nous les doivent; et nous ne pensons pas du tout qu'ils ne nous doivent point leur amitié.—*Vauvenargues.*

Il est plus honteux de se défier de ses amis que d'en être trompé.—*La Rochefoucauld.*

Il y a un goût dans la pure amitié où ne peuvent atteindre ceux qui sont nés médiocres.—*La Bruyère.*

Il ne faut pas regarder quel bien nous fait un ami, mais seulement le désir qu'il a de nous en faire.—*La Rochefoucauld.*

AMOUR.

Il en est de l'amour comme de ces montagnes en forme de pic, dont le sommet n'offre point de lieu de repos; à peine monté, il faut descendre.—*Lévis.*

Le commencement et le déclin de l'amour se font sentir par l'embarras où l'on est de se trouver seuls ensemble.—*La Bruyère.*

Vouloir oublier quelqu'un, c'est y penser.—*La Bruyère.*

AMOUR-PROPRE.

L'amour-propre des sots excuse celui des gens d'esprit, mais ne le justifie pas.—*Lévis.*

L'amour propre est l'amour de soi-même et de toutes choses pour soi; il rend les hommes idolâtres d'eux-mêmes, et les rendrait les tyrans des autres si la fortune leur en donnait les moyens.—*La Rochefoucauld.*

ANIMAUX.

Aimer les animaux, avoir de la charité pour eux est la marque d'un bon naturel.—*Christine.*

ART.

Rien dans la vie ne doit être stationnaire, et l'art est pétrifié quand il ne change plus.—*Madame de Staël.*

AVARICE.

La pauvreté manque de beaucoup de choses, l'avarice manque de tout.—*La Bruyère.*

Ce que l'on prodigue, on l'ôte à son héritier; ce que l'on épargne sordidement, on se l'ôte à soi-même: le milieu est justice pour soi et pours les autres.—*La Bruyère.*

L'illusion des avares est de prendre l'or et l'argent pour des moyens pour en avoir.—*La Rochefoucauld.*

L'avarice des pères ou des mères envers leurs enfants est un vice inexcusable. Elle les décourage, les avilit, les excite à tromper, les porte à fréquenter de mauvaises compagnies; puis, quand ils sont une fois maîtres de leur bien, ils donnent dans la crapule ou dans un luxe outré, et se jettent dans des dépenses excessives qui les ruinent en peu du temps. La conduite la plus judicieuse que les pères et les mères puissent tenir à cet égard envers leurs enfants, c'est de retenir avec plus de soin leur autorité naturelle que leur bourse.—*Bacon.*

BAVARD.

Il y a beaucoup de gens dont la facilité de parler ne vient que d'une impuissance de se taire.—*Cyrano de Bergerac.*

Les hommes ont sur les bêtes l'avantage de la parole; mais les bêtes sont préférables aux hommes, si les paroles ne sont de bon sens.—*Maximes des Orientaux.*

Personne ne fait plus paraître sa bêtise que celui qui commence de parler avant que celui qui parle ait achevé.—*Maximes des Orientaux.*

Un discours à contre-temps est comme une musique pendant le dessert.—*Ecclésiastique.*

Le vin est des vices dangereux, il en est de déplaisants, il en est de ridicules; le babil réunit tous ces inconvénients. En disant des choses ordinaires, le babillard est ridicule; en disant des méchancetés, il est odieux; en ne sachant pas taire un secret, il se met en péril.—*Plutarque.*

BIENFAIT.

Ce que j'ai dépensé, je l'ai perdu; ce que je possédais, je l'ai laissé à d'autres: mais ce que j'ai donné est encore à moi.—*Hitopadesa.*

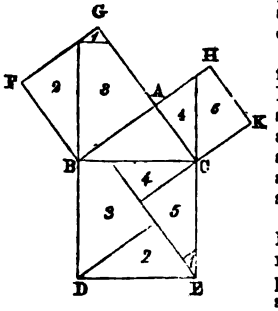
(To be continued.)

SOLUTIONS OF PROBLEMS AND QUERIES.

From No. 7, page 111.

4. Draw two straight lines making a right angle between them; and on one leg of this angle cut off from its vertex, a part equal to the side of the smaller square; from the point where this part is cut off, as a centre, with radius equal to the side of the larger square, describe a circle, cutting the other leg of the angle; the distance from the point where it is cut to the vertex of the angle is the side of the square equal to the difference between the two given squares. For by the 47th E. I., the squares of this distance and of the part cut off the other leg, are equal to the square of the radius of the circle. There the square of the said distance is equal to the difference of the squares of the radius and the part cut off, which straight lines are equal to the sides of the given squares re spectively.

5. Show how the squares B G and C H must be cut so that the pieces may be laid upon the square B E, and made exactly to cover it.



The following solution contains fewer pieces than that inserted in No. 16, but it is not so easy to slide the pieces into their position, as their sides do not possess the same property of making the same angle with the base of the largest square.

In the figure, the pieces marked 1, 2, 3, 4, 5, of the two squares B G and C H, will exactly cover the parts marked 1, 2, 3, 4, 5, of the square B E. We have received a geometrical demonstration of this construction, or rather dissection of the parts, from the author.

LITERARY NOTICES.

We have great pleasure in directing the attention of the readers of the Popular Educator *to the following announcement of the publication of* Euclid's Elements, *at One Shilling. As nothing less than the most extensive circulation can possibly remunerate us for the necessary outlay in producing such a work at such a price, we trust that the large body of our correspondents, at whose suggestions we engaged in the publication of it, will now do their part, by making it as widely known as possible among their friends and acquaintances. We have no fear, if this be done, that the demand will fully equal our most sanguine expectations, which, if realised, will inspire us with confidence to continue the series of valuable educational works, of which this may be considered the pioneer.*

Cassell's Shilling Edition of Euclid.—The Elements of Geometry, containing the First Six, and the Eleventh and Twelfth Books of Euclid, from the text of Robert Simson, M.D., Emeritus Professor of Mathematics in the University of Glasgow; with Corrections, Annotations, and Exercises, by Robert Wallace, A.M., of the same university, and Collegiate Tutor of the University of London, is now ready, price 1s. in stiff covers, or 1s. 6d. neat cloth.

The Illustrated Exhibitor and Magazine of Art.—The First Volume of this splendidly embellished work, handsomely bound, price 6s. 6d., or extra cloth gilt edges, 7s. 6d., is now ready, and contains upwards of Two Hundred principal Engravings and an equal number of minor Engravings, Diagrams, &c.

History of Hungary, with upwards of Eighty Illustrations.—The First Volume of the New Series of the Working Man's Friend, neatly bound in cloth, price 3s. 6d., contains the completest History of Hungary ever published; also, a History of China and the Chinese, with Forty-six Illustrations of the Manners, Customs, Public Buildings, Domestic Scenes, &c., of this most remarkable people; together with numerous instructive Tales and Narratives; Biographies, with Portraits; Scientific and Miscellaneous Articles, &c.—The Working Man's Friend is regularly issued in weekly Numbers, 1d. each, and monthly Parts at 5d. or 6d., according to the number of weeks in each month. Part IV. of Vol. II. (for August), price 5d. is now ready.

Cassell's Emigrant's Handbook, a Guide to the Various Fields of Emigration in all Parts of the Globe, Second Edition, with considerable Additions, and a Map of Australia, with the Gold Regions clearly marked, is now ready, price 9d.

The Pathway, a Monthly Religious Magazine, is published on the 1st of every month, price twopence—32 pages enclosed in a neat wrapper. No. 32, for August, is now ready, and Vols. I. and II., neatly bound in cloth and lettered, price 2s. 3d. each, may be obtained by order of any Bookseller.

ANSWERS TO CORRESPONDENTS.

E. K.: He writes a legible hand: we recommend him to practise as much as possible.—HANLEY: We shall have an article on German pronunciation in our next or the following Number, when, we trust, his difficulties will be removed. 1. The *name* of the vowel *e* is *ey* = *ey* in prey; but on being pronounced, is = *e* in met, bed, get, etc.; the same takes place in all languages; the names of the letters seldom agree with their pronunciation; e. g., the English letter *w*. 2. It should be *ae*.—J. C. WILD: It is sounded.—J. H. BARKER (Islington): German nouns are distinguished by gender to a much greater extent than is the case with English nouns; the waggon, the hat, etc., are nouns of the masculine gender in German. We refer our correspondent to the vocabularies, in which the gender of nouns is indicated by being followed by an *m*, for *n*, respectively, the first standing for *masculine*, the second for *feminine*, and the last for *neuter*.—GUILLAUME'S (London): With diligence and carefulness, he may accomplish much in a short period; there is no objection to his studying the two languages together. Respecting pronunciation, we refer him to "Stanley." Flügel's Dictionary is the best.—JUVENIS (Leeds): "Becker" is a good book, and well adapted for his purpose; though Schiller's historical works may be more justly pointed out as models of elegance.

ADMIRATOR wishes to know whether the human body changes every seven years. Physiology deals with facts and not with theories. It is a fact that there is a constant waste, and as constant a reparation of all the tissues of the body, but whether every individual particle has been renewed within the space of seven years, is more than we can venture to affirm.—JULIANA QUICK will find that a PACE measures five feet; and a stadium, as used in the third lesson, is equal to one hundred and twenty-five paces, or six hundred and twenty-five feet. Suppose a young lady had to go this latter distance to see her lover, how many miles would she have to walk?—E. D. (Tynemouth): The questions which he suggests as to the origin and early progress of Architecture, are the very points in which the most learned men are divided. The origin has been claimed by Egypt, India, and Persia. And if the primitive history of Meroë was involved in less obscurity, the question might be brought within the range of an easier solution.

ISAAC WALTON, jun. (Birmingham): Dialling will be treated of.—THAUMASTES (London): The philosopher of *Sans Souci* was Frederic of Prussia, and Voltaire was the author of the "Philosophical Dictionary." you will soon observe that it is his by the sneers he throws out against revelation. The *cloven foot* soon appears. The king and the wit were a dreadful pair! To multiply $1+s+s^2+\frac{s^3}{1-s}$ by $1-s$, observe that the denominator of the fraction in the multiplicand is the same as the multiplier; now if you multiply a fraction by a quantity which is the same as its denominator, the product is the numerator; therefore you have only to multiply $1+s+s^2$ by $1-s$, and to the product add the numerator of the fraction; this will give the result 1.—J. M. H.: The British Colonies will come in their order in the geography, and being of so much importance to this country, and especially to our surplus population, shall receive our best attention.—A. B. (Rochdale): We entirely sympathise with him on the subject of the hedgehog and the toad; the charges made against them are vulgar errors. We shall call the attention of our natural historian to the subject.—RICHD. JACKSON (Manchester): If the sentence quoted had been wrong, through inadvertence or any other cause, we should have thanked him, and acknowledged our error; but we are right.—A. M. WHITE (City): We rather think that the query about the nine rows of nine digits, is insoluble to the full extent of the requirement; but we shall not be too positive. Poetry, good poetry, shall find a place with us; but our standard is very *high*. We thank him for his philanthropic intentions regarding the POPULAR EDUCATOR.—LYCO (Wortley): We prefer Young's Algebra to Chambers's, and Riddle's Latin Dictionary to any he has mentioned; thanks for his recommendation.—J. B. (St. NEOTS): We recommend Cassell's "History of the Steam-Engine," price 7d. as the plainest we know.—S. B. (Bridlington): Read both lessons together.—R. C. A. (Gourock): Our worthy friend at the "Sant Watter," asks too many questions at once; we cannot cool our "kutes," and take matters as easily as he does. To rise early get an alarm-clock, or get a friend to put a wet sponge to your nose. The sentences "Alfred rides a horse," and "If it rains to-morrow," are both grammatical. A tank 12 feet deep, 41 feet long, and 9 feet broad, contains 4,428 cubic, or solid feet, for $12\times41\times9=4428$. Now multiply 4428 by 1728 the number of solid inches in a solid foot, and divide by 277.274 the number of solid inches in an imperial gallon, and you have the content of the tank in gallons; the answer will be about 27,575 gallons.

T. B. S. (Leeds): Messrs. Horne and Thornthwaite, Newgate-street, London, have published a cheap Manual of Photography.—J. P. (Norwich) shall be gratified by the mysteries of the number 9.—W. S. should of course improve his penmanship; but bad writing is not the reason of his getting no reply to letters in answer to advertisements.—SELAW: His suggestions as to mechanical arts are followed up to a considerable extent in the "Illustrated Exhibitor."—AMINTUS (Glasgow) will get Dr. Beard's "Latin Made Easy," by applying Simpkin and Marshall, London. A list of errata will be g the volume.

RICHARD RIGBY (Brades) wishes us to tell him more abo ceedings than we know ourselves. Now, curiosity is very pr when properly directed. What we have said in former numb work, we are making every effort to fulfil. Let this be co law of gravitation holds good in respect to all bodies. Tw very unequal weight let fall from a high tower, would reach in the same time. This is nicely illustrated by the *Guinea* experiment. In the exhausted receiver of an air-pump th to the bottom of the receiver at one and the same instant.— SIMPSON (Yorkshire) may acquire a pretty good knowledge o three months.—UN JEUNE MONTAGNARD (Glasgow): We to remain in his present employ, to try to improve his hand do everything to please his employers. His reward will come so *Perseverantia vincit omnia*.—J. O. N. (Liverpool) has been r will be attended to with pleasure.—The CLASS OF WORKM (Leicester), which wrote to us by the hands of the chairman to get a book on ETIQUETTE, written by AGATHOS; it is p Longmans, Paternoster-row; we believe the price is 1s.— (Cheltenham): His solution of query 8, p. 223, is wron queries 3 and 4, are right.—R. S. (Piccadilly): Proceed wil by all means. Get Cassell's Shilling Euclid.—JOHN WRIGH The solutions will be given.—J. C. G. M. (Walworth): His query 3, p. 223, is wrong.—HORATIO BLYTH (Norwich): H at composition is passable. *Heralded* is not a good word speaking of the beginning of time. The *Almighty* is the l use for *God*, when speaking of creation. He was indeed A and the *Hebrew* word is best rendered by this *English* word. term *Omnipotent*.—ISLINGTONIAN, if he wishes to be a man his face against theatricals and novels. History and b good. Let him study Latin and English well, and stick t —C. BOLDERO (Shrewsbury): He has now got the Latin k go on and prosper; fortune favours the brave.—A WO (Aberdeenshire): Received.—W. S. G—N: His solution p. 223, is wrong; those of queries 4, 5, and 6, are rig CRAWFORD (Largs), has also sent right solutions of th DAWSON (Knaresborough): His solutions of queries 1 and 2 a of queries 2 and 4, right.—JOHN DENNIS (Droylsde pleased with his communication, and shall take his hints w We shall be down on Naper's bones soon, and the circle too We shall make some use of his interesting communication.

V. A. (Richmond): His solution of the cup question is r (Coventry) should consult the Key to the Latin Lessons in t EDUCATOR.—A LAD who works in a factory should consult tions for Degrees in the London University Almanack: any nected with that university is open to him.—JAMES HALL that is required for the German in the POPULAR EDUCA (Torpoint): Professor Liebig, of Giessen, is reckoned the Chemist of the day; but he is a German.—NIL DESPERANDU *An* is used as well as *ne*, but the distinction will be pointe lessons.—A LABOURER (St. Osyth) will find the answer in the Latin Lessons.—W. S. WAKEFIELD (Waltham Abbe his benevolent plan would not succeed.—MECENAS (Lond solution to the following:—If two circles touch each other and parallel diameters be drawn; the straight lines join extremities of the diameter shall pass through the point of "Bland's Geometrical Problems," sect. 2, No. 85.—F. W. should study Geometry, beginning with the lectures on Eu (Aberdeen) will obtain all he wants in succeeding less (Brighton): Both.—R. BOWEN (Hayes): His suggestions ar H. H. (Farnham): England allowed an institution for th civil engineers to die. There is now no remedy but appr I. H. (Tyldesley): As the lines of small angles are nearly to the angles themselves, you will find the sine of 8′′·65 by the sine of 1′ by 8·65 and dividing by 60.—DEXTER (York geometrical solution to the following question, in Dr. Thom prop. 26, book 3 of the appendix.

> "A gentleman a garden had,
> Five score feet long, and four score broad;
> A walk of equal width all round,
> He made, that took up half the ground;
> Ye skilful in Geometry,
> Tell us how wide the walk must be."

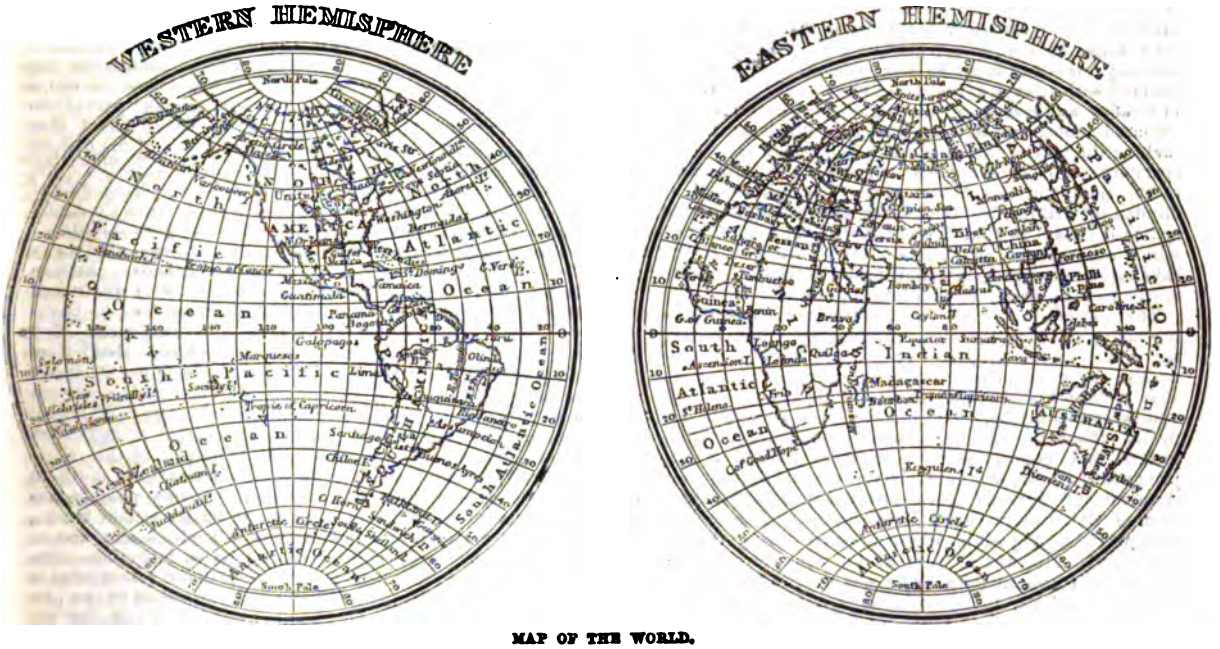
Construct the rectangle according to its dimensions, draw t and find the centre of the circle inscribed in the triangle. the sides drawn through this point will divide the rect quired.—A. E. should walk and converse with a friend, as can; one wiser and older than himself.

Printed and Published by JOHN CASSELL, La Belle Sauvage Ya hill, London.—August 7, 1852.

LESSONS IN GEOGRAPHY.—No. VI.

GEOGRAPHICAL DISCOVERIES OF THE SIXTEENTH AND SEVENTEENTH CENTURIES.

The new information gained by the old world, through the discovery of America and the voyage of Vasco de Gama, required a long period for its proper regulation and systematic arrangement. The ignorance which still prevailed among the ablest navigators and geographers, at the end of the fifteenth century, was such that, when Christopher Columbus, in his third voyage, discovered continental America, the violence of the billows, and the agitation of the sea at the mouth of the Orinoco, led him to believe that he was in the highest part of the globe, and consequently, in the regions of paradise! But the discovery of the new world revived and reinvigorated the desire for voyages to the north, and set them on a better footing. It appears, indeed, that previous to his grand discovery, Columbus had himself performed a voyage in the northern seas, and had even visited Iceland. This voyage, according to a note of the event found in his own handwriting, took place in 1467.



MAP OF THE WORLD.

John and Sebastian Cabot, who were employed in the expedition by Henry VII. of England, discovered the island of Newfoundland, and sailed along a considerable extent of the coast of North America. France, desirous of having her share of the spoil, fitted out an expedition under J. Cartier, who sailed from Dieppe in 1534; discovered Canada, and took possession of it in the name of his government. The grand object of these voyages in the northern seas, was the discovery of a north-west passage to India. The infatuated question of a communication between the two great oceans at the north, occupied the minds of geographers and navigators at that period, as much as it has done in the present day. How singular that this infatuation still occupies the public mind! Even on the supposition that such a passage really existed, and had been actually discovered, and put in evidence by the reappearance of Franklin in Europe from the East, of what use would such a frightful and dangerous passage be to the mercantile interests of the world? Surely it would still be better to pursue the ordinary route to India, either by sea or land, than to run the danger and risk of losing ships, property, and men, by sailing through floating mountains of ice, unknown rocks, and uninhabited and inhospitable coasts.

The voyage of Willoughby in 1553, although it ended in a sad shipwreck on the eastern coast of Lapland, added to geographical knowledge, by the discovery of Nova Zembla. Frobisher, under Queen Elizabeth, was more fortunate; his three voyages, performed between 1576 and 1578, ended in some discoveries, among which were the straits which bear his name, situated between Hudson's Straits and Cumberland Straits. John Davis, in the same reign, in his exploratory voyages performed in 1585, 1586, and 1587, threw a clearer light on the geography of the circumpolar regions of the north. In 1596 the Dutch discovered Spitzbergen; and eleven years afterwards it was rediscovered by Hudson, who performed four voyages, from 1607 to 1611, in order to find the passage to India either across the pole itself or to the north-west. In the fourth, he discovered the bay which bears his name. In the following year Thomas Button, penetrating into this northern Mediterranean, reached the mouth of the river Nelson. William Baffin enjoyed still greater success. In his second exploratory voyage, in 1616, he successively discovered and gave name to the following places in the arctic regions:—Cape Dudley Digges, in latitude 76° 35′ N.; the bay of Wolstenholme; the bay of Whales, in latitude 77° 30′ N.; the island of Hackluyt; the bay of Sir Thomas Smith, in latitude 78° N.; also the Carey Islands, the bay of Alderman Jones, and Lancaster Sound. In this expedition, he explored

the bay which has immortalised his name, and determined the geographical position of a great number of points.

During the sixteenth century, while discoveries were multiplied and expeditions became fruitful and productive, geographical science still remained in its infantile state, and as yet received little advantage from their progress. Light was breaking in upon all sides, but this science was immersed in darkness. A glance at the fantastical maps which preceded the glorious era of the Reformation, will show how profound was the ignorance of the geographers of that period. In our last lesson, a specimen of one of these maps was given in the fac-simile of the map of Africa belonging to the pilot of Christopher Columbus. In such maps of the world, the principal cities are denoted by little houses or churches roughly sketched; Jerusalem occupies the centre of the globe: paradise is surrounded with its impenetrable enclosure of verdant foliage; and the geographical illustrations are the most whimsical that can be imagined. The winds are represented by fabulous divinities, as sitting all round the world upon leathern bottles, whose sides they are pressing to force out the air; Western Africa is made to terminate at Cape Nun, then at Cape Bojador; the celebrated statue of the Canaries is seen flourishing his club at the top of a high tower; the coasts of the adjacent continent are lengthened in proportion to the discoveries of the Portuguese; Abyssinia figures with its Prester John, having on his head a brilliant mitre; the other kingdoms of Africa are denoted by their kings in costumes, enriched with gold and silver embroidery; this continent so long unknown, is represented as peopled with strange animals and black men; there are groups of giraffes and elephants; Portuguese camps are indicated by coloured tents; and light cavalry, splendidly caparisoned, are making the tour of this mysterious continent. In short, these specimens of chartographical art, are the faithful expression of the science of the middle ages. The pilot's map, already alluded to, will furnish the reader with examples of the preceding details. Behold the contrast in the map of the world which accompanies this lesson! We have inserted this map thus early in our progress, that it may be useful for reference; it will be fully described in a future lesson.

The period preceding the Reformation, was the era of legendary and popular tales, and geography had its fabulous age as well as its antiquity; only the fantastic notions of the middle ages were less marked by ingenuity and variety. Prester John has been mentioned. This was one of their most widely-spread myths. The name of this personage first appeared about the middle of the twelfth century. It was the general and popular belief that there existed a pontifical prince called John, who governed vast countries situated beyond Armenia and Persia. It was asserted that he professed that form of Christianity called Nestorianism. Ere long he was transported to Abyssinia, where he ruled during three or four centuries! He was as rich as he was powerful, and as formidable to his enemies, as he was dear to his subjects. In Asia or in Africa, there was always a formidable monarch, dwelling in a world of prodigies, over which he reigned as omnipotent master!

The vain tradition of El Dorado was no less believed at the period under review. This fiction, which travelled to America under the name which has given celebrity to it, in the first half of the sixteenth century, was applied to a country, that previously existed only in the imagination of the inhabitants of Europe. Although its true name is lost, it was at last placed in the new world, in the country of Santa Fé, in those regions of South America watered by the mighty streams of the Amazon, and which were scarcely known to Europeans. El Dorado, this name sufficiently indicates the nature of the imaginary country to which it was applied. It was the country of riches; there, were to be seen cities glittering with gold; there, so common was this metal, that it was used even in the most common household utensils. How unfortunate for ages, were the adventures in search of this golden dream! How many victims have been deceived by this dangerous tradition! Is this El Dorado to be at last realised in our own day? Are California and Australia to give actual existence to the fables of the middle ages? Modern appliances are great; chemistry and geology have done wonders; and human industry has encountered what at the beginning of the present century were deemed impossibilities. But let us not be too sanguine now, as to the realities of our colonial possessions. Even gold may become a drug; and how sad that state of society would be, when this most precious of metals, having made all rich, would fail to purchase that human labour, from which our comforts flow!

There has been also the fable of the kingdom of Paititi, a sort of counterpart of El Dorado, another garden of the Hesperides, where inexhaustible treasures awaited the immortal sufficiently well instructed to follow the track. This kingdom or empire was supposed to be situated in the plains of the Maranon, and to have been founded by the Incas of Peru, whose descendants knew how to conceal it from the view of the Spaniards by powerful enchantments. By degrees this myth was embellished with a thousand fables, and the Catholic missionaries themselves contributed not a little to propagate the conviction that this imaginary kingdom was a reality. This state of things continued even to the second half of the seventeenth century. The close of the sixteenth ages, therefore, had its mythical or fabulous geography, notwithstanding the real and ultimate progress made by the spirit of discovery. True science had not yet made its appearance.

The fifteenth century having closed with the two most memorable geographical events of modern times, the discovery of the New World, and the periplus of the African continent, the sixteenth century beheld the extension and success of European enterprise in distant seas. The Pacific Ocean, which Balboa had opened up to the fleets of Christendom, were navigated and explored by daring mariners. Soares discovered the Maldive Islands; another Portuguese, the Moluccas or Spice Islands; Villalobos, a group now supposed to make part of the Philippine Islands; Juan Fernandez, the small island which bears his name, and celebrated as the foundation of the story of *Robinson Crusoe*. To the latter, also, has been assigned the discovery of New Zealand. In 1567 Alvaro de Mendana first landed on the Solomon Isles, the isle of Santa Cruz, and others. Nearly thirty years later, the same navigator discovered the Marquesas, and the Archipelago, which was afterwards called by Carteret Queen Charlotte's Islands. Then came Drake; the Dutchman Van Noort; Quiros, who discovered Tahiti, and the Archipelago of the New Hebrides (or the Cyclades of Bougainville); Torres, who discovered Torres Guinea, and the strait which separates this large island from Australia,—all began to clear up the navigation of the Pacific or South Sea. In the interval, Sebald de Weert, fellow-navigator with Van Noort, had recognised the Malouines or Falkland Islands, discovered by John Davis. Two of his crew, Le Maire and Schouten, discovered in 1615, part of the Straits of Terra del Fuego, and Cape Horn, which forms the extremity of the American continent. A new passage thenceforward open to navigators bound for the Pacific, who were desirous of avoiding the difficulties and dangers which were to be dreaded in the straits of Magellan. The honour of having first landed on New Holland (Australia) is generally attributed to Dirk Hartog, who attached his name to that of this continent, which he had discovered, the name of his vessel he commanded, by calling it Endracht's land. Others, in 1618; Edels, in 1619; De Nuyts, in 1627; and lastly, De Witt, Carpenter, and Pelsart completed this part of the discovery.

It is not positively known whether the Spaniards or Portuguese had not visited the coasts of Australia in the sixteenth century before the Dutch, as two chartographical documents of that date would lead us to believe. Neither is it certain that the Portuguese Menezes and the Spaniard Saavedra had discovered New Guinea, the one in 1527, and the other the following year. The memorable voyage of Abel Tasman produced rapid and striking progress in the geography of Oceanica, or Australasia and Polynesia. This navigator, sailing from Batavia in 1642, discovered Van Diemen's Land, otherwise called after him Tasmania. The map of Australia was then completed, and the assurance was given that this continent did not extend indefinitely towards the south pole. Shortly after, the expedition landed on New Zealand; then it discovered the Friendly Islands, and the Tongataboo. Lastly, after a successful expedition of nine months, at the end of which it visited New Guinea, and discovered several islands to the north of it and of the coast of New Britain, the Dutch refitted their vessels in the port

Batavia, the capital of Java. It was only in 1665 that the name of *Nova Hollandia*, or New Holland, was given to the western part of Australia by a decree of the States-General of the parent country.

In 1700 Dampier, at this time celebrated for his buccaneer (piratical) expeditions, discovered some new islands to the north of New Guinea, and Papuasia,—that is, small islands contiguous to New Guinea, which was also called Papua. Wood Rogers sailed round the world in three years and three months, and encouraged by his successful expedition, the maritime powers proceeded to attempt similar enterprises, hitherto considered as extremely dangerous. Towards the end of the preceding century, France had also made expeditions into the Southern Ocean. Her first vessel which appeared in the Pacific Ocean, was commanded by one Lafeuillade; but the voyage, which took place in 1667, produced no new discovery.

The discoveries of the Russians in the north of Asia must be noticed. At the beginning of the seventeenth century, they knew nothing of the coasts of Siberia beyond the Yenisei. War and conquests laid open to the emperors the way to this immense region. In the space of less than a century, the whole of northern Asia, from the frontiers of China to the Frozen Ocean, was reduced under the crown of Russia. Geography was benefited by this annexation, which gave to the Russians new facilities for performing useful explorations in these inhospitable countries. In 1728 Behring alone made the important discovery of the strait which separates Asia from America, and rendered the peopling of the new world no longer a question of difficulty or doubt.

The northern circumpolar regions had not been the theatre of any important expedition, from that of Baffin, above mentioned, until the middle of the eighteenth century. The era of scientific expeditions was now begun. Geography, so long retarded in her progress to perfection, proceeded with a a sure and rapid step. This was the most brilliant period of the history of navigation from the time of the great discoveries of the sixteenth century. It was particularly remarkable for the positive character of its results. Bougainville, who had gained renown in the wars of Canada, anticipated that which he gained as a navigator, by an expedition to the Malouine or Falkland islands where he went to found a French colony in 1764. The circumnavigation of the world by commodore Byron, also begun in the same year, produced very important results; and so did the voyages of Wallis and Carteret, in clearing up some practical questions relating to the geography of Oceanica. Carteret, in particular, determined the geographical positions (that is, the latitudes and longitudes) of several islands in the direction of New Britain; his vessel having been the first English man-of-war which had touched at the island of Celebes. Three years after his first voyage, in 1767, Bougainville undertook his grand expedition to circumnavigate the globe. After a short stay in the river La Plata, he was detained in the straits of Magellan no less than a period of fifty-two days. He then entered the South Sea, and discovered the islands of Pomotou, which he called the Dangerous Archipelago. He then entered the chief port of Tahiti; his transactions with the inhabitants of New Cythera were not only pacific but amicable. He next visited the Navigator's island, or Samoa, touched at Papua or New Guinea, discovered to the east of it an archipelago which he called Louisiade, several of the Admiralty Isles, and another called by his own name near Solomon Isles. In the same direction he discovered several other islands of less importance, which had been seen by other navigators; and having visited New Ireland, discovered by Carteret, he arrived at Batavia; whence, he sailed to Europe by the Cape of Good Hope. This expedition was well received in France and in Europe; it had made several important discoveries, and had been marked with interesting episodes which were related with spirit and talent; and created a still greater desire for circumnavigating expeditions.

Questions on the preceding Lesson.

Who discovered America? Had this discovery any immediate effect on geographical science? What was the object of the voyages to the northern regions in the 17th century? What discoveries did Frobisher, Davis, and Baffin make at this period? What appearance did the maps of the world then present? Who was Prester John? What was the nature of the fiction of El Dorado? and of that of Paititi? Name some of the discoverers in Australasia and Polynesia. What English names occur at this period as discoverers? What French names? Who first set foot on Australia? Who gave it the name of New Holland? Who discovered Van Diemen's Land? What was it at first called? Who sailed round the world at the beginning of the 18th century? Who discovered the narrow straits between Asia and America? What difficult question did this discovery solve? Who was Bougainville? and what discoveries did he make?

LESSONS IN FRENCH.—No. XIX.

By Professor Louis Fasquelle, LL.D.

Section XI.

THE PAST INDEFINITE. [§ 121.]

1. The past indefinite is composed of the present of the indicative of one of the auxiliary verbs, avoir and être [§45 (8)], and the participle past of a verb. See the different paradigms of verbs, § 47 and following sections.

J'ai parlé, je suis arrivé. — *I have spoken, I have arrived.*

2. The past indefinite is used to express an action entirely completed, but performed at a time of which a part is not yet elapsed, or at a time entirely past, but not specified. [§ 121 (1) (2)]:—

J'ai vu votre père ce matin. — *I have seen your father this morning.*
Je ne vous ai pas encore parlé. — *I have not yet spoken to you.*

The past indefinite may also be used, when the time is specified [§ 121 (3)]:—

Je lui ai écrit la semaine dernière. — *I wrote to him last week.*
Je lui ai envoyé une lettre le mois dernier. — *I sent him a letter yesterday.*

4. In this tense and in other compound tenses, the adverb is generally placed between the auxiliary verb and the participle [§ 136 (3)]:—

Vous nous avez souvent parlé. — *You have often spoken to us.*
Je ne l'ai pas encore vu. — *I have not yet seen him*

5. The adverbs aujourd'hui, *to-day*; demain, *to-morrow*; hier, *yesterday*; polysyllabic adverbs of manner ending in *ment*, and long adverbs generally, do not come between the auxiliary verb and the participle, but follow Rule 1. Sect. 33. See § 136 (5):—

Vous avez lu dernièrement. — *You read lately.*

6. The unipersonal verb y avoir [Sect. 32, R. 3, 4], placed before a word expressing time, corresponds with the English word, *ago*:—

J'ai reçu une lettre, il y a huit jours. — *I received a letter eight days ago.*
Vous avez acheté une maison, il y a un an. — *You bought a house a year ago.*

Résumé of Examples.

Vos neveux nous ont parlé.	*Your nephew spoke to us.*
Nous avons parlé à votre père.	*We spoke to your father.*
Le tailleur a-t-il fait mon habit?	*Has the tailor made my coat?*
Le boulanger a mis son chapeau.	*The baker has put on his hat.*
Le cordonnier a ôté ses souliers.	*The shoemaker has taken his shoes off.*
Votre frère a dit quelque chose.	*Your brother said something.*
Votre sœur qu'a-t-elle dit?	*What did your sister say?*
N'avez vous rien dit à mon cousin?	*Have you told my cousin nothing?*
Je ne lui ai rien dit.	*I have told him nothing.*
Je ne l'ai jamais rencontré.	*I have never met him.*
Je ne leur ai jamais parlé.	*I never spoke to them.*
Qu'avez vous fait aujourd'hui?	*What have you done to-day?*
Hier, nous n'avons pas travaillé.	*We did not work yesterday.*
Leur en avez vous souvent parlé?	*Have you often spoken to them about it?*
Je leur en ai souvent parlé.	*I have often spoken to them about it.*
Je ne le leur ai pas encore dit.	*I have not yet said any thing to them about it.*
N'avez vous pas assez écrit?	*Have you not written enough?*
Il m'a écrit, il y a longtemps.	*He wrote to me a long time ago.*
Il nous a répondu il y a un mois.	*He replied to us a month ago.*

Exercise 79.

Avocat, m. *barrister;*	Garçon, m *boy ;*	Mis, *from* mettre, *put on;*
Cela, ceci, *that, this;*	Hier, *yesterday;*	Planter, 1. *to plant;*
Dit, *from* dire, *said;*	Journée, f. *day;*	Poirier, m. *pear-tree;*
Etudier, 1. *to study;*	Lu, *from* lire, *read;*	Soulier, m. *shoe;*
Gant, m. *glove;*	Ministre, m. *minister;*	Vu, *from* voir, *seen.*

1. Qui vous a dit cela? 2. L'avocat me l'a dit. 3. Lui avez vous parlé de cette affaire? 4. Je ne lui en ai pas encore parlé. 5. L'avez vous vu dernièrement? 6. Je l'ai vu il y a quelques jours. 7. N'avez vous pas écrit hier? 8. Nous avons lu et écrit toute la journée. [Sect. 25 (9).] 9. N'avez vous pas ôté vos gants et vos souliers? 10. Je n'ai pas ôté mes gants, mais j'ai ôté mon chapeau? 11. Le tailleur n'a-t-il pas mis son chapeau? 12. Oui, Monsieur, il a mis son chapeau. 13. Qu'avez vous fait à ce petit garçon? 14. Je ne lui ai rien fait. 15. Ne lui avez avous point dit que je suis ici? 16. Je ne le lui ai pas encore dit. 17. Qu'avez vous étudié ce matin? 18. Nous avons étudié nos leçons et nous avons lu nos livres. 19. Le jardinier du ministre a-t-il planté le poirier? 20. Il l'a planté il y a plus de huit jours. 21. Avez vous acheté un habit de drap noir? 22. J'en ai acheté un. 23. L'avez vous porté aujourd'hui? 24. Je ne l'ai pas encore porté. 25. Nous avons mis nos souliers et nos bas ce matin.

Exercise 80.

1. Have you studied to-day? 2. We have no time to study, we have read a page. 3. Have you not written to my brother? 4. I have not yet written to him. 5. Has not the German written to my mother? 6. He has not yet written to her. 7. Have you told (*à*) my mother that I have taken (*pris*) this book? 8. I have not yet seen your mother. 9. What have you done this morning? 10. We have done nothing. 11. Have you taken off your coat? 12. I have not taken off my coat, it is too cold. 13. Has the bookseller written to your brother? 14. He wrote to him a long time ago. 15. Did he write to him a month ago? 16. He wrote to him more than a year ago. 17. Have you planted a pear-tree? 18. We have planted several. 19. Is it too cold to *(pour)* plant trees? 20. It is too warm. 21. What has the gardener done to your little boy? 22. He has done nothing to him. 23. Has any one done any thing to him? 24. No one has done anything to him. 25. Is anything the matter with him? 26. Nothing is the matter with him. 27. Has your father put on his black hat? 28. No, Sir, he has not put on his black hat. 29. What has your brother said? 30. He has said nothing. 31. Has your sister told you that? 32. She told it me. 33. Did you not work yesterday? 34. We did not work yesterday, we had nothing to do. 35. Your little boy has done nothing to-day.

Section XLI.

The Past Participle. [§ 134.]

1. The past participle, which in French forms a part of every compound tense [§ 45 (8)], is susceptible of changes in its termination.

2. The student will find in the table of the terminations of the regular verbs [§ 60], the different changes which the past participle of these verbs undergoes. The feminine terminations of the past participle of the irregular verbs, will be found in the alphabetical table, § 62.

3. The last letter of the feminine termination is always an *e* mute.

4. The plural of a past participle not ending with an *s*, is formed by the addition of that letter to the singular, masculine or feminine.

5. The participle past, accompanied by the auxiliary verb avoir, never agrees with the nominative or subject [§ 134 (3)]:—

Les demoiselles ont chanté.	*The young ladies sang.*
Ces messieurs ont lu toute la journée.	*Those gentlemen read the whole day.*

6. The participle past, having être as its auxiliary verb, assumes in its termination the gender and number of the subject [§ 134 (2)]:—

Ma fille est arrivée ce matin.	*My daughter arrived this morning.*
Nos frères ne sont pas venus.	*Our brothers are not come.*

7. The participle, accompanied by the auxiliary verb avoir, agrees in gender and number with its direct object or re direct [§ 2 (2), § 42 (4)], when that object precedes [§ 134 (4) —

Les dames que nous avons vues.	*The ladies whom we have se*
Les lettres que nous avons lues.	*The letters which we have re*

8. When the régime direct or objective (accusative) fo the participle, no agreement takes place [§ 134 (5)]:—

Avez vous vu les dames?	*Have you seen the ladies?*
Avons nous lu les lettres?	*Have we read the letters?*

9. A participle past never agrees with its régime indire indirect object (dative or ablative) [§ 2 (3), § 42 (5)]:—

Les dames à qui nous avons parlé.	*The ladies to whom we have*

10. The participle past used adjectively, that is, with auxiliary verb follows the rule of the adjective [§ 134 (1)]:—

Des livres bien imprimés.	*Well printed book*

11. The participle, preceded by the relative pronoun remains invariable, although the en should relate to a fe or plural noun [§ 135 (7)]:—

Avez vous apporté des plumes?	*Have you brought an*
J'en ai apporté.	*I have brought some.*

12. The presence of en does not, however, prevent the ment of the participle, when it is preceded by a direct re [§ 135 (7)]:—

Les plumes que j'en ai apportées.	*The pens which I have brought*

Résumé of Examples.

Vos sœurs ont elles écrit?	*Have your sisters written*
Elles n'ont pas encore écrit.	*They have not yet written.*
Les lettres que nous avons écrites.	*The letters which we have*
Avez vous écrit vos lettres?	*Have you written your lett*
Je les ai lues, je les ai écrites.	*I have read them, I have writ*
Les avez vous apportées?	*Have you brought the*
Je ne les ai pas apportées.	*I have not brought the*
Avez vous appelé ces dames?	*Have you called the*
Je ne les ai pas appelées.	*I have not called the*
Qui avez vous vu ce matin?	*Whom have you*
Nous avons vu ces demoiselles.	*We have seen those*
Nous les avons vues.	*We have seen them.*
Nous ne leur avons pas parlé.	*We have not spoken*
Avez vous des livres reliés?	*Have you bound*
J'ai des livres brochés.	*I have unbound (sta*
	covers,) books.
Avez vous acheté des pommes?	*Have you bought*
J'en ai acheté.	*I have bought some.*
Nous en avons acheté.	*We have bought some.*
Nous les en avons persuadés.	*We have persuaded*

Exercise 81.

Achet-er, 1. *to buy.* [§ 49 (5).]	Donn-er 1, *to give;*	Gard er, 1.
Appart-enir, 1. *to belong;*	Dit, *from* dire, 4 ir. *said;*	Gravure f.
Appel-er, 1. *to call.* [§ 49 (4).]	Entend-re, 4. *to hear;*	Oubli-er, 1.
Broch-er, 1. *to stitch;*	Examin-er, 1. *to examine;*	Rec-evoir,
Bourse, f. *purse;*	Exprès, *on purpose;*	Reli-er, 1.
Cass-er, 1. *to break;*	Fleur, f. *flower;*	Revenu, m.
Commission, f. *errand.*		Tasse, f.
		Vu, *from* voir.

1. Nous avez vous apporté nos habits? 2. Nou avons pas encore apportés. 3. Les avez vous oubliés? ne les avons pas oubliés, mais nous n'avons pas eu le les apporter. 5. Pourquoi n'avez vous pas appelé l chands? 6. Je les ai appelés, mais ils ne m'ont pas 7. Avez vous entendu cette musique? 8. Je l'ai en 9. N'avez vous pas vu les jolies fleurs que j'ai apportées Je les ai vues; à qui les avez vous données? 11. Je données à personne, je les ai gardées pour vous. 1 vous bien examiné ces gravures? 13. Je les ai bien ex 14. Les avez vous achetées. 15. Je ne les ai point 16. N'avez vous point reçu vos revenus? 17. Je point encore reçus. 18. La domestique a-t-elle c tasses? 19. Elles les a cassées. 20. A-t-elle casse exprès. 21. Elle n'en a pas cassé exprès. 22. A acheté des livres reliés ou brochés. 23. J'ai achet reliés. 24. Nous avez vous dit ces paroles? 25.

les avons dites, mais vous les avez oubliées. 26. Je n'ai pas oublié votre commission.

Exercise 82.

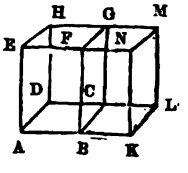
1. Have you seen my cups? 2. I have not yet seen them. 3. Have you brought me my books? 4. I have not forgotten them, I have left them (*laisse-er*, 1.) at my brother's. 5. Has your mother called your sisters? 6. She has not yet called them. 7. Has the servant told you this news? (*nouvelle.*) 8. She has told me this news. 9. She has told it me. 10. Have you forgotten my errand? 11. We have not forgotten it, we have forgotten your money. 12. Where have you left your purse? 13. We left it at the merchant's. 14. Have you bought the beautiful (*belles*) engravings which I saw at your booksellers? 15. I have not seen them. 16. Has your mother bought them? 17. She has bought books, but she has bought no engravings. 18. Has that little girl broken my cups? 19. She has broken them on purpose. 20. Does that lady receive her income every month? 21. She receives it every six months. 22. Is the house which you have bought large? 23. I have bought no house. 24. Did you receive a letter from your father yesterday? 25. I received a letter from him four days ago. 26. Have you spoken to those ladies? 27. I have spoken to them. 28. Have you given them flowers? 29. I have given them some (*en*). 30. Are the books which you have bought bound? 31. No, Sir, they are in paper covers. 32. Have you examined that house? 33. I have not examined it. 34. Your brother (*en*) has examined several (*plusieurs*).

LESSONS IN GEOMETRY.—No. IX.

LECTURES ON EUCLID.

In our last lecture, we stopped just at the point when every one wished most anxiously to know what we had to say about a point; I mean a *geometrical point*. Well, we have often given the substance of Dr. Simson's explanation, when lecturing to a class without book; but here we must present our students with the *ipissima verba*, the very words themselves written by that learned man.

"It is necessary to consider a *solid*, that is, a magnitude which has *length*, *breadth*, and *thickness*, in order to understand aright the definitions of a point, a line, and a superficies; for all these are from a solid and exist in it. The boundary, or boundaries, which contain a solid, are called superficies,* or the boundary which is common to two solids which are contiguous (adjacent), or which divides one solid into two contiguous parts, is called a superficies. Thus, if B C G F be one of the boundaries which contain the solid A B C D E F G H,† or which is the common boundary of this solid, and the solid B K L C F N M G, and *is* therefore in the one, as well as in the other, solid; and is called a *superficies* and has *no thickness*. For, if it have any, this thickness must either be a part of the thickness of the solid A G, or of the solid B M, or a part of the thickness of each of them. It cannot be a part of the thickness of the solid B M; because if this solid be removed from the solid A G, the superficies B C G F, the boundary of the solid A G, remains still the same as it was. Nor can it be a part of the thickness of the solid A G; because if this thickness be removed from the solid B M, the superficies G F, the boundary of the solid B M, does nevertheless remain. Therefore the superficies has *no thickness, but only length and breadth.*



The boundary of a superficies is called a line, or a line is the common boundary of two superficies that are contiguous, or which divides one superficies into two contiguous parts. Thus, if B C be one of the boundaries which contain the superficies A B C D, or which is the common boundary of this superficies and of the superficies K B C L, which is contiguous to it, this boundary B C is called a line, and has no breadth. For, if it have any, this breadth must be part either of the breadth of the superficies A B C D, or of the superficies K B C L, or part of each of them. It is not part of the superficies K B C L; for, if this superficies be removed from the superficies A B C D, the line B C, which is the boundary of the superficies A B C D, remains the same as it was; nor can the breadth that B C is supposed to have be a part of the superficies A B C D; because, if this superficies be removed from the superficies K B C L, the line B C, which is the boundary of the superficies K B C L, does nevertheless remain. Therefore the line B C has no breadth. And, because the line B C is in a superficies, and that a superficies has *no thickness*, as was shown, therefore a line has *neither breadth nor thickness*, but *only length.*

The boundary of a line is called a point, or a point is the common boundary or extremity of two lines that are contiguous. Thus, if B be the extremity of the line A B, or the common extremity of the two lines A B and K B, this extremity is called a point, and has no length. For, if it have any, this length must either be part of the length of the line A B, or of the line K B. It is not a part of the length of K B; for if the line K B be removed from the line A B, the point B, which is the extremity of the line A B, remains the same as it was; nor is it a part of the length of the line A B; for, if the line A B be removed from the line K B, the point B, which is the extremity of the line K B, does nevertheless remain. Therefore the point B has *no length.* And, because a point is in a line, and that a line has *no length, breadth, or thickness;* therefore a point has *no length, breadth, or thickness.* And in this manner the definitions of *a point*, *a line*, and *a superficies* are to be understood."

This explanation of Dr. Simson is so complete that nothing can be added to it. He who does not understand in what sense the terms, point, line, superficies or surface, and solid are to be taken in the Greek Geometry, after what has been said above, must be unacquainted with the meaning of the simple words that are employed, or else deficient in the ordinary gift of human intellect. We shall not suppose that any of *our* readers are in either of these predicaments; and therefore we shall consider further explanation of these terms unnecessary. We come now to consider the important definition of a *straight* line. This Dr. Simson has not considered it requisite to explain. Yet great fault has been found with Euclid's definition, and not without justice. Of course, we take it as the Dr. has given it to us; for, to enter into the question of the meaning of the Greek terms, which he has translated, would lead us too far away from our chief object, and could not be expected to interest every reader. The principal fault of the definition of a straight line is, that in the explanation, no very definite property of a straight line is involved. The word *evenly*, on which it hinges, is in its application here, nearly synonymous with *straight;* and therefore the definition almost amounts to this: *a straight line is a straight line.* Seeing this, it has been declared, by some geometers, that the idea of a straight line is so simple and self-evident, that it is incapable of logical definition. However this may be, all writers on geometry, and all editors of Euclid, have considered it necessary to give some definition of a straight line. Our esteemed friend Dr. Thomson, in his edition, adopts the definition given by Professor Playfair, as a substitute for Euclid's; viz., "If two lines be such that they cannot coincide in two points without coinciding altogether, each of them is called a *straight* line." This definition is manifestly imperfect, because two arcs of the same circle, are two lines such that *in a certain position* they cannot coincide in two points without coinciding altogether, and yet neither of them is a *straight* line. Dr. Thomson felt this, and therefore in his notes, he added an explanation or illustration to the effect that it was necessary to consider the two lines *in all positions*, like two rulers placed alongside each other, and made to turn round and round on their axes, or *lengthwise* upon one another. In an edition referred to in our last lesson, an attempt is made to convey the idea of a straight line in the following manner:—"If a perfectly flexible string be pulled by its extremities in opposite directions, it will assume, between the two points of tension, a certain position. Were we to speak without the rigorous exactitude of geometry we should say that it formed a *straight line.* But upon consideration, it is plain that the string has weight, and that its weight produces a flexure in it, the convexity of which will be turned towards the surface of the earth. If we conceive the weight of the string to be extremely small, that flexure will be proportionably small; and if, by the process of abstraction, we conceive the string to have no

* This is a Latin word of the fifth declension like *res*, and it is the same in the nominative singular and the nominative plural; this is also read in its English use; in the present case it is plural.

† The letters here which represent the solid are those at each of its eight ...rs; afterwards the same solid is represented by two letters at opposite ...rs, the line joining which would pass right through the middle of the

weight, the flexure will altogether disappear, and the string will be *accurately a straight line.*" In this extract, it is plainly supposed that the two points between which the "flexible string" is pulled in opposite directions, are placed in a *horizontal* position; if at these points, pulleys were placed and the string made to pass over both with heavy weights balanced at each extremity, it can be shown by the laws of mechanics, that the string could never be made to assume the horizontal position, until the weights were increased to infinity; indeed, Dr. Whewell, in an early edition of his "Elementary Treatise on Mechanics," has added the following curiously-worded corollary to a problem of this kind:—

> "For no force, however great,
> Can stretch a cord, however fine,
> Into a horizontal line,
> That is exactly straight."

But what learner is able to enter into the spirit of this illustration, without a much greater knowledge both of geometry and mechanics, than he can be supposed to have at the commencement of his studies? Is it necessary to go thus far for an explanation of a straight line? With all the above learned discussion, the said "flexible string," *would not be*, as the writer strangely says, "accurately a *straight line*;" it would not in fact, be a *geometrical line* at all, *however straight*. Several other definitions of a straight line have been proposed, all of them more *physical* than *metaphysical*, that is, more dependant upon our notions of sensible objects, than upon our mental conceptions or abstractions. Plato, and long after him, Proclus, a commentator on Euclid, defines a straight line as that which viewed throughout its whole length from one extremity to the other, appears simply as a point. This is a very clever and ingenious definition; but here, you fancy you see a fellow taking up a straight line in his hand and looking at one end of it, in order to see along the whole of it to the other end of it, as if it were a ruler, or straight piece of iron. The definition of Archimedes, the prince of ancient mathematicians, is generally considered the best; viz., "A straight line is the shortest way or distance between two points." Every one knows and understands this definition; it is the metaphysical reason of the practical fact which occasions the formation of so many footpaths across our fields from one place to another. Men reason and act geometrically, without giving their actions the name of geometry. So do bees, as we shall see further on; but these do it by *instinct*; those *by reason*. Still, even this definition is defective, great as its author really was, both as a mathematician and a philosopher. The defect is, that it does not apply to an *indefinite* straight line, any more than Euclid's; it is *fixed* between two points. Hence the necessity of Euclid's *first postulate*. This defect was removed by an ingenious friend of ours, whose original views of many subjects shine forth more fully developed in those of the well-known and eminent sons he has left behind him; we mean the late Thomas Wright Hill, Esq.* of Birmingham. To him are we indebted for the complete definition of a *straight line* which we have added to Euclid's; viz., "A straight line is that in which, if any two points be taken, the part intercepted between them, is the shortest line that can be drawn between those points."

The definition of a plane superficies is due to Dr. Simson; for he says, "instead of the definition as it is in the Greek copies, a more distinct one is given from a property of a plane superficies, which is manifestly supposed in the Elements,—viz., that a straight line drawn from any point in a plane to any other point in it, is wholly in that plane." In the edition of Euclid above referred to, this definition is ascribed to Hero of Alexandria, and it is added that Plato defined a plane surface to be one whose extremities hide all the intermediate parts, the eye being placed in its continuation. Euclid's definition of a plane superficies was similar to that of a straight line given by him,—viz., that which lies evenly between its lines or boundaries. This, of course, is more objectionable even than that of a straight line. Why it is so we leave to our ingenious students to find out. In conclusion, we add that a plane superficies may be more correctly defined as that in which, if any two straight lines be taken, the part intercepted between them, is the least surface that can exist or can be supposed to exist between those lines. The distinction between a *plane* and a *curve* surface is this, that a straight line cannot be drawn in the latter in every possible tion, whereas in the former it can. A straight line cannot be on the surface of a sphere; it may be drawn on the surface cylinder or cone in one direction, but not in every possible tion.

* The father of Rowland Hill, Esq., the inventor of the Penny Postage scheme; of M. D. Hill, Esq., Q.C., and Recorder of Birmingham; of Frederick Hill, Esq., Government Inspector of Prisons; of Edwin Hill, Esq., Superintendent of the Postage Stamp Department; and of Arthur Hill, Esq., Conductor of Bruce Castle School, Tottenham.

Questions on the preceding Lesson.

Give Dr. Simson's explanation of a point; of a line; of a surface and of a solid. What is defective in Euclid's definition of a line? What is Playfair's definition of a straight line, as in Dr. Thomson's edition? Give some idea of the attempts to the definition of a straight line from physical notions. What a flexible string over pulleys placed in a horizontal line stretched by equal weights at each end, fail to represent as line? What is the definition of a straight line given by Proclus? What is the definition of it given by Archi What is the improvement made in this definition by Mr. H

(To be continued.)

LESSONS IN LATIN.—No. XVIII.

By John R. Beard, D.D.

REGULAR VERBS.

The First Conjugation.

ACTIVE VOICE.

Example.—Amo, *I love.*

Chief Parts; amo, amávi, amátum, amáre.

Characteristic letter, A long.

Parts with the corresponding English.

	Ind. Pres.	Sub. Pres.	Ind. Imp.
Latin.	amo	amem	amábam
English.	*I love / I do love, or / I am loving*	*I may love*	*I did love, or / I was loving*

	I. Fut.	II. Fut.
Latin.	amábo	amávero
English.	*I shall or will love*	*I shall have loved*

	Ind. Perf.	Sub. Perf.	Ind. Pluperf	Sub.
Latin.	amávi	amáverim	amáveram	amav
English.	*I have loved*	*I may have loved*	*I had loved*	*I mig* *hav*

	Inf. Pres.
Latin.	amáre
English.	*to love*

	I. Sup.	II. Sup.	Part Pres.	Fut P
Latin.	amátum	amátu	amánte	amatú
English.	*to love*	*to be loved*	*loving*	*about*

	Ger.	Ger.	Ger.	Ger.	I
Latin.	amandi	amando	amandum	amando	am
English.	*of loving*	*to loving*	*loving*	*by loving*	*to*

	Inf. Fut.	Imp.
Latin.	amatúrum esse	ama
English.	*to be about to love*	*love thou*

Before I proceed I will explain these contractio

Contractions.	Ind Pres.	Sub. Pr
Explanation.—	*Indicative Mood, Present Tense.*	*Subjunctive Mo Tense.*
Contractions.	Ind. Imp.	Sub. Im
Explanation.—	*Indicative Mood, Imperfect Tense.*	*Subjunctive Mo fect Tense.*
Contractions.	I. Fut.	II. Fut.	Ind. P
Explanation.—	*First Future Tense.*	*Second Future Tense.*	*Indicative Perfect*
Contractions.	Sub. Per.	Ind Plu
Explanation.—	*Subjunctive Mood, Perfect Tense*	*Indicative Mood fect Tense*
Contractions.	Sub Pluperf.	Inf. Pre
Explanation.—	*Subjunctive Mood, Pluperfect Tense.*	*Infinitive Mood Tense*
Contractions.	Inf. Perf.	Inf. Fut.	
Explanation.—	*Infinitive Mood, Perfect Tense.*	*Infinitive Mood, Future Tense.*	

Contractions.	I. Sup.	II. Sup.	Pres. Part.
Explanation.—	*First Supine.*	*Second Supine.*	*Present Participle.*
Contractions.	**Fut. Part.**	**Act.**	**Ger.**
Explanation.—	***Future Participle, Active Voice.***		***The Gerund.***

Having in the above corresponding parts given the Latin as well as the English of several members of the verb, I need not repeat them. I supply in full what remains. As I write for young men and women rather than for children, I omit adding the English in all the detail of the persons; for when you know what is the first person, you will readily supply the rest; thus, if the English of amaveram, the first person, is *I had loved*, you know that the English of amaveras, the second person, is *thou hadst loved*, and of amaverat, the third person, *he had loved;* so also in the plural.

Instead of *I might have loved*, the sub. pluperf. may sometimes be rendered (put into English) by *I would*, *I should*, or *I could have loved*.

In the corresponding English words, I have given the nearest approach to the several Latin parts. The student will do well to adhere strictly to these meanings at the first, though, as the correspondence between the several Latin and the several English parts is not entirely complete and constant, he will find occasions when his English will appear scarcely idiomatic, or strictly proper. He cannot, however, learn too soon, that in few particulars are any two languages exactly correspondent. Accordingly, for amo, I have set down what may be termed three meanings,—namely, *I love*, *I do love*, and *I am loving*. Here, it is obvious that the English is more rich than the Latin, inasmuch as it has three forms of the present tense indicative mood, while the Latin has but one form. Having but one form, the Latin cannot by a form indicate the variations of the English present tense. Consequently here is a want of strict correspondence; and here also is a source of doubt; for we may ask, what is the English equivalent of amo? is it, I *love*, or I *do* love, or I *am* lov*ing*?

After these remarks the student will know that it is with some latitude that he is to take these

Corresponding Latin and English Signs.

	Ind. Pres.	Sub. Pres.	Ind. Imp.	Sub. Imp.	I. Fut.	II. Fut.
Lat.	o	em	bam	rem	bo	ero
Eng.	*do*	*may*	*did*	*might*	*will*	*will have*

	Ind. Per.	Sub. Per.	Ind. Pluper.	Sub. Pluper.	Inf. Pres.
Lat.	i	erim	eram	issem	are
Eng.	*have*	*may have*	*had*	*might have*	*to*

Inf. Perf.—*Latin.* isse *English. to have.*

	Inf. Fut.	Imp.	I. Sup.	II. Sup.	Part. Pres.	Fut. Part. Act.
Lat.	rum esse	ama	um	u	ans	rus
Eng.	*about to*	*do*	*in order to*	*to*	*ing*	*on the point of.*

Give yourself a thorough practice in these signs. Again and again ask, until you are perfect, what is the English sign of the indicative mood present tense? what the Latin sign? what is the Latin sign of the sub. pluperf.? what the English sign of the same? So go through all the parts.

I hope you understand what I mean by these signs. Your understanding of them is the more important because they pertain not merely to the verb amo, or to the first conjugation, but to all the verbs; and because, when you are perfect in your knowledge of them as just given, you will easily put Latin into English and English into Latin. On the account of this importance, I will subjoin a few explanations.

These signs, then, might be called a set of equivalents, and I might have indicated them after this manner:—

i	=	have
bo	=	will
erim	=	may have

These signs or equivalents are, you see, without any verb. They are so given because they are applicable to all verbs. Thus to i you prefix the stem amav, and make amavi; so to *have* you add *I* and *loved*, and make the corresponding English, that is, the English equivalent of amavi,—namely, *I have loved*.

In some instances the English sign is arbitrary, or the best we can get; in the ind. pres. *love* is chosen as the E. S. (English sign) for the want of a better. Scarcely less arbitrary is the E. S. of the imp.,—namely, *did*.

These departures from exact correspondence, precision, and uniformity are certainly drawbacks; but, notwithstanding these drawbacks, great aid may be derived from a careful and systematic attention to the system here set forth.

I have said that these signs are applicable to all verbs. If so, they need not be repeated. And in general the statement is correct. You will, however, bear in mind what you have previously learnt as to the tense-endings, and the mood-endings; and then you will remember that instead of bo,—am, (es, &c.) is the ending, and as the ending so the sign of the first future of the third and the fourth conjugations. One or two other deviations will occur to you.

Moods, Tenses, &c. of Amo, *I love.*

		Indicative.	*Subjunctive.*	*Imperative.*	*Infinitive.*	*Participle.*
Present.	Sing.	amó	ame-*m*		amá-re	ama-*ns*
		ama-*s*	ame-*s*	ama or amá-*to*		
		ama-*t*	ame-*t*	amá-*to*		
	Plural.	amá-*mus*	amé-*mus*			
		amá-*tis*	amé-*tis*	amá-*te* or ama-		
		ama-*nt*	amé-*nt*	amá-*nto* [tóte		
Imperfect.	Sing.	amá-*bam*	amá *rem*			
		amá-*bas*	amá *res*			
		amá-*bat*	amá-*ret*			
	Plural.	ama-*bámus*	ama-*rémus*			
		ama-*bátis*	ama-*rétis*			
		ama-*bant*	ama-*rent*			
Future.	Sing.	amá-*bo*			ama-*túrum*	
		amá-*bis*			[esse	ama-*turus*
		amá-*bit*				
	Plural.	amá-*bimus*				
		amá-*bitis*				
		amá *bunt*				
Perfect.	Sing.	amá-*vi*	amá-(*ve*)*rim*		ama-(*vi*	
		ama-(*vi*)*sti**	amá-(*ve*)*ris*			esse
		amá-*vit*	amá-(*ve*)*rit*			
	Plural.	amá-*vimus*	ama-(*vé*)*rimus*			
		ama-(*vi*)*stis*	ama-(*vé*)*ritis*			
		ama-(*ve*)*runt*	amá-(*ve*)*rint*			
Pluperfect.	Sing.	amá-(*ve*)*ram*	ama-(*vi*)*ssem*			
		amá (*ve*)*ras*	ama-(*vi*)*sses*			
		amá (*ve*)*rat*	ama-(*vi*)*sset*			
	Plural.	ama-(*ve*)*rámus*	ama-(*vi*)*ssémus*			
		ama-(*ve*)*rátis*	ama-(*vi*)*ssétis*			
		ama-(*ve*)*rant*	ama-(*vi*)*ssent*			
II. Future.	Sing.	amá-(*ve*)*ro*				
		amá-(*ve*)*ris*				
		amá-(*ve*)*rit*				
	Plural.	amá-(*vi*)*rimus*				
		ama-(*vé*)*ritis*				
		amá-(*vi*)*rint*				

Gerunds.		Supines.	
Nom.	ama-*ndi*	1.	ama-*tum*
Dat.	ama-*ndo*		
Acc.	ama-*ndum*	2.	ama-*tu*
Abl.	ama-*ndo*		

Examples.—Like this model, conjugate laudo 1, *I praise*; curo 1, *I take care of*; voco 1, *I call*.

Compare together the II. Fut. with the Sub. Pres. You will find that the endings are the same, except in the first person, which in the former is *ro*, in the latter *rim*. In other words, the Latin language has no distinctive form beyond the first person for one or the other of these tenses. A distinction is attempted with the aid of the accent or the quantity. Thus the first person plural of the second future is sometimes pronounced long, as amaverímus. But the authority for this is not uniform, and consequently you find the sign of the long and the sign of the short vowel thus ¯ over the *i*; denoting that the vowel is sometimes pronounced with and sometimes without the accent.

* Ama-(*vi*)*sti* pronounced amavisti, as one word; the vi is put in brackets to denote that it may by syncopation (*shortening*) be omitted; as afterwards explained.

There is a difference between the first future, amabo, and the future formed with the aid of the future participle, thus, amaturus sum. Amabo means *I will* or *shall love*, simply indicating a future act, without determining when, or the precise point in the future when the act will take place. Amaturus sum signifies *I am about to love*,—that is, *I shall shortly love*; intimating that the action signified in the verb is near at hand, is in the immediate future.

Of the first future there is properly no subjunctive tense; the import, however, is expressed by combination, thus, amaturus sim (sis, sit, &c.), *I may be about to love*; amaturus essem, *I might be about to love*. The second future also is without a subjunctive mood.

Exercises.—Form according to the model now given, that is, write them out in full, with all the parts in both Latin and English, these verbs,—laudo 1, *I praise*; vigilo 1, *I watch*; compăro 1, *I procure*.

LESSONS IN GEOLOGY.—No. IX.

By Thomas W. Jenkyn, D.D., F.G.S.

CHAPTER I.

ON THE ACTION OF VOLCANOES ON THE EARTH'S CRUST.

SECTION V.

ON VOLCANIC PRODUCTS, OR THE MATERIALS ERUPTED FROM VOLCANOES.

The quantity of matter which volcanic fires abstract from the bowels of the earth, and throw up to the surface is enormous. It has been scientifically calculated, that a volcano has, in some instances, thrown up, even at a single eruption, more matter than if the entire mountain had been melted down to yield the supply. The question which must interest every geologist is, "Where does all this mass of matter come from?"

Among the various productions of volcanoes may be enumerated, gases, aqueous vapours, lava, minerals, scoriæ, stones, ashes, sand, water, and mud.

It is well known that volcanoes emit different kinds of gases, such as muriatic gas, sulphur combined with oxygen or with hydrogen, carbonic acid gas, and nitrogen, besides aqueous vapours.

Several of the simple minerals, and some of the metals are found in the melted materials ejected by volcanoes, such as common salt, chloride of iron, sulphate of soda, muriate and sulphate of potassa, iron, copper, lead, arsenic, and selenium.

The examination of these gases and minerals belong rather to chemistry than to geology. They are related to geology only as they give aid in the study of the mineral character of rocks. From the very nature of such mineral productions it was to be expected that volcanic substances should greatly vary in lithological character, from that of light ashes to that of compact and heavy crystalline rock. Nor is it a wonder that the quantity of mineral matter ejected is so great as it is, especially when you consider what a multiplicity of elementary substances are acted upon by the fires below, and how these elements in their fused state, strive to combine with each other in different ways and proportions. It has been ascertained that, within three square miles around Vesuvius, more specimens of the simple minerals have been found than on any other spot of the same dimensions. Of the 380 different species of minerals known to the celebrated Haüy, 82 had been found on Vesuvius alone.

Lava is a name given to any mineral matter melted in a volcano, and ejected in a stream over the rim of the crater. When the molten lava is consolidated by cooling, it receives fresh names, partly according to its mineral composition, and partly according to the slowness or rapidity of its refrigeration. Hence such names as scoriæ, cinders, pumice, basalt, trachyte, obsidian, &c.

The melted lava may be boiling for years within the walls or cliffs of a crater, as has been represented in fig. 11 and fig. 15, without flowing over its edges. When lava swells above the edges of a crater, and flows down the declivities of the hill, it does not spread itself on all sides as a flood of water would, but it moves in a tall half-rounded mass, not very unlike the engravings that you have seen of a tubular bridge. The sides of this moving body of lava harden so as to form something like two walls; and its upper surface also hardens, so as, with the two sides, to form a kind of tunnel through which the burning or incandescent matter flows.

This peculiarity of the walls of a lava current is well known in Italy, and by this knowledge men are able to deflect the burning stream, and to turn it aside from its intended course. The people make a gash in one of the hardened sides of the current. At this gash the lava will issue out, and discontinue the course which it threatened to take. By this method many villages and towns have been saved from the destruction which menaced them. An instance of this took place in Italy a few years ago. The people of Campania saw a current of lava descending from Vesuvius which was likely to overwhelm their hamlet. They immediately went up to meet the fiery stream, attacked it on the side farthest from their direction, and turned the current towards Paterno. When the inhabitants of Paterno heard of this manœuvre, they took up arms, arrested the operation, and caused the burning tide to take its own course.

As such a hardened crust is a good non-conductor of heat, the melted matter within it takes a long time to cool. The lava which flowed from Etna in 1819, was, nine months after the eruption, in a state sufficiently fluid or molten, to move at the rate of a yard a day. There is an instance, in the same mountain, of lava being in perceptible motion even ten years after the eruption. This deserves your notice, on account of a very remarkable fact, and a fact which may help to resolve some difficult problems in the examination of ancient rocks.

In 1828 a large mass of ice, several hundred square yards in extent, was found in Mount Ætna lying under a bed of lava, which had covered it while flowing in a melted state. How could this be? You can imagine that rain-water, or drifted snow, might freeze into a glacier at the elevation of ten thousand feet, which was the height at which this ice was found. This bed of ice was formed in a large hollow, while the volcano was in a state of rest. But, when the burning lava flowed over the ice, how is it that the ice did not melt? It is probable that the bed of ice had been previously covered by a thick shower of volcanic ashes. As such a layer of ashes is also a good non-conductor of heat, it prevented the ice from melting: and after the bed of lava had cooled over it, it continued to preserve the ice in an unmelted state. The truth of this theory is established by facts which occur about Ætna in the present day. In the higher regions of that mountain, the shepherds, in order to provide a supply of water for their flocks during summer, are in the habit of sprinkling beds of snow with a layer of volcanic sand, a few inches thick, and this is found to be an effectual means of preventing the sun from melting until it is wanted.

The term scoriæ or cinders, is applied to the fragmentary slags of lava which are ejected into the air, and then settle around the volcano. The structure of these cinders is owing entirely to the influence of the external air, and not to any special difference of material in composition. Whether lava flows like a stream, or is thrown up in jets, it cracks and becomes porous, as soon as it is acted upon by the atmospheric gases. The result is, that the pieces or fragments become cellular or vesicular,—that is, a mass full of small rounded holes, as may be seen in any specimens of pumice and lava. If lava is cooled under great pressure, it becomes compact, and even crystalline as in trap, trachyte, &c.

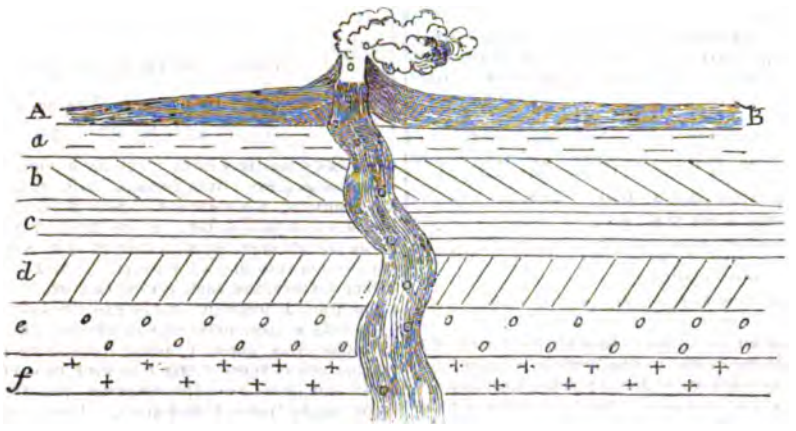
During an eruption, masses of stone are frequently thrown up into the air. Where do these stones come from, and come unmelted? When the little islet, called Graham's Island, rose in the Mediterranean, near the coast of Sicily, in 1831, its crater ejected pieces of dolomite rock, and fragments of limestone; and also masses of some pounds weight of Silurian rock. In the awful eruption of Tomboro, in Sumbawa, an island in the Molucca group, which took place in 1815, stones fell very thick—some of them as large as two flats, but most of them only of the size of a walnut. In a museum at Naples, are exhibited specimens of the various stones which have been ejected from the crater of Vesuvius. Several of these specimens are fragments of the limestone which prevails in the district, and these limestone specimens contain organic remains in them. These specimens prove that the vent of the volcano goes lower down than the limestone bed, and that the melted matter thrown up rubs against the sides of this rock, rends and tears portions of it off, and throws them up into the surface. These

imestone specimens are found to be impregnated with magesia, an element which entered it while it was being heated a this volcanic crucible.

In fig. 20, you see how the vent of a crater passes through arious beds of rock, such as A, B, C, D, E, F, some of which re fossiliferous, and others are of the more ancient class. The pper stratum, A B, is formed by the ejected matter which has een thrown up on all sides from the volcano.

Besides stones, it is found that volcanoes discharge a vast uantity of ASHES, hich darken the ir for hours, and ometimes for any days, and hich in their ill occasion great amage to agriulture, and to illages and owns. These dry nd hot ashes are robably only va pulverised r turned into owder by friction. It has been njectured by me that they iginate in the nd of bladdered oth which may ave once rested a the surface of ie incandescent atter while cooling under diminished pressure.

Fig. 20.



The vent of a volcano passing through various strata, and wearing away fragments from the sides of the rocks.

These ashes are sometimes like impalpable powder, but, in her instances, very heavy as a mass. During the eruption of mboro, in Sumbawa, in 1815, the ashes which fell, were so avy as to crush and destroy several houses even at forty les distance from the crater. Also at sea, to the west of matra, some thoud miles off from Tomro, the ashes and cinrs fell so thick as to at two feet deep on the rface of the sea, and der the passage of ps extremely difficult. other instances, the es were so light and tile as that, notwithnding an awning made cover the deck, they in heaps of a foot in th on many parts of vessel, and several s were thrown overrd.

The quantity of ashes charged by volcanoes st be immense. In 5 there was an erupn of Cosiguiana, a cano in the gulf of seca, on the shores of Pacific. During that ption, ashes fell at xillo, on the shores of Gulf of Mexico. Portn of this shower of es fell on board a ship twelve hundred miles westward of volcano, and four days later at Kingston, in Jamaica, 700 es eastward of it, having travelled in the air by an upper curt of west wind, at the rate of 170 miles a day. For about 30 es to the south of this volcano, ashes covered the ground e yards and a half deep. Thousands of cattle, wild animals, birds perished under the ashes. This fact assists the geologist in accounting for the bones and skeletons of extinct species of animals which are found in the ashes of ancient volcanoes, such as are found in Avergne, in France.

Many naturalists think that it was by such a shower of ashes that Pompeii and Herculaneum were destroyed, and that this accounts for the perfect preservation of even the most fragile articles found amid those fossil cities.

Some remarkable facts connected with the structure of these ashes deserve to be noticed. When Graham Island rose in the Mediterranean, in 1831, Dr. Davy mentions a shower of ashes which fell. In the substance of these ashes, he found fibres like vegetable fibre, and which had the smell of a burning sea weed. This has led to the conjecture that as sea-water entered the submarine volcano, fibres of weeds were sucked in with it. There is another fact more remarkable still. On Sept. 2, 1845, a Danish ship was sailing in 61° north latitude, a thick cloud was seen to approach the vessel from the N. W. in the direction of Iceland. The sails and the deck were immediately covered with ashes. These ashes had come from the volcano, Mount Hecla, which was in a state of eruption on that day. This volcano was 533 miles from the ship, so that the ashes must have travelled at the rate of 46 miles per hour. The famous Professor Ehrenberg examined this dust under a powerful microscope, and discovered that it abounded in well-known siliceous organic bodies, and in well preserved shells or cases of infusoria. This is a fact of great importance, as it helps us to account for certain volcanic dust found near extinct volcanoes such as the Eifel, on the Rhine.

Fig. 21.

Mud volcanoes, as seen by Humboldt at Turbaco, in New Grenada.

There are volcanoes which eject WATER, or whose craters are filled with it. The greater part of the vapour discharged by volcanoes is purely aqueous. It is this vapour when condensed by cold air that forms the springs which are on the sides of volcanic mountains. But, besides this aqueous vapour, there are cases in which water is a volcanic product. It has been argued by many that water acts an important part in the eruptions of volcanoes, since, of 300 volcanoes on the globe, two-thirds are situated in islands, and the greater part of the other third are either on the borders of the sea, or not far from the coast. There are, however, some volcanoes, such as those in Mexico and in Central Asia, which are very far from the sea.

Near Seminara, in Calabria, an earthquake opened a chasm in which a lake was formed 1785 feet long, and 937 broad. It was called Lago del Tolfino. The inhabitants of the district, from fear that the miasma from such a lake would be prejudicial to their health, tried to drain off its waters by means of canals. Their work proved vain, for the lake was found to be constantly filling from springs which issued at the bottom of the chasm.

In 1811 the volcanic island, afterwards called the Sabrina, was observed to rise from the sea near St. Michael, at the Azores. Its crater shot up cinders 700 or 800 feet above the level of the sea. These cinders were followed by an immense column of smoke. It began to rise in June. On the 4th of July it was high enough above the sea to form an island about a mile round. In its centre was a crater full of hot water, which discharged itself over one of the edges into the sea.

One of the most singular products of a volcano is MUD. When the aqueous vapours from the crater are condensed by the cold atmosphere, heavy rains are produced, which fall upon the volcanic dust on the sides of the mountain, and form a current of mud called by the Italians "lava d' aqua," or aqueous lava, an enemy much more dreaded than a stream of melted lava. It is disputed by some geologists whether it was not by such a flood of volcanic mud, rather than by volcanic showers, that Pompeii was destroyed. This, however, is only mud on the surface of volcanoes.

In some volcanic districts mud is found to ooze occasionally from the ground. Near Laureana in Calabria, the swampy soil of two ravines became filled with calcareous matter, which oozed out of their respective sides just before the shock of an earthquake was felt in that district. This mud flowing downward from both ravines, at last became united, formed one stream, increased in force, and was a mud river 225 feet wide and 15 feet deep. In its progress it overflowed a flock of goats, and tore up trees, which it carried on its bosom like the masts of small boats. When the mud became dry it was reduced in depth to about seven feet, and it was found to contain fragments of earth of iron colour.

I have now to call your attention to a real mud volcano, as represented by Von Humboldt, see fig. 21. Near Carthagena, in New Grenada, South America, there is a high hill called Popa. To the south-west of this hill there is a village district called Turbaco. In the midst of a thicket of palms is a marshy ground called Los Volcancitos. The tradition of the inhabitants is, that this ground was once all in flames, but that the fire had been extinguished by a monk who sprinkled the place with holy water. Since then the fire volcano has become a watery one.

The volcancitos are about 15 or 20 in number, stand in cones from 19 to 25 feet high, and measure around their bases from 78 to 85 feet each. On the top of each of these volcancitos is an aperture or depression from 15 to 30 inches in diameter, and filled with water, through which air-bubbles are constantly escaping, as seen in fig. 21. In other parts of the ground there are apertures for such escape of air, but which are not surrounded by cones. The cones have, no doubt, been raised by the clayey mud contained in the fluids, and the dull sound, which precedes every ebullition in the water of the cone, indicates that the ground is hollow. It seems that each crater receives its supply of air and gas from separate channels. These little craters are always filled with water, even in the driest seasons. The temperature of the water is not higher than that of the atmosphere.

These mud volcanoes originate with earthquakes, and their rise is accompanied with subterranean detonations and with jets of flame. Their diminished action supplies us with a specimen of the perpetual though subdued activity of the interior of the earth. The muddy water seems at the first ebullition to have been of a high temperature, but afterwards the temperature becomes lower. This fact implies that the vents, which at first communicated with deep-lying strata of great heat, have, by some means, become obstructed or choked up, and that the vents of the cooler water do not rise from any great depth below the surface.

These mud volcanoes are found in different parts of the globe. In the Caspian Sea, on the peninsula of Abscheron, is situated the mud volcano of Jokmali. It was formed November 27, 1827. At first flames sprang up from the soil, and blazed to a great height for three hours. Then, for twenty-four hours, they continued to burn about the above the crater from which the mud was ejected. village called Bakhichi the flame rose so high as to twenty-four miles off. Large fragments of rock were to a great distance round. These, as we have seen, must have been torn from the cavities of the strata. At Damak, in the province of Samarang, in the island there is a similar mud volcano, where the mud is of perature. At Girgenti, in Sicily, and at Sassuolo, in Italy, they are also found under the name of Salses.

LESSONS IN ENGLISH.—No. XI.

By JOHN R. BEARD, D.D

DERIVATION: PREFIXES (continued).

BEFORE proceeding further with these prefixes we may notice a common error. It is generally thought that words have disconnected significations. Several significations may have, but these significations are all allied one with another; they are allied one with another in such a way that a great connexion runs through them all. I mean that the second from the first, and conducts to the third. The meanings flow from a common source like the waters of a brook. common source, or parent-signification, is, in all cases, denotes some object of sense, for objects of sense are before other objects. Our first duty then is to ascertain cal meaning of a word. From that meaning the other flow as by natural derivation. Those secondary or significations then can scarcely be termed meanings; they so much meanings as modifications of the primary mean root. Certainly they are not independent significations viewed, words have not two or more senses, but in the one the one sense is varied and modified. Even in instances opposite meanings are connected with the same word, they may be traced, as both Jacob and Esau sprang from stock. I will take an example in the word prevent. means both *to guide* and *to hinder*, to lead to, and to debar. The opposition is sufficiently decided. Yet these two meanings are only modifications of the root-sense of First I will exhibit the diversity and then explain it. signifying *to guide, aid forward*:—

"*Prevent* us, O Lord, by thy grace.—"Book of Common Prayer.

"— Love celestial whose *prevenient* aid
Forbids approaching ill."

Prevent, signifying *to hinder, obstruct*.

"Where our *prevention* ends, danger begins."

"Which though it be a natural *preventive* to some evils, either stop or moderation, must needs exhaust his spirits." *Wottoniamae.*

"Physick is either curative or *preventive*; preventive which preventeth sickness in the healthy."—*Brown*, "Vulgar

"Prevent us, O Lord, by thy grace," means "aid us by" "Preventive of sickness," signifies that which causes to come. There is the contrariety. Now for the Prevent is made up of two Latin words,—namely, and venio, *I come* or *go*. Now, you may go before two opposite purposes. You may go before him in order aid, and conduct him onward; or you may go before his way, to hold him back, to *prevent* his advance. of these two purposes is prominent in the mind of the the word is used by him to signify, *to guide*, or *to* proper meaning, then, of prevent is, to come before: guide, or, as a natural consequence, 2, to aid; or struct, and as a natural consequence, 2, to stop, &c. moral and spiritual imports come out of the physical in the diverse applications of the word; for, as we have *preventive* medicine, so in divinity you may read of grace."

These remarks, illustrations of which occur in what has preceded, and will occur in what is about to follow, may show you that language must be studied genealogically. every word has a history; and in the dictionaries, every

given of a word ought to be a complete history of the word; a history of its origin, uses, and applications, the one traced from the other logically, or according to the laws of thought, and philologically, or agreeably, to the laws of language. Very different, and very inferior is the character of most dictionaries. To resume the subject.

ENGLISH PREFIXES (*continued*).

E, of Latin, or rather Greek origin, in the forms *e*, *ef*, *ex*, denotes *out of*, as in egress (*e* and gradior, Lat. I *walk*), *a walking out*; excess (*ex* and cedo, Lat. *I go*), *a going beyond*,—that is, too far; effect (*ef* and facio, Lat. *I do*), *a thing made out, produced*; *a result*.

E. "All occasions must be taken of sending forth pious heavenly ejaculations to God."—*Bishop Hall.*

Ex. "The ecclesiastical courts possessed the power of pronouncing excommunication; and that sentence, besides the spiritual consequences supposed to follow from it, was attended with immediate effects of the most important nature. The person excommunicated was shunned by every one as profane and impious; and his whole estate, during his life time, and all his moveables, forever were forfeited to the crown."—*Hume*, "History of England."

Ef. "Two white sparry incrustations, with efflorescencies in form of shrubs, formed by the trickling of water."—*Woodward*, "On Fossils."

En is a prefix found in the English, the French, and the Greek languages. Into the English it appears to have come from the Latin, through the French. Many words of Latin origin have passed through the French into the English. *En* is the form in Greek. In Latin, *en* becomes *in*. In French both *en* and *in* are used. The same is the case with the English. Though *en* and *in* are the same particle, it may be advisable to handle them separately, in order that their respective usages may become apparent.

En is found in the forms *en*, *em*. The prefix signifies *in* or *into*, e. g.,—

"He (Samson) rises and carries away the gates wherein they thought to have *encaged* him."—*Bishop Hall.*

So in *encamp*, *encase*, *enchain*, *enchant*, *enclose* (or inclose), *endemic* (*en* and demos, Gr. *a people*), *peculiar to a district*. *En* sometimes has an intensive or augmentive effect on the verb of which it forms a part; as in *encourage*, *enfeeble*, *enkindle* (candle), *encrease* (increase), *encumber* (incumber, from the French *encombre*, Lat. cumulus, *a heap*).

"*En*cumber'd soon with many a painful wound,
Tardy and stiff he treads the hostile round;
Gloomy and fierce his eyes the crowd survey,
Mark where to fix and single out the prey."
Rowe, "Pharsalia."

En has also, though seldom, the force of a negative; as in *enemy*. *Enemy* is from the Latin *inimicus*, where the English *en* represents the Latin *in*. Inimicus is made up of in, *not*; and amicus, *a friend*.

En for the sake of euphony becomes *em* before *b* and *p*; *em*bitter; *em*blem; *em*bosom; *em*broil; *em*prison (imprison); *em*ploy; *em*poverish (impoverish).

"At eve within yon studious nook,
I ope my brass-*em*bossed book,
Pourtray'd with many a holy deed,
Of martyrs crown'd with heavenly meed."
Warton.

There is a tendency to substitute *i* for *e* in many words. This tendency deserves encouragement, if only for the sake of uniformity.

Enter, coming from the Latin (intra, *within*) through the French (entre, *between, among*), is found in *enter*prise (*enter* and Fr. prendre, Lat. prehendere, *to take, to take hold of*), *an undertaking*; also in *enter*ment (*in* and terra, Lat. *the earth*), now more common as interment. It is found also in *enter*tain (Fr. entretenir, Lat. inter and tenere, *to hold*).

"His office was to give *enter*tainment
And lodging unto all that came and went,
Not unto such as could him feast againe,
And double quite for that he on them spent;
But such as want of harbour did constraine,
Those, for God's sake, his dewty was to *en*tertaine."
Spenser, "Faërie Queene."

Epi, a prefix of Greek origin, signifying *upon*, as *epi*demic, upon or over (widely spread over) a people. *Endemic* declares that a disease is in-born, native to the soil; *epi*demic that it is very prevalent. *Epi* is found in *epi*gram (*epi* and grapho, Gr. *I write*), *epi*lepsy (*epi* and Gr. lepsia, *a taking*), *epi*phany (*epi* and Gr. phaino, *I appear*), *epi*stle, &c.

"He that would write an *epi*taph for thee,
And do it well, must first begin to be
Such as thou wert; for none can truly know
Thy worth, thy life, but he that hath liv'd so." *Donne.*

Equi, of Latin origin (aequus, *equal*), denoting equality, forms part of several words; as, *equi*poise (*equi* and peser, Fr. *to weigh*; pendére, Lat. *to hang*), *equity*; *equi*vocal (*equi* and vox, Lat. *a voice*).

"Faith—here's an *equi*vocator that could swear in both the scales against either scale; who committed treason enough in God's sake, yet could not *equi*vocate to heaven; oh, come in *equi*vocator."—*Shakspeare*, "Macbeth."

Es, of French origin (Lat. e, ex), is in English found in words borrowed from the French, as in escalade (*es* and scala, Lat. *a ladder*), a scaling (of a city), escape (Fr. eschapper, *to get away*), escheat (Fr. escheoir, *to fall due*), a forfeit, eschew (Fr. eschever, *to shun*), escutcheon (*es* and scutum, Lat. *a shield*).

"Hence without blushing (say whate'er we can)
We more regard the escutcheon than the man;
Yet, true to nature and her instincts, prize
The hound or spaniel as his talent lies." *Cawthorn.*

Eu, of Greek origin, signifying *well*, occurs in *eu*phony (*eu* and phoné, Gr. *a sound*), *eu*thanasia (*eu* and thanatos, Gr. *death*), *a happy death*; the *eu* in eunuch is a part of the word; eunuch being from euné, in Greek, *a bed*; eunuchs were *chamber*lains. Men were made eunuchs by the jealousy of Eastern despots. They were also made so, in order to give them a contro-alto voice. The latter fact is well alluded to in this quotation:

"Our present writers, for the most part, seem to lay the whole stress in their endeavours upon the harmony of words; but then, like *eunuchs*, they sacrifice their manhood for a voice, and reduce our poetry to be like echo, nothing but a sound."—*Lansdown*, "Peleus and Thetis."

Ever, of Saxon origin, signifying *always*, is seen in *ever*lasting, *ever*more; *evermore* appears in the older writers as *evermo*.

"I shall readily grant that the words for ever and *ever-lasting* do not always, in Scripture, signify an endless duration."—*Barrow*, "Sermons."

Extra, of Latin origin, with the meaning *out of*, appears in *extra*neous, *out of* (not belonging to) the subject; *extra*ordinary *extra* and ordo, Lat. *order*), *out of the usual order*.

"Some lands, either because they were in the hands of irreligious and careless owners, or were situate in forest and desert places, or for other now unsearchable reasons, were never united to any parish, and, therefore, continue to this day *extra*-parochial."—*Blackstone*, "Commentaries."

For, of Saxon origin, whose original is probably found in the German *ver*, which denies and reverses the action expressed in the verb, occurs in *for*bid (not to bid, that is to bid not).

"Rather how hast thou yielded to transgress
The strict *for*biddance, how to violate
The sacred fruit forbidd'n." *Milton*, "Paradise Lost."

For is found also in *for*bear, *not to bear* or *take*; *to abstain*.

"Phidias, when he had made the statue of Minerva, could not *for*bear to engrave his own name, as author of the piece."—*Dryden.*

Fore, a different word from the preceding, of Saxon origin (vor, Germ. *in advance*; vorwarts, Germ. *forwards*), appears in *fore*tell, *fore*cast, *fore*fathers, *fore*head.

"The *fore*knower is not the cause of all that are *fore*known."—*Hammond.*

In *for*give (Germ. vergeben), the idea seems to be that of giving *away*, giving *without a return*, giving *freely*, and hence to pardon (Fr. pardonner; in low Lat. perdonare).

"Not soon provoked, however stung and teased,
And if perhaps made angry, soon appeased;
She rather waves, than will dispute her right,
And injured makes *for*giveness her delight." *Cowper.*

Hept, of Greek origin (hepta, *seven*), forms the first syllable of *hept*agon (Gr. gonia, *an angle*), *that which has seven angles*, and consequently seven sides; and *hept*archy, a *seven-fold government*.

"Seven independent thrones, the Saxon *hept*archy, were founded by the conquerors."—*Gibbon.*

LESSONS IN BOTANY.—No. XI.

CLASS XIV.—DIDYNAMIA.

Plants bearing flowers with *Four* Stamens, of which the two outer are longer than the rest.

In this class there are two orders:—I. Gymnospermia. Seeds naked, never more than four. II. Angiospermia. Seeds in a capsule.

Order I. Gymnospermia.

Seeds naked, never more than four.

The common bugle is so hardy a plant that its blue blossoms will sometimes venture to unfold themselves amidst the dreariness of January, though not with the vigour of a more genial season. In May it may readily be found in woods and moist pastures, and varies with a pale lilac or even white blossom. The stem is erect, but the creeping shoots issuing from it distinguish the species. Among the old names of this plant is that of the sicklewort, or carpenter's herb; it being supposed that when the labourer or the workman was cut by a sickle or any other sharp instrument, the plant would tend to heal the wound In France they associated with it another plant as similarly efficacious: "He needs neither physician nor surgeon who hath bugle and sanicle." But the proverb of our continental neighbours is wrong, as the latter flower is absolutely injurious. There are three other species of the bugle: the pyramidal bugle, growing in dry heathy pastures in the highlands of Scotland, and flowering in June; the Alpine bugle, growing on mountains in Carnarvonshire, Derbyshire, and Durham, and flowering in July; and the yellow bugle, which flowers in April and May, and grows in sandy fields in England. The latter is often called the ground pine, and is not uncommon in Kent and Surrey.

The stem of the wood germander is about a foot and a half high, the leaves are wrinkled, and the corolla of a pale yellow. The plant grows in woods, and also in the clefts of rocks and among rubbish, and flowers in July. So bitter is the whole plant, that it is said it might be used instead of hops, in making beer. Very bitter also is the water germander, with its branched stems, its hoary leaves, and its pale-purple corolla. It grows in wet meadows, and flowers in July and August. Nor less bitter is the wall germander. Its stems are nearly erect, about a foot high, with rounded corners, leaves fringed, and crimson flowers. This plant grows on old buildings, and flowers in July.

In July and August the flowers of the common cat-mint may be observed in hedges and waste places growing in spikes. They are white, and have the lower lip dotted with crimson. The leaves are stalked, and heart-shaped; the stems are two or three feet high; and the whole plant is soft and downy. Of its smell cats are extravagantly fond.

Of mint, a different plant, there are not fewer than ten kinds. Horse-mint grows in moist, waste ground, and has pale purple flowers in August and September. The spear-mint is so called on account of its leaf being narrower, and more like a spear or spike than the other varieties. It grows in watery places. Its stems are two or three feet high; its whorls of pale purple flowers appear in August. Peppermint is said by the French botanists to have been found only in this country. It has a smooth purple stalk, and purple flowers which appear in August and September. This plant cannot be mistaken, from its penetrating smell, and more pungent glowing taste, sinking, as it were, on the tongue, which is followed by a very agreeable sensation of coldness. The distilled water and essential oil of peppermint are used in a variety of cordial and medicinal preparations. Pennyroyal was likewise considered very effective. Gerard says, "If this herb be dried and taken to sea it will purify corrupt water without hurting those who drink it." It has been regarded as very useful when water is not good, on land. The old herbalist describes it also as a valuable medicine. This plant grows in moist heaths and pastures in England, and the south of Ireland; has a light purple corolla, externally hairy, and flowers in September.

One plant has been thus poetically and graphically described:—

> "And there upon the sod below,
> Ground-ivy's purple blossoms show
> Like helmet of Crusader knight
> Its anther's cross-like form of white."

Ground-ivy grows by old walls, hedges, and road-sides, and flowers in April and May, but frequently before these months, the leaves may be found clustering, though the aromatic odour which they emit when spring comes, is scarcely sensible. The ground-ivy may be easily recognised by one peculiarity: its flowers grow in threes between the stalk and the leaf. Few animals, except impelled by hunger, will touch this plant, and to horses it is said to be injurious.

The white dead-nettle, or white archangel, stands about a foot high, its stems being covered with short deflected hairs; the leaves are veiny and hairy, and the flowers, which appear in May and June, large, white, and hairy; but individual flowers may be procured at all seasons. The plant grows among rubbish, and by hedges, walls, and road-sides. It is something like the true nettle, but its rings of white flowers at once distinguish it, as the blossoms of the true nettles are all green. It has a very disagreeable odour; but it is said to be used as a table-vegetable in Sweden. There is a variety with purple flowers and spotted leaves, called the spotted dead-nettle; and besides this, there is the red, the cut-leaved, and the hen-bit dead-nettle.

Of the hemp-nettle there are several kinds. The red hemp-nettle has a stem about a foot high, with opposite branches; its rose-coloured flowers, spotted with crimson and white, and growing in dense whorls, and appearing in August and September. The plant grows in gravelly fields, and among rubbish. The pale yellow flowers, with a large, cleft, upper-lip, or the downy-hemp nettle, are found in sandy corn-fields in July and August. The common hemp-nettle, growing in cultivated grounds, hedges, and waste places, has flowers in June and July, with a purple upper-lip, and a nearly equal three-lobed lower one, variegated with white and purple; while in the latter month, the large-flowered hemp-nettle, with its yellow corolla, grows among corn.

Whorls of six dull-red flowers, appearing in July and August, adorn the hedge woundwort, which grows among rubbish and by hedge-walls, and sometimes rises to the height of three feet, with leaves veined and hairy. The hair or down of this and other plants serves to protect them from heat and cold, and is also of use to some insects. Kirby and Spence, the eminent entomologists, state that one species of wild bee knew what materials would slowly conduct heat long before the celebrated experiments made as to them by Count Rumford. It goes to the species called the downy woundwort, and to plants of similar structure, scraping off the wool, rolling it into a ball, and then sticking it to the plaster that covers its cells. This plant grows in hedges and by roadsides; its stems are two feet high, and its corolla of a light purple. We have altogether six native species of woundwort: the name applied to them being descriptive of the healing power which they were supposed to have. Gerard mentions applying the marsh woundwort in more than one instance with good effect.

Order II. Angiospermia.

Seeds in a capsule.

There are no fewer than seven species of broom-rape. The greater broom-rape grows on gravelly soil, on the roots of broom and furze. Its stem, about a foot high, is erect, dusky, fleshy, covered with short glandular, hairs, and scattered lance-shaped erect scales. It has a spike of about twenty flowers, with a purplish-brown corolla, which appears in June and July. The broom-rape looks at a glance like a withered plant.

One of the most elegant and showy of our native plants is the foxglove. Its numerous large, pendulous, crimson flowers, or elegantly-mottled bells, and hairy within, appear in dry hilly pastures, on the steep banks of rivers, and in rocky and other places, in June and July. The leaves, when carefully dried and powdered, or made into an infusion or a tincture, is used in medicine. It is dangerous when used ignorantly, but in small and repeated doses it is very useful, lowering the pulse in an extraordinary manner. Many an artist has selected this showy plant as a special ornament to his picture.

The toad-flax, like many other plants, partakes of great variety. Six kinds of it are well known to botanists. The flowers of the ivy-leaved toad-flax, of a pale purple with a small portion of yellow, appear from May to November, growing on old walls. The stems of the plant are round, smooth, and leafy; the leaves alternate, stalked, and shining. It is often hung up in a flowerpot from the ceiling of a cottage, while the long stems hang down all around it. In hedges and on the borders of cornfields, a stem may be frequently observed in August and September, with large sulphur-coloured blossoms; it is the yellow toad-flax. Its hue leads country people to call it "butter and eggs:" while the foliage of the plant has on it that seagreen bloom which is known as the glaucous tint.

BIOGRAPHY.—No. VI.

BENJAMIN FRANKLIN: THE PRINTER, EDITOR, PHILOSOPHER, AND STATESMAN.

HAVING passed his first night in Philadelphia, Benjamin Franklin, on the following morning, waited on Mr. Bradford, the printer to whom he had been directed, who having no work for him, sent him to a brother in trade called Keimer. This printer, also, having no work to give him, set him to put an old press in order; and being satisfied with his work, a few days afterwards gave him regular employment. Franklin now established himself in respectable lodgings, in the house of Mr. Read, on whose doorsteps he had noticed the interesting young woman on the day when he entered Philadelphia. Here he had the happiness, as the saying is, to fall in love, the damsel proving amiable, and not disinclined to wed. It were interesting to know how a man so wonderfully prudent demeaned himself under the influence of this passion. But as we have no means of knowing this, our curiosity must remain unsatisfied. If a love-letter written by Franklin were discovered it would certainly be a most extraordinary rarity.

When Franklin had been at Philadelphia for several months, he received a letter from a brother-in-law, who was the captain or master of a vessel, pressing him urgently to return home again to his family. Franklin declined to comply with the request, it being, as he said, his particular desire at the time to forget Boston as much as possible. The letter containing this reply, happened to reach his brother-in-law when in company with Sir William Keith, governor of the province. Its composition and penmanship appearing to his relative much superior to those of the ordinary style of letter-writing, he showed it to his "excellency." The governor expressed himself extremely pleased with it, and manifested a good deal of surprise on being told the age and circumstances of the writer. He also condescendingly observed, that the young man was evidently a person of very promising talents, and added: "If he is disposed to set up in business on his own account, at Philadelphia, I will undertake to procure him the printing of all the public papers, and do him every other service in my power."

Franklin received no immediate information of this gentleman's praiseworthy intentions, his brother-in-law having, for reasons of his own, neglected to communicate with him on the subject. One day, however, while he and his master were at work in the printing-office, they observed through the window, two smartly attired gentlemen, one of whom was recognised to be governor Keith, and the other (as it afterwards appeared) was Colonel French, of Newcastle, in the province of Delaware. They were crossing the street in the direction of the office, and presently knocked, with dignity and official consequence, at the door. Keimer ran down in high expectation of some government patronage; but his excellency inquired for Mr. Benjamin Franklin, entered, went up stairs, and, as Franklin says, "with a politeness to which I had never been accustomed, paid me many compliments, desired to be acquainted with me, obligingly reproached me for not having made myself known to him on my arrival in the town, and wished me to accompany him to a tavern, where he and Colonel French were going to taste some excellent Madeira wine!" Franklin was very much surprised, and Keimer was positively thunderstruck. He went, however, with the governor and the colonel to a tavern; for the first time in his life, tasted of Madeira, and while engaged in drinking it, was favoured by proposals from Sir William for the establishment of a printing-house. The probabilities of success were flatteringly represented; and when Franklin expressed a doubt whether his father would assist him, the governor volunteered to write a letter, exhibiting the advantages of the scheme in such a light as would undoubtedly persuade the old gentleman to concur in the speculation. It was accordingly concluded that Franklin should return to Boston by the first vessel sailing thither, carrying with him the governor's letter of recommendation to his father. His excellency several times subsequently invited him to dinner, an honour which Franklin esteemed very highly, the more especially as the governor always conversed with him in a most affable, friendly, and familiar manner.

In pursuance of the above arrangement, Franklin returned home at the close of April, 1724. He had been seven months absent, and during the whole time, had never heard from, or communicated with, his parents. He was not the less heartily welcomed back, all his family, with the exception of his brother James, being greatly delighted on seeing him again. It was an additional pleasure to find him apparelled in an excellent suit of clothes, with a good silver watch, and about five pounds sterling in his pockets. His father was not a little surprised on being informed of the object of his visit, and even more astonished at the contents of governor Keith's epistle. After long deliberation, he came to the resolution of refusing his assistance to the scheme, judging his son as at present too young for the management of such a business; adding, moreover, that he thought the governor had evinced anything but discretion in proposing it. Franklin therefore returned back to Philadelphia, and on waiting on the governor to communicate the result of his journey, Sir William observed that his father was too prudent;" and added, "since he will not do it, I will do it myself." It was then ultimately arranged that Franklin should proceed personally to London to purchase everything necessary for the proposed establishment, the governor undertaking to provide him with a letter of credit to the amount of £100, for the expenses, and to furnish him with recommendations to "various people of influence."

Franklin was to go to England in the ordinary packet-ship; and as the time of sailing drew near, he naturally became importunate for the governor's letters of credit and recommendation. His excellency, however, always put him off under some plausible pretence. At last, when the vessel was on the point of starting, he was sent on board, with the assurance that Colonel French would bring the letters to him immediately. That gentleman, subsequently came on board with a packet of despatches, which were put into the captain's bag, Franklin being informed that those intended for himself were tied up with the rest, and would be delivered to him before landing in England. The voyage was successfully performed, and on arriving in the Thames, Franklin was allowed to search the bag for his expected letters, but could find none either directed to himself, or in any shape addressed as being intrusted to his care. He however selected six or seven, which, from the addresses, he conceived must have been intended for his service. One of these was to the king's printer; Franklin accordingly waited upon that gentleman to present it, hoping that something useful might turn up; but no sooner had the latter opened it than he exclaimed, "Oh, this is from Riddlesden!—(the said Riddlesden being a rascally attorney at Philadelphia); I have lately discovered him to be an arrant knave, and wish to have nothing more to do with him, or with his letters." So saying, he turned upon his heel, and resumed his occupation. In short, it turned out that none of the letters were from the governor; so that Franklin found himself in a most awkward situation. This he took occasion to explain to a gentleman named Denham, who had been a fellow-passenger in the packet, and he was then informed that the governor was a complete cheat, deceiving people, from vanity and a love of self-importance, with promises which he neither intended nor was able to fulfil. So far from being competent to give a letter of credit for a hundred pounds, it seems the man had not a sixpence worth of credit for himself.

Franklin was therefore once more a citizen of the world, with the capital city of "foggy Babylon" to roam about in, seeking provender. Luckily for him, daily bread was more readily obtainable in his days than it is now. He was not long ere he got employment in the office of the "celebrated Mr. Palmer." Here, as usual, he distinguished himself by his diligence and ability. Among the books which he was set to work upon, was an edition of Wollaston's "Religion of Nature;" some of the positions assumed in which appearing to him feeble and erroneous, he prepared and published a small metaphysical treatise designed as a refutation. This pamphlet acquired him credit with his employer, as a man of talent, though that gentleman strongly reprobated the doctrines which it maintained. It inculcated the customary material notions which distinguished the fashionable "freethinking" gentry of the eighteenth century, and was therefore in nowise profitable for doctrine, and was utterly adverse to sound philosophy. We are informed that the publication "procured him the countenance of various eminent individuals." In this circumstance, however, we perceive nothing remarkable, there being scarcely any philosophical absurdity or gay frivolity proposed by man which "various eminent individuals" have not been found to countenance at some period or other. Franklin's transactions with Sir Hans Sloane seem more worthy of our passing notice: it appears that he sold Sir Hans some "American curiosities;" and amongst others an asbestos purse, for a high price in hard money.

From Mr. Palmer's office he subsequently removed to that of

ANSWERS TO CORRESPONDENTS.

Copies of the Shilling Euclid may be had through the Post-office to any address, on the receipt of eighteen-pence worth of stamps at this office.—C. T. PRICE (Frenchay, Bristol): His method of practically proving the 47 of E. I. is good and well-known.—A FRIEND (Middlebro') wishes us to explain the process of multiplying £99 19s. 11¾d by itself. In the early numbers of the "London Mechanic's Magazine," he will find loads of solutions of this question. We do no not see the utility of reviving it; still, if it be the general wish of our subscribers, we shall do it; but we consider there is no practical utility in the question taken by itself.—JOSEPH F. (Chesterfield): Yes.—JOHN BOURTON (Paddington) is right; any number will do as well as 9. J. W. YOUNG (Preston): The rule on p. 267 is given only for *simple* subtraction; to make it apply to *compound* subtraction it must be expressed in a different way. If he reduces all the money into the same name or denomination, he will find it answer to a T.—Our friend, Mr. WHITE (Woodstreet), must excuse us for not mentioning prices. The best theological work is that which was begun by Moses and closed by John, to which let no man *add*, and from which let no man *take away*. On the other subject we have already expressed our opinion.—ONE GRATEFUL shall have a dictionary; his self-taught does him very great credit; we advise him to attend more carefully to his spelling.—J. C. W. S. BEAUFORT should take up English Grammar.—A TEACHER (Stanley): We should be happy to oblige him; but our time is too limited to answer all. We therefore take up the most important, and especially those who give us their names and addresses in confidence.—M. M. (London): The Welsh choristers sang from M.S. copies, and we are not aware that any of their pieces are in print.—PHI has been received.

A MIDDLETON WEAVER BOY (Manchester) has so movingly solicited us to explain the following operation in Algebra, that we consider it a duty to yield to his solicitations. The question is to multiply two quantities together, thus:—

Multiplicand $a^n+a^{n-1}x+a^{n-2}x^2+\ldots\ldots+ax^{n-1}+x^n$

Multiplier $a-x$

1st Part. product	$a^{n+1}+a^nx \quad +a^{n-1}x^2+\ldots\ldots+a^2x^{n-1}+ax^n$
2nd Part. product	$\quad -a^nx \quad -a^{n-1}x^2-a^{n-2}x^3\ldots\ldots\ldots-ax^n-ax^{n+1}$
Whole prod. of	$a^{n+1} \quad \bullet \quad \bullet \quad \bullet \quad \bullet \quad \bullet \quad -ax^{n+1}$

Here, the quantities in the first partial product are all *positive*, and those in the second partial product are all *negative*. In the first partial product, the same *quantities* are found with the *positive* sign, which in the second partial product are found with the *negative* sign, except the first term of the one, and the last term of the other. The *positive* term in the first partial product, answering to the *negative* term $-a^{n-2}x^3$ in the second partial product, though not expressed is understood, as it follows the term $+a^{n-1}x^2$ according to the law or order of the indices; and the *negative* term in the second partial product, answering to the *positive* term $+a^2x^{n-1}$, in the first partial product, though not expressed is understood, as it precedes the term $-ax^n$, according to the same law or order of the indices. Hence, these and all other intermediate terms in both partial products, cancel each other when they are added, in order to obtain the whole product.—F. OWENS (London) should purchase Cassell's "French Lessons," price 6d. By inclosing seven penny stamps, with his address, to this office, it will be sent to him.—MERIDONENSIS has answered the question he asks: *Committo* means *to commit*, that is, *to send with*; for, if there were an order *to commit* him to prison, it would be necessary *to send with* him an officer to see it executed.—CARACTACUS (Sheffield) will be satisfied when this reaches him that our promise is performed. Bills of Exchange and Bookkeeping, &c., are quite in our sphere.—A SON OF TOIL (Longton) is too complimentary; he makes us blush.—EDWARD SUTTON (Retford): We shall do all the things he mentions in their proper order, but he must know that they cannot be done at once. Geology is quite defensible in its proper place. The facts of the science are incontrovertible; it is the *theories* founded on these facts that are to be blamed, when *they can be shown* to be ill-founded or erroneous. His astronomical question is answered elsewhere. "Candidus auratis aperit cum cornibus annum;" *a white bull with golden or gilt) horns opens the year*. For the seven wonders, see p. 176.—AMATOR SCIENTIÆ (O. K Road) will find rules in the P. E. for the order of Latin words. *Taxidermy* means literally *putting the skin in order*, and is the name given to the art of *stuffing* the skins of *animals*, so as to give them the appearance of life. The pronunciation of *acoustics* is *a-cow sticks*, putting the emphasis or accent on *cow*.—A STUDENT *Ab initio*, will find concise explanations of the process of Electro-gilding at pp. 676, 677, and 686, of the "Illustrated Official Catalogue" of the Great Exhibition.—S. H., J. R. (Paisley): The answer to the arithmetical question p. 288 is correct.—A SUBSCRIBER: The *Dublis* sounds like *a* in *paper*. The name is taken from the botanist *Dahl*.—I. R. R. (Bradford) should study the Lessons in Euclid, and the Lessons on Arithmetic.—CARBONARIUS: Very not up to the mark.—M. A. B (Manchester): His solution of or query 1, page 111, is good.—The CLACKMANNANSHIRE B sent us very capital solutions of the queries and problems in A "WELSHMAN" (Birmingham): "If two bodies of the same substance and form," or of different textures or substances "but differing greatly in size, were to be dropt from the same the same time; they would reach the earth at the same time *in a vacuum*.—W. T. (South Shields): His plan is good, but great abuse.—L. T. C. D. (Seskanmore, Omagh) wishes a solu following: "There is an oblique triangle, two of whose sides 40 poles, respectively; what must be the length of the other it may contain just one acre?"—F. C. FLETCHER (Cheltenh area of an equilateral triangle is found by multiplying the its side by ·4330127. Reverse this rule, and you obtain your H. ROBINSON (Sheerness), DELTA (East Dereham), Q. PRIN gow). Their answers to Lewis W. H.'s question do not come the requirements.

MUSIC.—JOHNNIE: As we have received both approval a the development of our method of teaching music, from "musicians" of the first class, both for theory and practice, tent to bear the reproaches of Johnnie, and are quite willing that "the modulator *is* a puzzler" to the musicians of whom L. W. S. H.: We are obliged to him for his communicati method of teaching the pianoforte. We are interested by simplicity and usefulness. He shall hear from us again aft put it to a few tests.—A. F. (Dublis) sends us a description chord, which he has ingeniously used as an instrument, and he was able to execute all the examples of the sixth lesson. sions are incorrect, but we hope to make early use of the useful and obliging letter.—PITT: Can any of our friends of what stone the Rock Harmonicon is formed, and what most sonorous?—B. STIRLING: Knight's well known "Music Hickson's "Singing Master," and Curwen's "School M "People's Service of Song, a Tune Book for the Few," are popular works which mark the rate of movement by the As the cheap metronomes mentioned in our lessons become practice will become more common. But our correspondent member that, for psalm tunes, much should be left to t requirements of the words. A large number of other letter a degree of interest and personal effort, which we shall encourage, will find their answer in the eighth lesson.— (Chelsea) should understand that we concern ourselves to t "*system*," but the *facts* and *verities* of music itself. If he fi differ from the "system" which he has learnt, that is no fa Probably the eighth and following lessons will remove his d J. L. (Sunderland) is thanked for his well drawn and w monochord, of which we may make some use.

MISS AUGUSTA should return to his father's house and be will then recover his cheerfulness. The ministry is not a trad it be too often made one.—TWO YOUNG MEN (Batley Car a Latin dictionary; they will get an old one for a shillin *Amo* and *diligo* both mean *to love*.—H. M. F. (Cheltenham) the Pythagorean received.—IRLANDAIS (Manchester): Se J. R WHITE (Morpeth): A Hebrew Lexicon is published Paternoster-row; write to him.—A READER: *Concert* is the right word; can he for a moment suppose that a credito to other creditors!!!—Mr. HYPOGRAPHEUS, of Waltham G to know "Whether the gold-fields of California and Au existed since the formation of the world or not?"—QUINT (Glasgow) should study Arithmetic and Algebra.

D. HOLMES (Dukinfield) and his friends cannot be serv request, about the Marseillaise hymn.—ST. ELME (Newc should only be too happy to serve him; but we should op correspondence that would overwhelm us.—JNO. TREVITT, Sc Problems on the globes shall come in course. The sixpen Lessons," so often advertised to be had for seven penny st office, will be a sufficient key to pronunciation.—C S E "History of England" complete, 4 vols. in one, 3s. 6d. different history will be given in the P. E.—J. E., and E. F. (Wakefield) should by all means get a French dictionary Spiers is reckoned among the best.

*** As our Lessons on Botany in the POPULAR EDUCATOR a to a close, it will be gratifying to our botanical pupils to k complete system beautifully illustrated will appear in Septem "Illustrated Exhibitor and Magazine of Art."

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LESSONS IN MUSIC.—No. VIII.

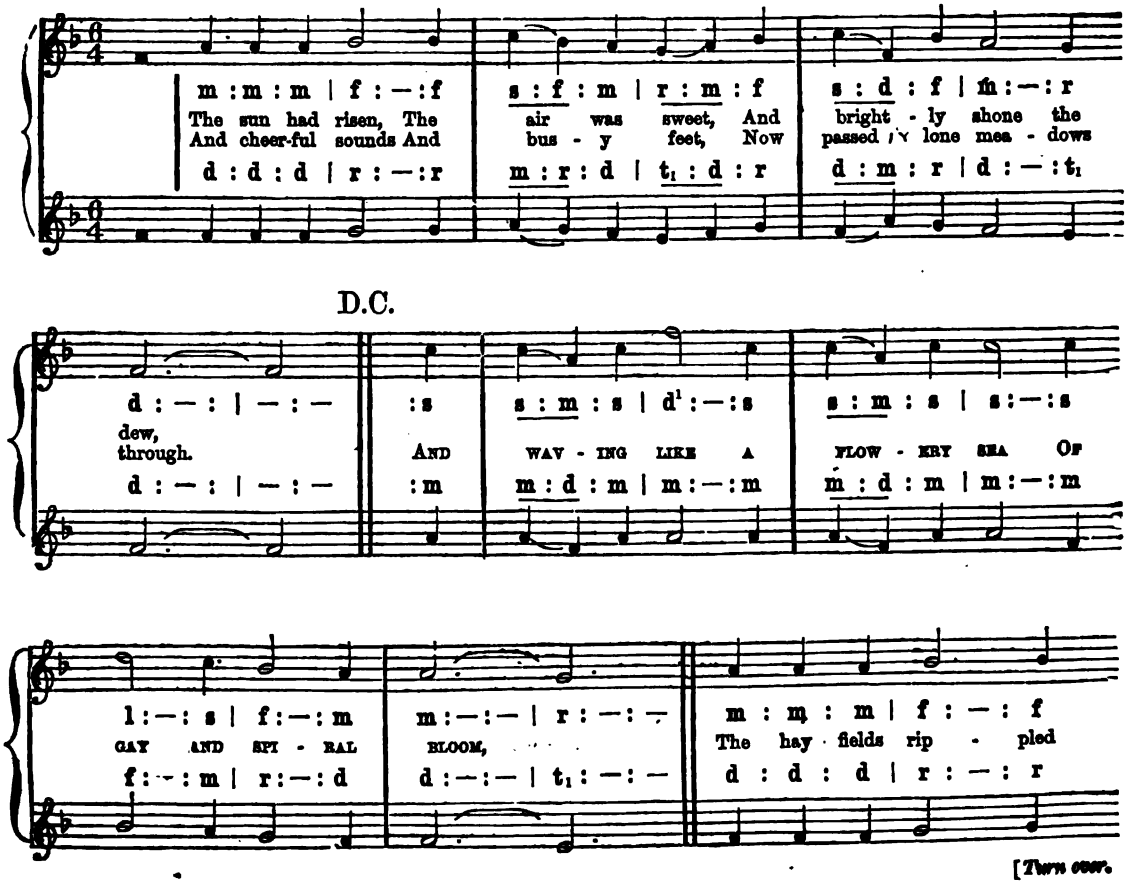
By JOHN CURWEN.

1. THE most *perfect* consonance (or sounding together) of any two notes, is that of two which are octaves to one another,—as DOH and DOH^1, SOH and SOH^1, &c. The notes agree so "perfectly" as to be constantly regarded as the same. The consonance which stands next in the order of agreement is that of the first of the scale with the fifth,—DOH with SOH. Approaching to this in "perfectness" of concord are the first and fourth,—DOH with FAH. But it is not the most "perfect" consonance that is the most *pleasing*. For the production of pleasure and beauty in music, as in all other fine arts, there is needed a certain *variety* in *unity*,—a certain difference blending with agreement. Hence it is that the most pleasing consonance of the scale is that of the first and the third,—DOH with ME. The first, third, and fifth,—DOH, ME, SOH,—form, when sounded together, the most delightful union of sounds that is known. A consonance of three or more notes is called a "chord."

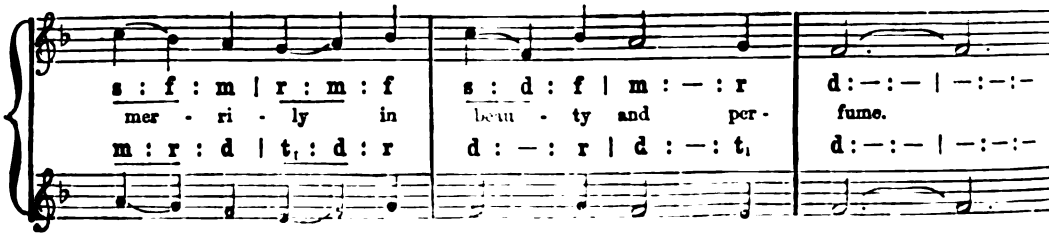
2. Try each of the above consonances in order, either by the help of a friend or with some musical instrument. You will thus be aided in forming a kind of personal acquaintance with the notes. You will be enabled to individualise them, and to recognise by the ear their mental effect.

3. The ancient and well-known tune, "Prospect," is introduced to illustrate still further the qualities of DOH, ME, and SOH. The pupil will notice that it has a *soft* and *gentle* opening, which exhibits the properties of ME, relieved by those of FAH, and enlivened by SOH. In the fifth line there is a most beautiful *awakening* to bolder and brighter sounds, in which SOH and upper DOH^1 play their part, and then the music returns to the softer expression again. As the pupil learns to appreciate these points, and to notice them for himself, his taste will insensibly improve, and with his taste his "execution." Study in every possible way the various points of beauty and expression of which your music is capable.

EXERCISE 18. **PROSPECT.** (An Old English Melody.) KEY F. M. 72.


m : m : m | f : — : f
The sun had risen, The
And cheer-ful sounds And
d : d : d | r : — : r
s : f : m | r : m : f
air was sweet, And
bus - y feet, Now
m : r : d | t1 : d : r
s : d : f | m : — : r
bright - ly shone the
passed o'er lone mea - dows
d : m : r | d : — : t1
D.C.
d : — : | — : —
dew,
through.
d : — : | — : —
: s
AND
: m
s : m : s | d1 : — : s
WAV - ING LIKE A
m : d : m | m : — : m
s : m : s | s : — : s
FLOW - ERY SEA OF
m : d : m | m : — : m
l : — : s | f : — : m
GAY AND SPI - RAL
f : — : m | r : — : d
m : — : — | r : — : —
BLOOM,
d : — : — | t1 : — : —
m : m : m | f : — : f
The hay - fields rip - pled
d : d : d | r : — : r

[Turn over.

PROSPECT (*continued*).

2. I saw the early mowers pass
Along that pleasant dell,
And rank on rank the shining grass
Around them quickly fell.
I looked, and far and wide at noon
The fallen flowers were spread;
And all, as rose the evening moon,
Beneath the scythe were dead.

℣. A fable full of truth to me,
Is this, the mower's tale—
I, soon, a broken stem shall be,
Like hay that strews the vale.
At early dawn, or closing light,
The scythe of death may fall:
Then let me learn the lesson right,
So full of truth to all.

OTHER WORDS TO THE SAME TUNE.

Lord! who hast bled and died for me!
I thankfully resign
All that I am and have, to be
Now and for ever thine.

Take thou possession of my soul,
And all its sin subdue;
Its pride abase, its lusts controul,
And fashion all things new.

Oft have I vowed that I would give
To thee my mortal days;
That to thine honour I would live,
And, dying, speak thy praise.
But ah! how oft my vows I broke,
My best resolves forgot;
And though my dying Saviour spoke,
My heart regarded not.

Yet turn, oh, turn me, gracious God!
And leave me not to die;
From the vile paths which I have trod,
I would for ever fly.
And here again I give to thee,
This guilty soul of mine;
In time, and through eternity,
Oh, make and keep me thine!

NOTE.—The first song is from the "Hymns for Infant Minds," by Jane Taylor and Mrs. Gilbert (Jackson and Walford),—a work, like all by the same authors, of priceless value in aid of education in school or family. But, for the sake of those who would sing this tune to a sacred hymn, we add the exquisite words composed for this tune by the late Thomas Rawson Taylor, of Bradford, Yorkshire—hitherto treasured, like his other poems, by a select circle, but, henceforth, we trust more widely to be known. This tune must be thoroughly solfa-ed "by heart," like the rest, pupil must point to the notes on the modulator as he thus [Our pupils must expect no explanation, at this stage of t of the sharps or flats, or clefs, introduced at the begin old notation staff. A proper explanation now, would and out of place. They are introduced thus early for those who play on instruments. It is enough for the square mark shows him the place of the key-note.]

LESSONS IN FRENCH.—No. XX.

By Professor LOUIS FASQUELLE, LL.D.

SECTION XLII.

USE OF THE AUXILIARIES (§ 46).

1. THE active verb [§ 43 (2) (3)] that is, the verb which has or may have a direct regimen or object, always takes avoir, as its auxiliary [§ 46 (1)]:—

Nous avons écrit à notre banquier.	*We have written to our banker.*

2. Almost all neuter verbs, i. e. verbs which cannot have a direct object, take the auxiliary avoir, when they express action:—

Nous avons couru, marché, parlé.	*We have run, walked, spoken.*

3. The compound tenses of a few neuter verbs, expressing action, are, however, conjugated with *être*—aller, *to go*; arriver, *to arrive*; choir, tomber, *to fall*; décéder, mourir, *to die*; naître, *to be born*; venir, *to come*; parvenir, *to succeed*; devenir, *to become*; revenir, *to return*:—

A quelle heure êtes vous venu?	*At what hour did you come?*
Je suis* né en France.	*I was born in France.*

4. A few neuter verbs [§ 46 (3)] take avoir, when they express action, and être, when they express situation:—

Votre frère a-t-il sorti aujourd'hui?	*Has your brother gone out this morning?*
Votre frère est il sorti?	*Is your brother gone out?*

* Observe that when the person spoken of is *living*, the French use the present and not the past of the auxiliary with the past participle of naître, *to be born*:—Cette dame *est* née en Angleterre. *That lady (is) was born in England*:—Mon frère *est* né en France. *My brother (is) was born in France.*

5. The past indefinite of the verb être, [4 ir.] (Je suis) is used instead of the preterite indefinite of aller (Je suis allé) when speaking of a place where one *has* been:—

Le médecin a été à Paris.	*The physician has been at P*
J'ai été à l'église ce matin.	*I went to church this morn*

6. When, however, we are still in a given place and road towards it, the expression. Je suis allé, &c. is used

Le médecin est allé à Londres.	*The physician is gone to L*
Votre sœur est allée à l'église.	*Your sister is gone to chur*

RÉSUMÉ OF EXAMPLES.

Avez vous été au bal hier au soir?	*Did you go to the ball last*
Nous n'y avons pas été.	*We did not go.*
Où cette demoiselle a-t-elle été?	*Whither did that young*
Elle a été chez son frère et chez nous.	*She went to her brother's house.*
Où votre sœur est elle allée ce matin?	*Where is your sister go ing?*
Elle est allée trouver sa cousine.	*She is gone to her cousin*
N'avez vous pas sorti aujourd'hui?	*Did you not go out to-day*
Je n'ai pas encore sorti.	*I have not yet been out.*
Où est Monsieur le général?	*Where is the general?*
Je ne sais pas, Monsieur, il est sorti.	*I do not know, Sir, he*
Où ce monsieur est il né?	*Where was that gentleman*
Il est né à Paris ou à Lyon.	*He was born in Paris*
Votre nièce a-t-elle été voir son frère?	*Did your niece go to*
Elle a été le voir hier.	*She went to see him yesterday* (is back).
Elle est allée le voir hier.	*She went to see him yesterday* (is not back).

Exercise 83.

Bijouterie, *f. jewellery;*	Maçon, m. *mason;*	Orfèvre, m. *goldsmith;*
Chapelier, m. *hatter;*	Magasin, m. *warehouse;*	Part-ir, 2 ir. *to set out;*
Eté, *(from* être, 4 ir.) *been.*	Malade, *sick;*	Retourn-er, 1. *to return;*
Espagne, *f. Spain;*	Marchandise, *f. merchandise;*	Sort-ir, 2 ir. *to go out;*
Horloger, m. *watchmaker;*	Né, *from* Naître, 4 ir. *to be born;*	Venu, *from* venir, 2 ir. *come.*

1. A quelle heure votre sœur est elle venue? 2. Elle est venue à huit heures moins un quart. 3. Ces demoiselles sont elles nées à Rouen ou à Caen? 4. Elles ne sont nées ni à Rouen ni à Caen elles sont nées à Strasbourg. 5. L'horloger est il chez lui? 6. Non, Monsieur, il est allé à son magasin. 7. A-t-il été à Paris cette année? 8. Oui, Madame, il y a été. 9. Y a-t-il acheté des marchandises? 10. Il y a acheté de la bijouterie. 11. Avez vous été trouver mon père? 12. J'ai été le trouver. 13. Votre chapelier a-t-il sorti aujourd'hui? 14. Il n'a pas sorti, il est malade. 15. Le maçon est il à la maison? 16. Non, Madame, il est sorti. 17. Quand est il sorti? 18. Il est sorti il y a une heure. 19. Votre chapelier est il arrivé aujourd'hui ou hier? 20. Il est arrivé hier à quatre heures du matin. 21. Notre tailleur a-t-il été voir son père aujourd'hui? 22. Il est parti pour Lyon. 23. L'orfèvre de mon cousin n'est il pas parti pour l'Espagne? 24. Non, Monsieur, il est retourné en Allemagne. 25. Ma sœur a été à l'eglise ce matin, et elle est allée à l'école, il y a une demi-heure.

Exercise 84.

1. Is the physician at home? 2. No, Sir, he is not at home; he is out. 3. Have you been out this morning? 4. No, Sir, I have not been out; I am sick. 5. Is your sister's little girl out? 6. Yes, Sir, she is out, she is at my brother's. 7. At what hour did the hatter arrive? 8. He arrived last evening at nine. 9. Did the jeweller go to Paris or Lyons this year? 10. He went to Paris six months ago, but he is back (*de retour*). 11. Did you go to my brother or to my sister? 12. I have not had time to go to them. 13. Where was that gentlemen born? 14. He was born in England, in Exeter, or in Portsmouth. 15. Was not your sister born in Paris? 16. No, Sir, she was born in Madrid, in Spain. 17. Did you tell me that your brother has bought a good house? 18. He has bought a very good house in London. 19. Do you know at what time the watchmaker arrived? 20. He arrived this morning at a quarter before five. 21. Has he brought much jewellery? 22. He has not brought much jewellery, but he has brought many watches (*montre*, f.). 23. Has he been in France or in Germany? 24. He has been in France, in Germany, and in Switzerland (*Suisse*). 25. Is your sister in (*à la maison*), Sir? 26. No, Sir, she is out; she is gone to church. 27. Did she go to school yesterday? 28. She went to school and to church. 29. Is she there now? 30. No, Sir, she is back. 31. Is the hatter arrived? 32. Yes, Sir, he is arrived. 33. When did he arrive? 34. He arrived yesterday at nine o'clock in the morning.

Section XLIII.

1. Combien de temps corresponds with the English expression, *how long.*

Combien de temps avez vous demeuré en Italie?	*How long did you live in Italy?*

2. Combien de fois answers to the English, *how often, how many times.*

Combien de fois y avez vous été?	*How many times have you been there?*

3. Jusqu'où is used for *how far, what distance,* &c.

Jusqu'où avez vous été?	*How far have you been?*

4. Jusqu'à quelle heure (*till what hour*), means also, *how late.*

Jusqu'à quelle heure avez vous attendu?	*How late did you wait?*

5. D'où means *whence*; par où, *which way, in what direction.*

D'où venez vous mon ami?	*Whence do you come, my friend?*
Par où votre ami est il allé?	*Which way is your friend gone?*

6. Mener [§ 49], porter, *to take, to carry;* amener, apporter, *to bring, to take with one;* emmener, emporter, *to take, to carry away.* We use mener, amener, emmener, for *to take, to bring, to take away,* in the sense of *conducting, leading, guiding, on foot or in a vehicle.* Porter, apporter, emporter, mean *to carry, to bear, to carry away,* &c.

Menez votre sœur à l'école.	*Take your sister to school?*
Portez ce livre à votre sœur.	*Take this book to your sister.*

Resume of Examples.

Jusqu'où votre frère est il allé?	*How far is your brother gone?*
Il est allé jusqu'à Paris.	*He is gone as far as Paris.*
Combien de temps va-t-il y rester?	*How long is he going to stay there?*
Il va y rester jusqu'au printemps.	*He is going to stay there until spring*
Combien de temps avez vous demeuré à Londres?	*How long did you live in London?*
Nous y avons demeuré six ans.	*We lived there six years.*
Jusqu'où avez vous été?	*How far did you go?*
Nous avons été jusqu'aux Champs Elysées.	*We went as far as the Champs Elysées.*
Jusqu'à quelle heure avez vous écrit?	*How late did you write?*
J'ai écrit jusqu'à minuit.	*I wrote until midnight.*
D'ou viennent ces Allemandes?	*Whence come those German ladies?*
Elles viennent d'Aix-la-Chapelle.	*They come from Aix la Chapelle.*
Par où sont elles venues?	*Which way did they come?*
Elles sont venues par Bruxelles.	*They came by Brussels.*
Menez vous cette petite fille à l'école?	*Do you take (lead) that little girl to school?*
Je ne l'y mène pas, je l'y porte, elle est trop petite pour marcher.	*I do not lead her there, I carry her there; she is too small to walk.*
Amenez vous vos enfants?	*Do you bring your children?*
Portez vous une lettre à la poste?	*Do you take a letter to the post-office?*
J'emmène mon cheval, j'emporte ma montre.	*I bring away my horse, I bring away my watch.*

Exercise 85.

Bruit, m. *noise;*	Ici, *here;*	Pied, m. *foot;*
Drap, m. *cloth;*	Loin, *far;*	Quitt-er, 1. *to leave;*
Elève, m *pupil;*	Magnifique, *magnificent;*	Soieries, *f. p. silk goods;*
Fils, m. *son;*	Midi, *noon;*	Voiture, *f. carriage;*
Fin, e, *fine;*	Nouvelle, *f. news;*	Voyageur, m. *traveller.*

1. Le jeune homme est il allé loin? 2. Il n'est pas allé bien loin, il n'est allé que jusqu'à Paris. 3. Vos enfants font trop de bruit, pourquoi ne les emmenez vous pas? 4. Ils sont malades, ils ne peuvent marcher. 5. Comment les avez vous amenés ici? 6. Je les ai amenés en voiture. 7. A quelle heure amenez vous le médecin? 8. Je l'amène tous les jours à midi. 9. Combien de fois par jour menez vous vos élèves à l'église! 10. Je les mène à l'église deux fois pas jour. 11. Combien de fois y avez vous été? 12. J'y ai été plusieurs fois. 13. Par où ces voyageurs sont ils venus? 14. Ils sont venus par Amiens et par Rouen. 15. D'où apportez vous cette nouvelle? 16. Je l'apporte de Cologne. 17. D'où avez vous amené ces superbes chevaux? 18. Je les ai amenés d'Angleterre. 19. Si vous quittez la France, avez vous l'intention d'emmener votre fils? 20. J'ai l'intention de l'emmener. 21. Qu'avez vous apporté de France? 22. Nous avons apporté de magnifiques soieries, des draps fins et des chapeaux de Lyon. 23. Avez vous amené votre fille à pied ou à cheval? 24. Je l'ai amenée en voiture. 25. Vos frères nous ont apporte des livres.

Exercise 86.

1. How long did your son live in London? 2. He lived there ten years. 3. How far is the physician gone? 4. The physician is gone as far as Cologne. 5. Has he taken his son with him? 6. He has not taken him. 7. How have you brought your two little girls? 8. I brought one in a carriage, and I carried the other. 9. Is she too little to walk? 10. She is not too small to walk, but she is sick. 11. Have you brought your horse? 12. We have brought two horses. 13. Have you brought the books which you have promised me (*promis*)? 14. I have forgotten to bring them. 15. Has that lady brought her eldest (*aîné*) son? 16. She has brought all her children. 17. How did they come? 18. They came in a carriage. 19. Which way did your brother come from Germany? 20. He came by Aix-la-Chapelle and Brussels. 21. Do you intend to take your son to school this afternoon? 22. I do not intend to take him there, it is too cold. 23. Is that child too sick to walk? 24. He is too sick to walk, and I intend to carry him. 25. Why do you not take him in a carriage? 26. My brother has taken my horse away. 27. Have you brought the physi-

cian? 28. I have not brought him, no one is sick at our house. 29. Will you take this book to church? 30. I have another, I do not want it. 31. Have you taken my letter to the post-office? 32. I have forgotten it. 33. How late did you write? 34. I wrote until midnight (*minuit*). 35. Whence do your sisters come? 36. They come from Paris.

LESSONS IN GEOGRAPHY.—VII.

DISCOVERIES OF THE EIGHTEENTH CENTURY.

The greatest modern navigator, whose fame is European, is acknowledged to be Captain James Cook. His first voyage had for its grand object the observation of the transit of Venus, that is, the passage of this planet in its orbit over the disk of the sun, a phenomenon, alike important in astronomy, navigation, and geography. The ship Endeavour was put under the command of this young lieutenant, who had previously given more than one proof of his skill and courage. The Endeavour left England on the 26th of August, 1768, touched at Rio Janeiro, and proceeded to the straits of Lemaire, in order to double Cape Horn. Terra del Fuego did not present to him such a dreadful aspect as it did to Wallis; the naturalists of the expedition collected there some plants and animals. One of their excursions, however, nearly proved fatal to them. Having ascended a mountain whose vegetable products they wished to examine, they were overtaken by the shades of evening and the coldness of a severe frost. Dr. Solander was on the point of perishing under its influence, when the wise importunity, or rather pertinacity of his companions saved his life, by hindering him from giving way to sleep, the forerunner of death. After having spent several hours in great distress, and having seen two of their servants sink under its power, the imprudent explorers with much difficulty reached the coast. After this delay in the Straits of Magellan, Cook stood out for Tahiti, where the astronomical observations intrusted to the care of the expedition, were to be made.

The natives of Tahiti welcomed this expedition in the same manner as they had done that under Bougainville, in a hospitable and agreeable manner. During their three months residence in this island, Cook and his learned companions made an ample collection of specimens of its natural history, and of observations on the manners and customs of its natives. They then visited several other islands of the Tahitian group, and gave to the whole Archipelago, the name of the Society Islands. They explored New Zealand, and found the natives the very opposite of the Tahitians in their disposition, both hostile and cruel. They discovered that this island consisted of two separate parts intersected by a strait, which now bear the name of Cook; but they durst not examine the interior of the country; as it would have been too dangerous to have ventured into the midst of a race of cannibals, whose savage habits were very soon observed by the expedition. Cook left the shores of New Zealand on the 31st of March, 1770, and in twenty days afterwards beheld those of New Holland, where he discovered the bay, which forms now one of our most important colonial settlements, called Botany Bay. Proceeding northward, he was nearly shipwrecked in latitude 16° S. by the vessel striking on a coral rock. The Endeavour was providentially saved, and enabled to reach a small harbour where she was repaired, and put into a condition to resume her homeward voyage, which she completed without meeting any further disaster.

The second voyage of Captain Cook undertaken in July, 1772, had for its object, the discovery of that great *southern land* which had been for ages supposed, by navigators and geographers, to exist in the southern part of the Great Pacific Ocean, and which Abel Tasman fancied he had seen when he landed on New Zealand. Two vessels called the Resolution and the Adventure, were put under the command of Captain Cook. The expedition proceeded directly southward; but in latitude 67° 13′ S. it met with rocks which appeared to be impassable. No attempt was made to get beyond this obstacle, and the expedition returned northward to the nearest cape, under the conviction that if any southern continent existed, it could only be at a very great distance, and quite in the vicinity of the South Pole. The two vessels which were separated from each other among the ice, proceeded to New Zealand, where they again met. After useless explorations to the east of this island, and as far as the 46th parallel of latitude, Captain Cook made for the Society Islands, where he remained until the health of the expedition was recruited.

A second attempt to discover the southern continent soon brought the expedition to latitude 71° S., but here again the passage to the south was blocked up by ice, and it was obliged to return northwards. In a new exploration of the seas of Oceanica, Captain Cook rediscovered Easter Island, which Commodore Byron, Carteret, and Bougainville had searched for in vain; he also discovered some new islands belonging to the Marquesan Archipelago, returned to Tahiti, and revisited Tongataboo and the Friendly Islands, where he discovered Savage Island, and Batoa or Turtle Island, belonging to the group of the Feejee Islands; he then re-established several points of New Guinea, and discovered Tanna, Erromango, and several other islands of the New Hebrides, New Caledonia, Norfolk Island, and the Sandwich Islands. The point of departure for a third exploration of the Antarctic or Southern Seas was New Zealand. Captain Cook endeavoured to reach the South Pole in a more easterly direction than formerly. Having arrived at latitude 55° 48′ S., he sailed towards Cape Horn, and continued his route towards the east. In this route he discovered the Island of South Georgia, to the east of Terra del Fuego; and south-east of the former a group of islands which he called Sandwich Land. Here he terminated his voyage toward the southern circumpolar regions. He had circumnavigated the globe in high southern latitudes, and had demonstrated that no southern continent existed in the immense zone which he had explored. The hypothesis of its existence was thrown many degrees nearer the South Pole; and the illusion of this problematic continent, so richly endowed by nature, was dissipated for ever!

In this remarkable expedition Captain Cook was absent from England more than three years; and he arrived at Portsmouth on the 13th of July, 1775. In the interval, some other voyages were made in the South Seas; and the islands of Marion and Crozet, as well as that called Kerguelen's Land, were discovered by the navigators whose name they bear. Again the indefatigable Cook resumed his voyages of discovery. This time he intended to search for the north-west passage to India, by passing through Behring's straits. He left England on the 12th of July, 1776, with the ships Resolution and Discovery, under his command. He first visited the islands above mentioned, and then touched at Van Diemen's Land and New Zealand. Soon after, he discovered the central Polynesian group Toubouai, the Archipelago of Harvey's Islands or Monaian group, and the islands Watehoo and Otakootai, in the same seas. Sailing to the north of Tahiti, he arrived at the Sandwich Islands, where he was taken for a superior being, and as such received by the natives. On the first of January, 1778, he made the discovery of this important group. Captain Cook then prepared for the accomplishment of the principal object of the expedition. He sailed along the north-western coast of the new world, until he reached a point of land which he called Icy Cape, in latitude 70° 27′. Here a solid mass of ice, ten feet thick, extending to the opposite coast of Asia, presented to him an insuperable barrier. He returned to the Sandwich Islands, where, alas! his fate awaited him. On the island, in this archipelago, called O-why-hee, he fell by the hands of a savage; and thus, unfortunately, ended the life of the greatest navigator of modern times. Captain Clarke, who was second in command, took charge of the expedition, and sailed to the north-east in search of the passage to the Atlantic; but the same obstacles compelled him to return and abandon the enterprise.

To attempt to describe all the benefits which the discoveries of Captain Cook has conferred on the sciences of geography and hydrography, is more than can be done in this historical sketch of these memorable expeditions. The accuracy with which this illustrious navigator determined the geographical positions of the places which he discovered or visited, rectified numerous errors in the maps and charts of the century in which he flourished, and accelerated the progress of the science to which these remarks form our introduction, in a degree hitherto unknown. Mathematical geography has, since his time, taken her place among the exact sciences.

In concluding this lesson, we may remark, that Cook lifted the veil of darkness which hung over the extremities of the Pacific Ocean, and the junction of the continents of Asia and America. His last voyage, by disclosing the vast breadth of America at the latitude of Behring's Straits, made the hopes of discovering the north-western passage darker than ever. That continent had, previous to the time of the English navigator, been considered as terminating to the north in a point or cape, after passing which, the navigator would find himself at once in the south seas, and in full sail to China or Japan. But the discovery of Cook showed that there was found intervening a space of land of nearly three thousand miles in breadth, a very large portion of the circumference of the globe. Hence, geographers viewing the coast running northward from Behring's Straits, and Hudson's and Baffin's Bays, all enclosed by land, received the impression, and constructed their maps accordingly, that an unbroken mass of land reached onwards to the Pole, and that all these boundaries were for ever barred against the enterprising navigator.

LESSONS IN LATIN.—No. XIX.

By John R. Beard, D.D.

REGULAR VERBS.

The First Conjugation.

PASSIVE VOICE.

Example.—Amor 1, *I am loved.*

Chief Parts; amor, amatus sum, amari.

Characteristic letter, A long.

Parts with the corresponding English.

	Ind. Pres.	Sub. Pres.	Ind. Imp.	Sub. Imp.
Latin.	amor	amer	amábar	amárer
English.	*I am loved*	*I may be loved*	*I was loved*	*I might be loved*

I. Fut.

Latin.	amábor
English.	*I shall be loved*

	II. Fut	Ind. Perf.	Sub. Perf.
Latin.	amatus ero	amatus sum	amatus sim
English.	*I shall have been loved*	*I have been loved*	*I may have been loved*

	Ind. Plup.	Sub. Plup.	Inf. Pres.
Latin.	amatus eram	amatus essem	amari
English.	*I had been loved*	*I might have been loved*	*to be loved*

Inf. Perf.

Latin	amatum esse
English	*to have been loved*

	Inf. Fut.	Imp.	Past. Part.	Fut. Part. indus
Latin.	amatum iri	amare	amatus	amandus
English.	*to be about to be loved*	*be thou loved*	*loved*	*ought to be loved*

After what has been said; the corresponding English and Latin signs will easily be deduced by the student; thus—of the present, the Latin sign is *or*, the English, *be loved;* in the sub. imp. the Latin sign is *rer*, the English, *might be.*

Compare together the forms in the active voice, and the forms in the passive voice, and carefully notice how they differ, and how the one may be changed into the other, that is, the active into the passive, and the passive into the active.

Remark that the English *I am loved, he is loved,* &c., denotes a present act, equivalent to this, *they* or *you love me, they are loving me,* loving me *now;* such is the force of amor with its several persons. It is thus contrasted with amatus sum, which if translated literally, would seem to mean *I am loved,* but which is a past tense and signifies *I have been loved.* Mark carefully that amatus sum (es, est, &c.) is a past tense; learners are apt to construe it as a present tense. The Latin verb has, in strict speech, no perfect tense of the passive voice, though it can express a perfect passive act. That expression it effects by a periphrasis (a Greek word equivalent to the Latin circumlocution, or *round about way of speaking*), thus it uses the passive participle and parts of the verb esse *to be;* for instance, amatus sum, *I have been loved;* amatus sim, *I may have been loved;* amatus eram, *I had been loved,* &c. The participle amatus, of course undergoes the variation of declension, so as to agree with the pronoun or noun connected with it; thus, if the noun is plural and feminine, amatus becomes amatae; if neuter and singular, amatum; and so on.

The inf. perf. is formed by the aid of the passive infinitive of eo, *I go,* as amatum *iri, to go to be loved,* that is, *to be about to be loved.*

Moods, Tenses, &c. of a Regular Verb of the First Conjugation, Passive Voice.

		Indicative.	*Subjunctive.*	*Imperative.*	*Infinitive.*	*Participle.*
Present.	*Sing.*	amor amáris amátur	amer améris amétur	[tor amáre or ama- amátor	amari	
	Plural.	amámur amámini amántur	amémur amémini améntur	[mínor amámini or am- amántor		
Imperfect.	*Sing.*	amábar amábaris amábatur	amárer amárēris amarētur			
	Plural.	amabámur amabámini amabántur	amarémur amarémini amarēntur			
I. Future.	*Sing.*	amábor amabēris amábitur			amatum iri	amandus
	Plural.	amábimur amabēmini amabintur				
Perfect.	*Sing.*	amatus sum amatus es amatus est	amatus sim amatus sis amatus sit		amatum [esse	amatus
	Plural.	amati sumus amati estis amati sunt	amati simus amati sitis amati sint			
Pluperfect.	*Sing.*	amatus eram amatus eras amatus erat	amatus essem amatus esses amatus esset			
	Plural.	amati erámus amati erátis amati erant	amati essémus amati essétis amati essent			
II. Future.	*Sing.*	amatus ero amatus eris amatus erit				
	Plural.	amati erimus amati eritis amati erunt				

Instances:—Form according to these examples the following verbs; namely, honōro 1, *I honour;* corōno 1, *I crown;* and judĭco 1, *I judge.*

Vocabulary.

Castĭgo 1, *I chastise, punish;* congrego 1, *I collect* or *gather together* (E. R. *congregation*, from grex, gregis, *a flock*) contamino 1, *I defile, contaminate;* crucio 1, *I crucify, I torture* (Lat. crux, crucis, *a cross*); emendo 1, *I amend, improve;* exŏro 1, *I entreat, obtain by entreaty;* muto 1, *I change* (E. R. *mutation*); obscūro 1, *I darken* (B. R. *obscure*); recupero 1, *I regain, recover;* spero 1, *I hope;* violo 1, *I violate, injure;* caveo 2, *I avoid* (E. R. *caution*); morbus, i, *sickness, disease;* flagitium, i, n. *a shameful deed;* studium, i, n. *desire, effort* (E. R. *study*); splendor, ōris, m. *splendour, bright, shining;* judex, judĭcis, m, *a judge;* pax, pacis, *f. peace;* munus, ĕris, *reward, present;* aequus, a, um, *equal, just;* piger, gra, grum, *idle, lazy;* sancte, adv. *holily.*

Latin-English.

Ego laudabar, tu vituperabāre;* urbs oppugnabatur; ego laudabor, tu vituperabĕre;† urbs oppugnabitur; quum urbs ab hostibus oppugnabatur, omnium civium animi ingenti timore occupabantur; cives vehementer ab hostibus vexati sunt; quum pugna erat atrocissima, sol nubibus obscurabatur; maleficī post mortem justis poenis castīgabuntur; urbs ab hostibus oppugnata est; omnium civium animi ingenti terrore occupati sunt; si litteras diligenter tractaverīmus, a parentibus pulchris muneribus donabimur; quum urbs ab hostibus expugnata erat, omnes cives acerbissimo dolore cruciabantur; si lĭbĕri vestri bene a vobis educati sunt laudabamini; industrius discipulus laudātor, piger vituperator; leges divinae ab hominibus sanctae observantor; exoramini, O mei parentis! O mi puer, delectare litterarum studio! exorare, O judex! milites certa

* Another form of vituperabāris. † Another form for vituperabĕris.

dfe in urbem congregantor; cives ne flagitiis contaminantor; melior est certa pax quam sperata victoria; terra mutata non mutat mores; dolor patienter toleratus minus acerbus est; bonus vir laudandus est; boni parentes curant ut liberorum mores emendentur; cura ut in omni re conscientia recta servetur; tu a me amaris ut ego a te redămer; heri ambulabam ut tristis animus exhilararetur; milites nostri acerrime pugnabant ut urbs ab interitu servaretur; vide ne a praeceptoribus vituperére; bonus civis cavet ne leges a se violentur; non dubito quin amicus meus morbo liberaturus sit; nemo dubitabat quin pax recuperata esset; nescio qua re pax turbata sit.

ENGLISH-LATIN.

Peace has been regained; peace will be regained; peace was regained; I do not doubt that peace will be regained; peace has been disturbed; has peace been disturbed? has not (*nonne*) peace been disturbed? peace will be disturbed; peace ought not to (must not) be disturbed; I shall be praised, he will be blamed; he must be blamed; he has been blamed; the city has not been captured; O father, be entreated (overcome by entreaty) by your suppliant daughter! the mother was overcome by entreaty; the sun is obscured by a cloud; yesterday the sun was obscured by clouds; dear son, thy mind is occupied by terror; my mind was occupied with grief; the minds of all the citizens will be occupied with fear and sorrow; young men, be not contaminated with vice; I love thee that I may be loved again by thee; the father must be loved; the bad boy must be chastised; let the laws of the state be conscientiously observed by all citizens; the laws of God are observed by holy men; have the precepts of virtue been observed by the young men (*adolescens, tis*) of the city?

LESSONS IN BOTANY.—No. XII.

CLASS XV.—TETRADYNAMIA.

Plants bearing flowers, having invariably four petals, with *Six* Stamens, of which four are *longer* than the other two.

THE difference is thus obvious between this class and the sixth, as in that all the six stamens are of nearly *equal* length.

ORDER I. SILICULOSA.

The plants of this order comprise those which have a short roundish pod or pouch for a seed-vessel, frequently provided with a shaft, in some kinds as long as the pouch itself. There is also a natural subdivision of this order in those plants which have the pouch *entire* at the top, and those in which the pouch is *notched* at the top.

Seeds enclosed in a pouch *entire* at the top.

The common whitlow-grass grows on walls and dry loose soil; with leaves arranged in a star-like form on the ground, and yielding clusters of white flowers which appear in March and April. Here we have a plant in miniature. So small are the flower and the foliage that they might be covered by an ordinary thumb-nail. Often are its roots protected by the low green moss, above which it rises to reward the attention it invites. It is worth remembering too, that it grows in patches. Another name borne by this plant is nail-wort, and it was recommended by the old herbalists as a cure for whitlows, a painful inflammation at the ends of the fingers. There are four other varieties of this remarkable grass.

Sea-Kale, or as the old writers called it, Sea-Colewort, is an excellent vegetable. Gerard says, "It groweth naturally on the beach and borders of the sea, where there is no earth to be seen, but sand and rolling pebble-stones. I found it growing between Whitstable and the Isle of Thanet, near the brink of the sea, and in many places near to Colchester, and elsewhere by the sea-side." It grows in sand, with a large and fleshy root, stems two feet high, branched, smooth, and spreading, with stalked, leathery leaves, and clusters of large white flowers which are observable in May and June. In former times it was only procured, as it has been stated, "with the greatest danger, by boys who let themselves down by means of a rope, which is lowered or shifted by others standing at the top, the very sight of which makes the most indifferent observer tremble, while it excites the wonder of others, that so great a risk should be ventured for so small a reward as a dish of this marine vegetable." For many years past it has formed a profitable article with market gardeners, who have cultivated it, and when they have forced it, have obtained for it a high price.

Seeds enclosed in a pouch, *notched* at the top.

The common shepherds-purse has a branched stem, ab foot high, small white flowers which may be observed d the long season from March to November, and a universally heart-shaped and somewhat triangular. plant grows by road-sides and in cultivated ground, and there are varieties which we cannot now particularise. name, pleasing in its associations, like those of so many flowers, is obviously derived from the little purses pro by the plant, resembling in shape the purses of former

SILIQUOSA.

The seeds of this order are enclosed in a long pod.

There are four species of cardamine, or wild-cres May and June we may observe the minute flowers narrow-leaved cardamine, which grows in mountainous dows, by the sides of streams. The plant is about a foo The hairy cardamine varies from three inches to a height; the leaves are more or less hairy, and the which may be noticed from March to July are sma white, growing in loose soil and shady places. The flo the cuckoo-flower are, on the contrary, large; they g corymbs, pale-purple, lilac, or white; and appear dur month of May. The plant is found in moist meadow watery places, and is about a foot in height. The stems bitter cardamine vary in height from one to two fe flowers in April and May, are large and white; it in wet meadows.

The common wall-cress grows on walls, and on dry ground. It rises to about a foot in height; it is bra and bears small white flowers, which it puts forth in The hairy wall-cress has stems about a foot high, erec leafy, covered with spreading hairs. It grows on dry gravelly banks, and walls. To the same family belo Bristol rock-cress, the Alpine rock-cress, the fringe cress, and the tower-cress, which grows on old walls, in May of a pale yellow, and has pods thickened edges.

The celebrity of the water-cress is of very ancient da was thought to brighten the intellect of those that which gave rise to the Greek proverb, "Eat cress, and more wit." Pliny dwells much on the medicinal vir this plant; and the Romans recommended that cress be eaten with vinegar, by those who were deranged. In countries and in nearer times, the virtues of this plan attracted much attention. The Dutch eat great qua of it in the spring, as an antiscorbutic. Lord Bacon t that the water-cress is an herb, that while young, is f to life.

As this plant is sometimes confounded with the cr water-parsnip, which is of a pernicious quality, it is imp that the difference between the two should be distinct ceived. The leaves of both plants are winged, like th the rose, or the ash; but the water-cress leaf is of a ro heart-like shape, with few indentures on the edges, resembling the first leaves of the radish. The upper the plant is of a reddish-brown colour, and of a dark gr the under side of the leaves; whereas those of the parsnip are of a light green, ending in a point and w gular saw-like teeth on the edges. The white flowers water-cress may be observed in June and July. O yellow-cress there are three kinds: the creeping yellow has erect stems, a foot high, numerous, small, gold- flowers in clusters; and may be gathered in wet meadow watery places.

The treacle mustard grows in corn-fields, and flow July, with an erect, branched stem, two feet in height. pods are nearly erect. The seeds are used for dest worms in children. The garlic hedge-mustard, or Jack hedge, has a stem from one to three feet high; its num white flowers appear in May. The plant grows among ru and by hedges and walls. When bruised, it emits a str garlic, from whence it derives its name; it is bitter and and has been used as salad. The hare's ear, another va of the same plant, has a stem from one to two feet high, loose cluster of cream-coloured flowers. It grows in field on rocks near the sea.

The wild wall-flower has a bushy stem, from one to two feet high, large flowers, appearing in May and June, with rich yellow petals. It grows on old buildings and high walls. Of this plant Moir says, with enthusiasm,—

"The wall-flower—the wall-flower,
How beautiful it blooms!
It gleams above the tower,
Like sun-light over tombs:
It sheds a halo of repose
Around the wrecks of Time;—
To beauty give the flaunting rose,
The wall-flower is sublime.

In the season of the tulip-cup,
When blossoms clothe the trees,
How sweet to throw the lattice up,
And scent thee on the breese;
The butterfly is then abroad,
The bee is on the wing,
And on the hawthorn by the road
The linnets sit and sing.

Rich is the pink, the lily gay:
The rose is summer's guest;
Bland are thy charms when these decay,—
Of flowers—first, last, and best;
There may be gaudier in the bower,
And stateller on the tree;
But wall-flower—loved wall-flower!
Thou art the flower for me!"

The cabbage bore a name among the Greeks which arose from the seed resembling that of the radish, while that used by the Romans, *Brassica*, still employed by botanists, is supposed to be derived from *præsco*, because it was cut off from the stalk. Another Latin name for it was *caulis*, on account of the goodness of its stalks, and from which the English name cole, colwort, or colewort is derived. The word cabbage, by which all the varieties of this plant are now imperfectly called, means the firm head or ball that is formed by the leaves turning close over each other; hence the saying the cole has *cabbaged*, the lettuce has *cabbaged*. The cant-word used in speaking of tailors, who formerly worked at private houses, intimates that they rolled up pieces of cloth belonging to their customers, instead of the list and shreds which they claimed as their due.

Gerard is the oldest English author who has written fully on this useful vegetable. He mentions the white cabbage cole, the red cabbage cole, the curled cabbage cole; and says the Savoie cole is among the headed coleworts or cabbages. He says also, "the swolen colewort of all others is the strongest, and which I received from a worshipfull marchant of London, Master Nicholas Lete, who brought the seed out of France, who is greatly in love with rare and faire flowers and plants; for which he doeth carefully send into Syria, having a servant there at Alepo, and in many other countries; for the which myself and likewise the whole lande are much bound unto." The same writer adds: "Rape cole is another variety; they were called in Latin *caulo-rapum* and *rapo-caulis*, participating of two plants, the coleworts and turnips, from whence they derive their name. They grow in Italy, Spain, and some places in Germanie, from whence I have received seeds for my garden." This variety has long become one of our hardiest field-plants. The German cabbage is grown to so great a size in Holland that a single head often weighs forty pounds, and remains perfectly sweet and tender.

LESSONS IN NATURAL HISTORY.—No. VII.

THE WOLF.

[*Order* CARNIVORA, *species* CANIS LUPUS.]

THE wolf is larger, stronger, and more muscular than the dog. His colour is generally pale gray. His powers of scent are very delicate, his hearing is acute, and his habits always cautious. He never carries his tail curled upwards, and his pace is marked by hesitancy and indecision. The track of a wolf is readily distinguished from that of a dog by the two middle claws being close together; while in the dog they are separated: the marks, however, when the wolf is at speed, and the middle toes are separated, can be determined by the claws being deeper, and the impression more hairy; the print is also larger and narrower, and the ball of the foot more prominent. Wolf-hunters commonly assert that the animal is weak in the loins, and, when first put to speed, that his hind-quarters seem to waver; but, when warmed, that he will run without halting, from the district where he has been hunted, taking a direct line for some favourite cover, perhaps forty miles or more in distance. On these occasions he will leap upon walls above eight feet high, cross rivers obliquely with the current, even if it be the Rhine, and never offer battle unless he be fairly turned; then he will endeavour to cripple the opponent by hasty snaps at the fore-legs, and resume his route.

"As to attacking the wolf," said a shepherd to Mr. Barrow, when he was in Spain; "it is no very pleasant task; he has both teeth and claws, and dog or man who has once felt them, likes not to venture a second time within his reach. These dogs of mine will seize a bear singly with considerable alacrity; though he is a most powerful animal; but I have seen them run away howling from a wolf even though there were two or three of us at hand to encourage them."

Another shepherd said: "A dangerous person is the wolf, and cunning as dangerous: who knows more than he? He knows the vulnerable point of every animal; see, for example, how he flies at the neck of a bullock, tearing open the veins with his grim teeth and claws. But does he attack a horse in this manner? I trow not." "Not he," said the first shepherd, "he is too good a judge; but he fastens on the haunches, and hamstrings him in a moment. Oh! the fear of the horse when he comes near the dwelling of the wolf. My master was the other day, riding above the pass, on his fine Andalusian steed, which had cost him five hundred dollars: suddenly the horse stopped, and sweated, and trembled, like a woman in the act of fainting; my master could not conceive the reason, but presently he heard a squealing and growling in the bushes, whereupon he fired off his gun, and scared the wolves, who scampered away; but he tells us that the horse has not yet recovered from his fright."

At one time the wolf was the plague and terror of our island. The Saxons, it is said, called January, "wolf-monat," or wolf-month, because the wolves of our ancient forests, impelled by hunger at this season, were wont to prowl and attack man himself; the inferior animals, on whom they usually preyed, having retired or perished from the inclemency of the weather. Then, laws were made with a view to the destruction of this animal, retreats were built in the northern districts to secure passengers from its attacks, and taxes were paid in wolves' heads.

King Edgar, to encourage the destruction of these animals, commuted the punishment of criminals, in many cases, into a requisition of a certain number of wolves' tongues from each, according to the degree of the offence. A Welsh prince who paid tribute to him, was oppressively ordered to produce annually, instead of money, a hundred wolves' heads. Nor was this a solitary instance of rigorous enactment; for, as Somerville says,—

"Cambria's proud kings (though with reluctance) paid
Their tributary wolves; head after head,
In full account, till the woods yield no more,
And all the ravenous race extinct, is lost."

Then, too, kings and chiefs adopted the name of the wolf or have been recognised by it, either in consequence of their ravages, or from a desire to appear truly formidable. Such was the case among the Saxons, and hence we read in history of *Æthel*wolf, or noble wolf; *Berth*wolf, or illustrious wolf; *Ead*wolf, or prosperous wolf; and other combinations of the same kind, which are similarly significant.

Though endeavours were long made to exterminate the wolf in England, it maintained its ground there for many centuries, and lingered still longer in the Islands of Scotland. The last wolf is said to have fallen in Lochaber, by the hands of Sir Ewen Cameron, of Lochiel.

Thomson thus pictures the ravages of these creatures in other lands:—

"By wintry famine roused from all the tract
Of horrid mountains, which the shining Alps,

And wavy Apennine, and Pyrenees
Branch out stupendous into distant lands;
Cruel as death, and hungry as the grave,
Burning for blood, bony, and gaunt, and grim,
Assembling wolves in raging troops descend;
And pouring o'er the country, bear along
Keen as the north wind sweeps the glossy snow,
All is their prize. They fasten on the steed,
Press him to earth, and pierce his mighty heart;
Nor can the bull his awful front defend,
Or shake the murdering savages away;
Rapacious at the mother's throat they fly,
And tear the screaming infant from her breast."

The wolf combines cowardice with ferocity, and when not impelled by hunger, conceives every object is a snare to entrap him. Thus, in Lapland, if he comes on a reindeer, tied to a post to be milked, he will not venture to approach it, lest the animal should be tied there as a decoy; yet no sooner is the deer set at liberty than he commences a pursuit, and destroys it. But should the deer become irritated and stand at bay, the wolf is instantly intimidated. Mr. Lloyd, who has written on the "Field Sports in the North of Europe," gives us a still more striking fact. A peasant, when one day in his sledge, in the neighbourhood of St. Petersburg, was pursued by eleven wolves. At this time he was only about two miles from home, towards which he urged his horse at the very top of his speed. At the entrance to his residence was a gate, which happened to be closed at the time, but the horse dashed this open, and thus himself and his master found refuge within the courtyard. They were followed, however, by nine out of the eleven wolves; but, very fortunately, at the instant these had entered the enclosure, the gate swung back on its hinges, and thus they were caught as in a trap. From being the most voracious of animals—now that they found escape impossible—they became completely changed; so far, indeed, from offering molestation to any one, they slunk into holes and corners, and allowed themselves to be slaughtered almost without making resistance.

WOLVES.

"Worse than the he-wolf," said a soldier to Mr. Barrow, "is the female. I was once travelling over the hills of Galicia, when we heard a howl. 'These are wolves,' said my companion, 'let us get out of the way;' so we stepped from the path, and ascended the side of a hill a little way, to a terrace, where grew vines, after the manner of Galicia; presently appeared a large gray she-wolf, snapping and growling at a troop of demons, who followed close behind, their tails uplifted, and their eyes like firebrands. What do you think the perverse brute did? Instead of keeping to the path, she turned in the very direction in which we were; there was now no remedy, so we stood still. I was the first upon the terrace, and by me she passed so close that I felt her hair brush against my legs; she, however, took no notice of me, but pushed on, neither looking to the right nor left, and all the other wolves trotted by me without offering the slightest injury, or even as much as looking at me. Would that I could say as much for my poor companion, who stood farther on, and was, I believe, the demon's way than I was; she had nearly passed him, suddenly she turned half round, and snapped at him. never forget what followed; in a moment a dozen wolve upon him, tearing him limb from limb, with howlings li thing in this world; in a few moments he was devour thing remaining but the skull and a few bones; and the passed on in the same manner as they came. Good reas I to be grateful that my lady-wolf took less notice of m my poor comrade."

The Spanish soldier in calling the wolves demons s accordance with a widely-extended superstition. T Saxons spoke of the *weir-wolf* under the idea that sessed some evil spirit; and the peasantry of many districts of France call him still the *loups garous* for t reason.

Wolves are still very frequently seen at Ecommoy and in the department of the Sarthe, France. Not long ago wolf seized a child by the frock, and dragged it away presence of its mother, who followed it to its den, w found her child in the midst of nine cubs, without any The cubs were instantly killed by the neighbours, but escaped.

Strang may s wolf, taken capable tamed. brated ist, C Buffon, up ac these He st when during year, very d even c and if will ne turb th nor a animal that a of fifte or tw their ferocity to ap they chance vent t

Instances, however, are not wanting in which of early training has continued. Not long ago, the "The Garden of Plants" in Paris, a black wolf brought when very young, and presented to Mad Devousel, the step-daughter of the famous Baron Cu lady found him so tame, that she desired he mig dog as a companion, and be entirely fed on broth a meat. Her orders were obeyed, and the animal re his gentleness and docility. He never saw her stretching his paws through the bars to be shaken; she let him loose, he was accustomed to lie down to lick her feet, and to show every mark of joy and a

The Scripture account of this animal correspo cisely with the description given above of his cunning, and his rapacious nature. These are al in the patriarch's character of the tribe of Ben Genesis xlix. 27: "Benjamin shall ravin as a wol morning he shall devour the prey, and at night he sh the spoil."

LESSONS IN GEOLOGY.—No. X.

By Thomas W. Jenkyn, D.D., F.G.S., &c.

CHAPTER I.

ON THE ACTION OF VOLCANOES ON THE EARTH'S CRUST.

SECTION VI.

ON HOT WELLS, OR THERMAL SPRINGS.

The mention which I made, in the last lesson, of water and mud in connexion with volcanoes, is likely to have prepared you to expect that something should be said about the hot wells, or springs of hot water, which are found to prevail so extensively over the globe. I ought, however, to explain to you the reason why thermal springs are introduced here, and not reserved till we come to our next chapter which will be concerning the action of WATER upon the earth's crust.

It is well known, that whenever an earthquake takes place in volcanic regions, new springs burst forth in several spots; or, former wells have their volume of water much increased, and others have the temperature of their water greatly raised. It is on this account that these hot wells are considered under the head of volcanic action; for it is evident that such springs are of a mixed character, partly igneous, and partly aqueous.

As thermal springs play an important part in the formation of the crust of the earth, a knowledge of their phenomena is of great use in geological investigations. Modern chemistry has shown that all mineral springs, whether they issue forth from the surface of the earth, or bubble up in the "dark unfathomed caves of ocean," contribute essentially to the benefit of vegetable and animal life. By their *heat*, they contribute to the development of aquatic animals in the sea; and by the elementary substances which they bring up from the bowels of the earth to the surface-soil, they are subservient to the nutrition, both of plants and animals. The knowledge of this fact will be useful to you when you come to study the fossil plants and animals, called the flora and fauna, of the older sedimentary rocks.

The water which issues from our common springs derives its amount of warmth, either from the heat of the sun, or from the temperature of the rocks through which it has sunk or percolated. There are, however, many springs whose temperature cannot be ascribed to the sun and atmosphere, for their temperature, varies from that of the surrounding air to that of boiling water.

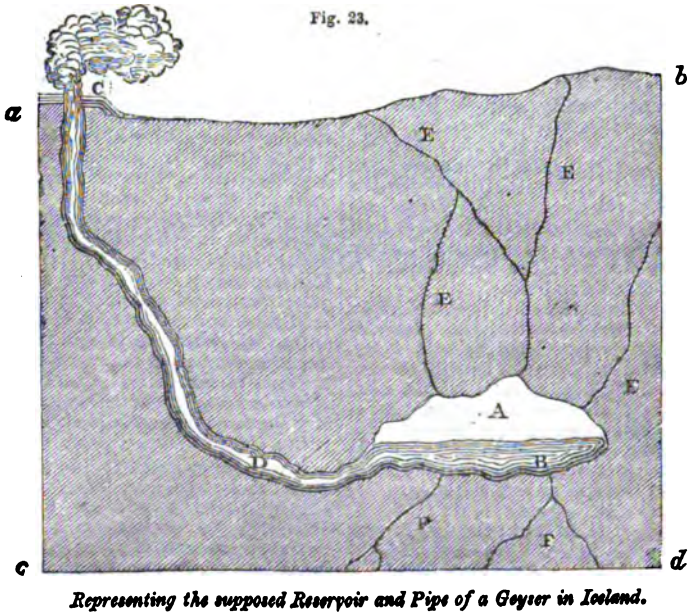
Two theories have been applied to the explanation of thermal springs. According to one, their water is supposed to rise from very great depths; depths at which the rocks are intensely heated by subterranean fire. The other supposes that the heat of these deeply-seated rocks is communicated upward through fissures, until it meets and heats that water which has percolated from the surface, and causes it to ascend in another direction.

Fig. 22.

The Geyser, in Iceland.

The illustrious chemist, Berzelius, ascribes the origin of thermal springs to the waters of the atmosphere percolating through the soil and the underlying rocks, and descending downwards until they reach volcanic heat, and that then they are forced upward charged with the various substances with which they have combined in the strata below. Another great chemist, Von Hoff, supposes, on the contrary, that the heat which influences their waters is not from volcanic action, but from those fiery processes which are deeper in the interior of the earth, and which are themselves the causes of volcanoes and earthquakes.

Fig. 23.



Representing the supposed Reservoir and Pipe of a Geyser in Iceland.

What do you think? Is the high temperature of these thermal springs owing to this deep subterranean heat or not? One would think that it is; for they are found in almost all situations, not only in districts where volcanoes are now active, but in the regions of extinct volcanoes, as in central France, and also even in spots which are very far removed from all volcanic points. As, also, they are found in ranges of mountains which have evidently been upheaved by the force of subterranean heat pressing upward, it is a fair inference that the heat of the springs which issue at the sides of such mountains is

derived from the heat beneath. Take the following for instances. In some of the higher regions of the Himalaya, in India, a spring is formed on the banks of the river Jumna so hot, that the hand cannot be kept in it many moments. Also at Jumnotri, a place 10,483 feet above the level of the sea, nearly three times the height of Snowdon or Ben Nevis, thermal springs rise through crevices in a rock of granite, the heat of which is so near the boiling point, that the finger cannot be kept in it two seconds.

These thermal springs are found to rise in almost all kinds of rock, such as granite, gneiss, limestone, lava, &c. Though they are not limited to volcanic points, they are most abundant in districts where violent earthquakes have occurred, and where great disturbance and dislocation of strata has taken place. To give an enumeration of the situations on the globe where thermal springs are found, belongs rather to physical geography than to geology. I will, however, point you to a few spots where these springs are accompanied by very remarkable phenomena.

At the Ozark Mountains in North America, there is a valley between two slate hills, where there is a magnificent burst of about seventy hot springs, and varying in temperature from 120° to 140° Fahrenheit. It is remarkable that about, and even in, some of the hottest of these springs, vegetables and confervæ grow and thrive; and also that on the floor and at the sides of such hot wells, little insects are seen sporting in gaiety and glee. These confervæ are diminutive, and thread-like plants which spread themselves in fine filaments. This fact must be interesting to you, as it will help you to understand how such aquatic plants could come into quartz pebbles, and into chalk, as the microscope has revealed to us.

At Salzburg, in the Alps, there is a hot well called Bâd Gastein. In that hot water, not only are aquatic animals and vegetable found, but even a fresh water shell called *limneus peregor* enjoys itself at the heat of 117° Fahrenheit.

At La Trinchera, in the district of Valencia, South America, there is a spot where thermal springs and wells of cold water are within forty feet of each other. This phenomenon illustrates the great variety of courses which waters take among the strata below. Von Humboldt says that the hot wells at this place are so copious as to form a rivulet which, during the greatest droughts, is two feet deep and eighteen wide. The temperature of the well is 194°, and eggs were boiled by it in four minutes. The springs issued from granite, were strongly impregnated with sulphuretted hydrogen, and deposited a sediment of carbonate of lime. At forty feet distance were wells of fresh water of the ordinary temperature. The waters which came to form these two classes of wells so near each other must have been derived from widely different sources, and must have undergone different influences.

Having stated to you a few of the remarkable facts connected with thermal springs, I will now try to explain to you how they become heated, and how they find their way to the surface.

I have intimated that, most probably, they are heated by communications of hot steam which rises from rocks below. Facts seem to intimate that this is the case. In the neighbourhood of Naples, and in the Lipari Islands, there are spots where fissures, crevices, or holes are formed, from which jets of steam are issuing and have issued for centuries. From these fissures no water comes, but only steam, and that of a heat above the boiling point. The Italians call these jets of steam "stufas." Now, where does this hot steam come from? It comes, undoubtedly, from subterranean heat.

Suppose this steam to be rising from deeply-seated rocks intensely heated. Before it reaches the surface it becomes condensed by passing through strata percolated by cold water. The result will be, that it will heat the water and cause it to rise in thermal springs. If this rising steam be not what Newton calls the "vera causa," the true cause of the phenomenon, it is, at least, an adequate cause. For, if the expansion of elastic fluids at great depths be sufficient to hurl up heavy columns of lava to the summits of volcanic mountains, it can surely raise columns of water to a still greater elevation.

Whatever your doubts on this subject may be, they must all vanish on a visit to the Geysers of Iceland; for they furnish an instance of aqueous eruption, in which steam alone is the moving agent. Fig. 22 will give you a representation of one of them.

The Geysers are situated in the south-west divisio land. About one hundred of them play within a circ miles. These rise in a thick bed of lava derived from Hecla, a volcano whose summit can be seen fro the distance of some thirty miles. Fig. 22 represent called the "Great Geyser." It rises out of a spaci which surrounds a vent or a well. The basin con mound which has been formed around this well by sil flinty matter which has fallen from the spray of the w which has settled as a circular incrustation. The di the whole basin is 56 feet in one way and 46 in In the centre of the basin is the well, shaft, or pi goes down seventy-eight feet deep, and which is fro ten feet in diameter. At intervals this basin is qui but usually it is filled with water that boils as if in on the fire.

Before an eruption of the Geyser takes place the a rushing water is sometimes heard in the chasms be surface; for here, as in the districts of Ætna, riv brooks flow in subterranean channels formed in po cavernous lava. The Geysers jet and rest alternately few of them play for more than five minutes at a t intervals they throw up an immense quantity of h and steam. When an eruption of the boiling wate subterranean noises are heard which resemble the di charges of cannon, and these are repeated rapidly b larly.

Before the eruption actually takes place the wat and rises several times in the well or the pipe to whi referred, and then a column of water jets up suddenly basin to the height of ten or twelve feet, accompa clouds of steam. The first column rises as if it had had been snapped from the water below. The next about fifteen feet, and then a quick succession of abou jets in five minutes take place, which rise about fifty After the last jet, which is the most furious of all, suddenly disappears from the basin, and sinks down the pipe or well in the centre. It sinks about ten then begins to rise gradually. Its temperature in th about 209° Fahr. There have been many instances these jets of boiling water have risen in columns fro dred to a hundred and fifty feet high. A great rush almost always follows the subsidence or disappearan water in the well.

I will now try to explain to you the means by w water is boiled, and the principles on which it is thro jets attended by steam. Before I do so, examine diagram, fig. 23.

Imagine *a b c d* to be a mountain mass of lava, a mil From the surface *a b* there are fissures, E E E, throu atmospheric water is percolating to a cavern A B. have said in the last lesson about an enormous m being found under a bed of lava, will assist your c how such subterranean caverns may be produced. colating water settles like a lake at B. At the bott mass, *c d*, there are also fissures through which hot constantly rising from incandescent rocks below. rents of hot steam reach the water B, through the f rents F F. This steam gradually raises the temperat water until it boils, and then fills the cavity A wi under high pressure, as in the boiler or tube of a steam The expansive force of the steam in A now pres greater power on the water B, and drives it up the until it runs over the edge of the basin at C, where or flint which it holds in solution settles and forms When a portion of the water B has been so driven pressure of the steam at A becomes expanded, a upwards the whole of the water at B; the steam rush it at the same time with great violence, and the play with a cloud of mere vapour.

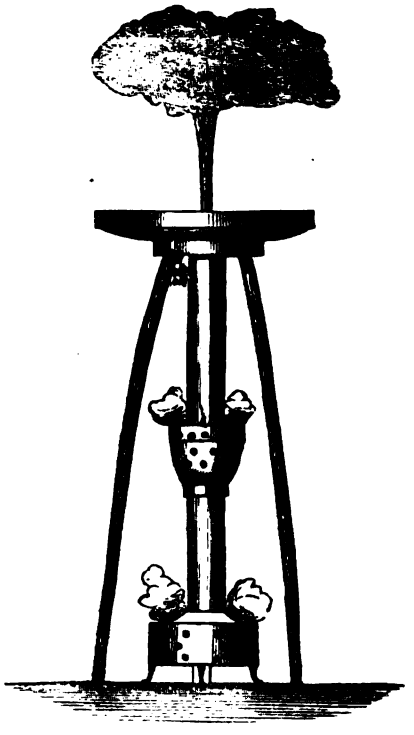
It will be manifest to you that if the pipe C D b means choked up, even for a short interval, a great in heat must take place in A B—the water is made to b violently—the elastic steam struggles with more migh new eruption both of water and vapour takes place. found that when stones are thrown, by travellers or sp into the pipe while the steam is rushing out, they are

ıtely hurled up, projected to a great height, and commonly attered into fragments.

Several philosophers have tried to account for the action of ysers, and to imitate their phenomena, by means of humble ıtruments. In 1832 Sir J. Herschel read a paper to the ological Society, in which he shows that the Geyser jets ıy be imitated by heating red-hot the stem of a tobacco-pipe. ıe bowl was to be filled with water, and the stem to be a tle inclined to allow the water to run through it. The water ll not escape in a stream, but by a succession of explosions jets. In this case, precisely as in that of the Geysers, there first a jet of steam, then a jet of water mixed with steam, d, as the pipe cools, a jet almost wholly of water.

A German chemist has imitated the same phenomena, by a tube six feet high. On the top of the tube is a wide basin. ıth the basin and the tube are filled with water, which is ated by fire below. This instrument is represented by . 24. Compare this with the statements made under fig. 23.

Fig. 24.



apparatus for imitating the eruptions of the Geysers of Iceland.

When you think of the vast number of thermal springs on globe, and consider that their waters are more constant in seasons than those of cold water, the question naturally es—Where does all this water come from? or, how can ons of volcanic heat send forth such incessant supplies of er?

is a common belief that all the waters of the clouds sink the soil, break out in wells and rills, and eventually h the ocean. If this belief or opinion be right, it is ossible to account for the inexhaustible quantity of water ring in thermal springs. Facts contradict this opinion. oring deep near sea-shores it is often found that streams resh water are met with at a depth many hundred feet w the level of the sea. Where does this water go to? It is bable that it sinks, and sinks far below the bottom of the sea. resh water percolates rocks at such a depth, it is much e likely to be the case with the salt water of the ocean. It kely that sea-water, under great pressure, in some places s beneath the floor of the ocean through porous or fissured strata. After running downwards to great depths, it reaches rocks sufficiently heated to convert it into vapour, which, in passing through colder strata, condenses again into water of high temperature. This inference seems warranted by the fact that thermal springs are most abundant in volcanic districts, where the heat is likely to be nearer the surface; or in districts where earthquakes have produced fissures which communicate between subterranean heat and the surface.

LESSONS IN GERMAN.—No. X.

Section XIX.

Verbs of the Old Conjugation (commonly called irregular verbs) differ from those of the New, not only in respect to terminational variations, but also in regard to changes of the radical vowels. Ex.: Ich komme, I come; ich kam, I came; ich ſchreibe, I write; ich ſchrieb, I wrote; ich ſehe, I see; ich ſah, I saw. (See § 77; also list of irregular verbs, § 78. 1).

The form of the past participle, in verbs of the Old Conjugation, frequently differs from that of the infinitive, only by the augment ge. *Ex.: Infinitive,* kommen. *Past participle,* gekommen.

Infinitive.	*Present.*
Fallen, to fall;	ich falle, I fall;
Geben, to give;	ich gebe, I give;
Gehen, to go;	ich gehe, I go;
Kommen, to come;	ich komme, I come;
Sprechen, to speak;	ich ſpreche, I speak;
Springen, to spring;	ich ſpringe, I spring;
Schreiben, to write;	ich ſchreibe, I write;
Singen, to sing;	ich ſinge, I sing;
Sehen, to see	ich ſehe, I see;
Imperfect.	*Past Participle.*
ich fiel, I fell;	gefallen, fallen;
ich gab, I gave;	gegeben, given;
ich ging, I went;	gegangen, gone;
ich kam, I came;	gekommen, come;
ich ſprach, I spoke;	geſprochen, spoken;
ich ſprang, I sprang;	geſprungen, sprung;
ich ſchrieb, I wrote;	geſchrieben, written;
ich ſang, I sang;	geſungen, sung;
ich ſah, I saw;	geſehen, seen;

I. The present tense of some verbs of the Old Conjugation, is irregular in the second and third persons singular. Ex.:

Fallen, to fall.	Geben, to give.
Ich falle, I fall;	Ich gebe, I give;
Du fällſt, thou fallest;	Du gibſt, thou givest;
Er fällt, he falls.	Er gibt, he gives.
Sehen, to see.	Sprechen, to speak
Ich ſehe, I see;	Ich ſpreche, I speak;
Du ſiehſt, thou seest;	Du ſprichſt, thou speakest;
Er ſieht, he sees.	Er ſpricht, he speaks.

II. In the imperfect tense of verbs of the Old Conjugation, as well as of the New, the second and third persons are regularly formed from the first person singular in the manner following. Ex.:

Gehen.

Ich ging, I went;	wir gingen, we went;
Du gingſt, thou wentest;	ihr ginget, you went;
Er, ſie, or es ging, he, she, or it went;	ſie gingen, they went.

Geben.

Ich gab, I gave;	wir gaben, we gave;
Du gabſt, thou gavest;	ihr gabet, you gave;
Er gab, he gave;	ſie gaben, they gave.

CONJUGATION OF THE IRREGULAR VERB „haben" IN THE INDICATIVE.

Infinitive.	*Participles.*
PRES. Haben, to have.	PRES. Habend, having.
PERF. Gehabt zu haben, to have had.	PERF. Gehabt, had.

PRESENT TENSE.

Singular.	*Plural.*
Ich habe, I have;	wir haben, we have;
Du haſt, thou hast;	ihr habet, you have;
Er hat, he has;	ſie haben, they have.

IMPERFECT TENSE.

Ich hatte, I had;	wir hatten, we had;
Du hatteſt, thou hadst;	ihr hattet, you had;
Er hatte, he had;	ſie hatten, they had.

PERFECT TENSE.

Ich habe gehabt, I have had;	wir haben gehabt, we have had;
Du haſt gehabt, thou hast had;	ihr habt gehabt, you have had;
Er hat gehabt, he has had;	ſie haben gehabt, they have had.

PLUPERFECT TENSE.

Ich hatte gehabt, I had had;	wir hatten gehabt, we had had;
Du hatteſt gehabt, thou hadst had;	ihr hattet gehabt, you had had;
Er hatte gehabt, he had had;	ſie hatten gehabt, they had had.

FIRST FUTURE TENSE.

Ich werde haben, I shall have;	wir werden haben, we shall have;
Du wirſt haben, thou wilt have;	ihr werdet haben, you will have;
Er wird haben, he will have;	ſie werden haben, they will have.

SECOND FUTURE TENSE.

Ich werde gehabt haben, I shall have had;	wir werden gehabt haben, we shall have had;
Du wirſt gehabt haben, thou wilt have had;	ihr werdet gehabt haben, you will have had;
Er wird gehabt haben, he will have had;	ſie werden gehabt haben, they will have had.

IMPERATIVE.

Singular.	*Plural.*
Habe du, have thou;	haben wir, let us have;
Habe er, ſie, or es, let him, her, or it have;	habt or habet ihr, have ye or haben Sie, or you; haben ſie, let them have.

Exercise 19.

Ab'reiſe, *f.* departure; Heute, to-day; Tag, *m.* day;
An'genehm, adj. agreeable; Kleid, *n.* dress, garment; Taſch'entuch, *n* handkerchief;
Eben, just, even, now; Niemand, nobody, no one; Vor'geſtern, day before yesterday?
Gramma'tik, *f.* grammar; Schuh, *m.* shoe; Warum'? why?
Handſchuh, *m.* glove;

Ich habe ihn heute geſe'hen.	I have seen him to-day.
Ich habe ihn geſtern geſe'hen.	I saw (have seen) him yesterday.
Was Sie hoffen, iſt ſehr un'gewiß.	What you hope is very uncertain.
Ging Ihr Herr Bruder geſtern nach Leipzig?	Did your brother go to Leipsic yesterday?
Nein, er ging nach Dresden; aber ich werde wahrſcheinlich, morgen nach Leipzig gehen.	No, he went to Dresden; but I shall probably go to Leipsic to-morrow.
Du ſangſt ſchön; aber deine Schweſter ſang in Ihrer Jugend göttlich.	You sing beautifully, but your sister sang in her youth divinely.
Wem nahmſt du dieſes Schwert?	From whom did you take this sword?
Ich habe es meinem Feinde genommen und gab es meinem Freunde.	I took it from my enemy and gave it to my friend.

1. Was hat Ihr Herr Bruder? 2. Er hat neue Kleider und neue Bücher. 3. Warum haben Sie heute meine weißen Handſchuhe gehabt? 4. Ich hatte ſie geſtern; aber heute habe ich ſie nicht gehabt. 5. Wir werden morgen einen angenehmen Tag haben. 6. Mein Vater wird meinen Brief vor ſeiner Abreiſe gehabt haben. 7. Dieſer arme Mann ging vorgeſtern zu meinem Onkel. 8. Er gab ihm zwei Taſchentücher und einen neuen Hut. 9. Siehſt Du oft meinen Bruder und ſprichſt Du zuweilen mit ihm? 10. Ich ſah ihn geſtern; aber ich habe nicht mit ihm geſprochen. 11. Sangen Sie heute Morgen oder ſang Ihre Fräulein Tochter? 12. Ich habe in meiner Jugend geſungen; aber jetzt ſinge ich nicht mehr. 13. Haben Sie meine neue deutſche Grammatik? 14. Nein, eben nicht, aber ich habe ſie geſtern gehabt. 15. Niemand iſt glücklich als der Zufriedene (Sect. 17), und Niemand iſt weiſe als nur der Fromme. [illegible] Frau Gemahlin einen Brief an Ihren Herrn Vetter geſch[illegible] Nein, noch nicht, aber ſie wird morgen an ihn ſchreiben. [illegible] nach Rom: „ich kam, ſah und ſiegte.“ Ich gab dieſem armen [illegible] alten Schuhe.

meinen

1. Have you seen my brother? 2. No, I hav[e] him, but my wife saw him the day before yesterd[ay] langen ein Wort
wrote a long letter and spoke not a word. 4. Sh[e] mir
to me a new dress and a beautiful handkerchief. Sie Wetter
think that we shall have fine weather to-morro[w] Glaube regnen
but I think that it will rain.

Questions. 1. In what respect do verbs of th[e] jugation differ from those of the New? 2. In w[hat] only do past participles of verbs of the Old Conj[u]quently differ in form from those of the New? said of some verbs of the Old Conjugation in the third persons singular? 4. How do verbs of both C[on] form their second and third persons?

Section XX.

Welcher? welche? welches? (which?) as interrog[a]clined precisely like dieſer, e, es. The genitive is sel[dom]

DECLENSION OF THE DEMONSTRATIVE PRONOU[N] e, e s, (this).

	SINGULAR.			PLU[R]
	Masc.	*Fem.*	*Neut.*	*All gen*
Nom.	Dieſer;	dieſe;	dieſes; this.	Dieſe, th[ese]
Gen.	Dieſes;	dieſer;	dieſes; of this.	Dieſer, of [these]
Dat.	Dieſem;	dieſer;	dieſem; to this	Dieſen, to [these]
Acc.	Dieſen;	dieſe;	dieſes; this.	Dieſe, th[ese]

I. Der, die, das, frequently stand independent belonging to a noun. When so used, it is called pronoun, and answers to our demonstrative pron[oun] inflection, as seen in the Declension following, dif[fers] of the article, and it is likewise commonly pron[ounced] stronger emphasis.

DECLENSION OF THE SUBSTANTIVE PRONOUN D[er]

	SINGULAR.			PLURA[L]
	Masc.	*Fem.*	*Neut.*	*All gen*
Nom.	Der;	die;	das, that;	die, those
Gen.	Deſſen;	deren;	deſſen, of that;	deren, of [those]
Dat.	Dem;	der;	dem, to that;	denen, to, [for]
Acc.	Den;	die;	das, that;	die, those

Examples of the use of the substantive pron[oun]

Sein Mantel iſt ſchwarz und der ſeines Bruders* iſt blau.	His cloak is black his brother is bl[ue]
Die Uhr meines Vaters iſt groß und die ſeines Freundes iſt klein.	The watch of m[y] large and *that* is small.
Das Leder des Schuhmachers iſt ſchwarz und das des Sattlers iſt gelb.	The leather of the is black and *that* dler is yellow.
Seine Gänſe ſind grau und die ſeines Nachbarn ſind weiß.	His geese are gr[ay] of his neighbou[r]
Ich habe meinem Hut und den meines Freundes.	I have my hat an[d] friend.
Sie hat ihre Feder und die ihrer Freundin.	She has her pen her friend.
Der Knabe hat ſein Buch und das ſeines Vaters.	The boy has his b[ook] of his father.
Die Knaben haben ihre Bälle und die ihrer Freunde.	The boys have th[eir] *those* of their fr[iends]

* Such elliptical form as “His cloak is black and is blue” (Sein Mantel iſt ſchwarz und ſeines Bruders iſt seldom in German.

Exercise 20.

Adolph, *m.* Adolphus; Amerika'niſch, adj. American (§ 5., Note VII.); Bild, *n.* picture, image; Bild'hauer, *m.* sculptor; Brief, *m.* letter; Buch'halter, *m.* book-keeper; Fabel, *f.* fable; Gellert, *m.* Gellert; Heinrich, *m.* Henry; Rathhaus, *n.* city-hall, council-house; Ro'ſenfarben, adj. pink-coloured; Tinte, *f.* ink; Wann, when; Welcher, which; Zim'mermann, *m.* Zimmerman. Zoll'einnehmer, *m.* toll-gatherer; Zwilling, *m.* twin.

Haben Sie den Geſang' der Nachtigall gehört'?	Have you ever heard the song of the nightingale?
Ja, ſehr oft, aber nie den der Lerche.	Yes, very often, but never that of the lark.
Das Licht der Sonne iſt nützlich.	The light of the sun is useful.
Weſſen Buch iſt dieſes?	Whose book is this?
Welchem von Ihnen gehört' dieſes Buch?	To which of you does this book belong?
Welches Buch meinen Sie?	Which book do you mean?
Das neue große Buch.	The new large book.
Welches iſt denn der rechte Name?	Which is then the right name?

1. Welchen Tiſch haben Sie? 2. Ich habe den meines Freundes, des Tiſchlers. 3. Welches Papier haben Sie? 4. Ich habe das meines Freundes, des Lehrers. 5 Welcher von dieſen Knaben hat meine blaue Tinte? 6. Keiner von ihnen hat Ihre Tinte, aber einer von dieſen Knaben hat Ihr ſchönes roſenfarbenes Papier. 7. Welcher von ihnen hat es? 8. Adolph hat es, und Heinrich, Ihr kleiner Vetter, hat Ihren hölzernen Bleiſtift. 9. Welches von meinen Büchern iſt in Ihrem Zimmer? 10. Ihre Gellert's Fabeln ſind dort. 11. Welcher von dieſen zwei kleinen Knaben iſt Ihr Neffe? 12. Sie ſind beide meine Vettern. 13. Sind ſie Brüder? 14. Ja, ſie ſind Zwillinge. 15. Welche Ihrer amerikaniſchen Freunde ſind in dem Rathhauſe? 16. Herr C. und Herr L. 17. Weſſen Buch haben Sie? 18. Ich habe das Ihres Vetters. 19. Wann hat Herr Zimmermann meinen Brief gehabt? 20. Er hat ihn vorgeſtern gehabt und ſein Freund, der Maler, hat ihn geſtern gehabt, und ich habe ihn heute. 21. Hat der Lehrer den Sohn des Bäckers oder den des Schneiders gelobt? 22. Er hat weder den des Bäckers, noch den des Schneiders, ſondern den des Maurers gelobt. 23. Haben Sie die Federn des Kaufmanns oder die des Buchhalters? 24. Ich habe weder die des Kaufmanns, noch die des Buchhalters, ſondern ich habe die des Zolleinnehmers. 25. Wer lobt den alten Capitän? 26. Der Hauptmann lobt ihn. 27. Er lobt das ganze Volk. 28. Der Wagen des Franzoſen iſt groß und der des Engländers ſchön.

Regenſchirm
1. Which umbrella have you? 2. I have that of my brother,
kauften Sie
the sculptor. 3. When did you buy this pink-coloured dress?
Tuchhändler Wollen
4. I bought it yesterday from my cousin, the draper. 5. Will you give this book to this man or that? 6. I will not give it
Keinem
to either.

Questions. 1. Like what is welcher? welche? welches? as interrogative declined? 2. Is the genitive often used? 3. How does der, die, das, frequently stand? 4. What is meant here by independently? 5. What is it then called? 6. How employed? 7. From what does it differ in Declension? 8. How is it generally emphasised? 9. Can you repeat some examples of its use? 10. What is said of such elliptical forms as ſeines Bruders, &c., in German?

LESSONS IN ARCHITECTURE.—No. III.

THE ORDERS OF ARCHITECTURE.

After the rude style of building practised in early times had spread itself in various forms over the ancient world, true art at last made its appearance. The great nations of antiquity, as they advanced in civilisation, created a national architecture, each with a feeling and expression peculiarly its own. As soon as the stones used in buildings began to assume a cubical, prismatic, or cylindric form, and the square and compasses gave a new direction to stereotomy (or stone-cutting), architects gave wing to their imagination, because they now had the means of realising its creations. Symmetry was studied in the ground-plan of their edifices; their architraves were raised upon pillars and columns; and experience ere long taught them the strength of every stone, and the proper height of every part of a building. Hence arose that harmony and proportion which elevated architecture into an art. We shall not attempt to decide the question whether pillars and columns were first formed in excavations, or in separate constructions; but it is evident that they were the first elements of a regular architecture,—that is, of the orders which constituted the first basis of architectural harmony. To the pyramidal constructions of Egypt and of Asia, the erection of palaces and other edifices speedily succeeded, in which square and cylindrical pillars formed a most essential part; because the great weight of the materials employed, required that they should be supported at short distances for the formation of internal and external galleries. These single pillars could only be connected at the top by architraves of such dimensions as combined the ratio of their breadth with the proportions of the supporting power of the columns. Upon these architraves were placed platforms or ceilings of flat stones, which, by their thickness, formed a new dimension above the former; and, upon these platforms were formed terraces or flat roofs, which were surrounded by another row of stones forming a border, and having an outward projection which preserved the façade from the effects of the rain. These were the origin of cornices and entablatures. The column in preference to the square pillar became the type of architectural proportion. Simple, at first, it presented nothing but a cylindrical shaft, without ornament, and only expressing the purpose for which it was originally intended. The oldest specimens in Egypt are of this description; Asia presents similar specimens; and Greece, with the whole of the west, follows the same track; thus proving that everywhere there is an invariable similarity in the origin of the arts. The simplicity, elegance, and utility of the column, engaged the attention of architects, and concentrated all the efforts of their imagination. Thus it became their architectural type or model; and formed the nucleus of the different characteristic styles of the great nations of antiquity.

The most ancient monuments of Egypt ornamented with columns are situated in the Heptanomis. They exhibit specimens of the greatest simplicity, and strongly analogous to those of the Doric order. The monuments of India excavated in the rock present the same principles of these primitive orders. In these two countries, which are the cradles of architecture, artists at first decorated their columns and their capitals with ornaments of which the ideas were taken from the local vegetation, to which were sometimes added others borrowed from animal nature. Thus in Egypt after having set up the simple cylindrical shaft for their column, they sculptured upon it branches of the lotus, meeting each other and fastened together by fillets. The capital which crowned the column was at first composed of the bud of the same flower. This first idea was afterwards developed in the application of vegetation of every kind to the ornamentation of the columns of the temples and of the great public edifices. In the following examples of Egyptian capitals there is one composed of the leaves of the palm-tree.

Fig. 9.

Egyptian Capitals.

Egypt thus adorned with orders of architecture had its national style. The numerous works upon the history and anti-

quities of Egypt published during the last half-century have made us acquainted with its archaiological treasures, such as the temples and palaces of Thebes, of the Isle of Philoe, of Tentyra, of Apollinopolis, and of others; and large public buildings, decorated with numerous columns, immense pillars, obeliaks, and sphinxes, which give to this style a peculiar character of antiquity and grandeur, of which mere verbal description would fail to convey any idea to the reader; but which have been extensively illustrated in our Lessons on the Ancient History of Egypt. In India, as in Egypt, isolated

Fig. 10.

Temple or Palace of Indra at Ellora.

columns and pillars appear to have had their origin in subterranean excavations for architectural purposes; of these numerous examples are seen at Ellora, in the palace or temple of Indra. These pillars are much shorter than those of Egypt, their bases and capitals occupying a considerable portion of the height of the column and the entablature or rather the corona is less accurately traced. In cases where the Indians cut out the rock for the purposes of decoration, and sculptured them over with various ornaments the column assumes a lighter appearance and the principles of an order of architecture can be traced.

The excavated temples of India are numerous and extensive; the principal ones are those of Elephanta, Salsette, and Vellore, or Ellora. Elephanta is situated near Bombay on a small island of the same name, which received this appellation from the figure of an elephant being cut out upon the rocks on the southern shore. The grand temple is 120 feet square, and is supported by four rows of pillars; along the side of the cavern are 50 colossal statues from 12 to 15 feet high. The face of the great bust is five feet long, and the breadth across the shoulders 20 feet. At the west end of this pagoda or temple, is a dark recess 20 feet square, without ornament; the altar is in the centre, and there are two gigantic statues at each of the four doors by which it is entered. On entering Elephanta, there is a piazza extending sixty feet from east to west, and having a breadth of sixteen feet; indeed the body of the cavern is surrounded on every side by similar piazzas. The caves of Kenneri on the larger island of Salsette, in the same vicinity, and those of Carli on the opposite shore of the continent, are equally remarkable. The mountain of Kenneri appears to have had a city hewn out on its rocky sides capable of containing many thousand inhabitants. The front is hewn into four stories or galleries, in which there are three hundred apartments; these have generally an interior recess or sanctuary, and a small tank for ablution. The grand pagoda is forty feet high to the soffit of the arch or dome; it is eighty-four feet long, and forty-six broad. The columns of the portico are finely decorated with bases and capitals; and at the entrance are two colossal statues each twenty-seven feet high. Thirty-five pillars of an octagonal form, about five feet in diameter, support the arched roof of the temple; their bases and capitals are composed of elephants, horses, and tigers, carved with great exactness. Round the walls are placed two rows of cavities for receiving lamps. At the farther end is an altar of a convex shape, twenty-seven feet high, and twenty feet in diameter; round this are also cavities for lamps; and directly over it is a large concave dome cut out of the rock. It is said that about this grand pagoda, there are ninety figures or idols, and not less than six hundred of these figures within the precincts of the excavations. The cave-temple at Carli is even on a greater scale than that now described. But the temples of Ellora, near Dowlatabad, of one of which fig. 10 is a mere sketch, is reckoned the most surprising and extensive monument of ancient Hindoo architecture. They consist of an entire hill excavated into a range of highly-sculptured and ornamented temples. The number and magnificence of these subterranean edifices, the extent and the loftiness of some, the endless diversity of the sculpture of others, the variety of curious foliage of minute tracery, the highly-wrought pillars, rich mythological designs, sacred shrines and colossal statues, all both astonish and distract the mind of the beholder. It appears truly wonderful that such prodigious efforts of labour and skill should remain, from times certainly not barbarous, without a trace to tell us the hand by which they were designed, or the populous and powerful nation by which they were produced. The courts of Indra, of Juggernaut, of Parasu Rama, and the Doomar Leyna, or nuptial palace, are the names given to several of these great excavations. The greatest admiration has been excited by the one called Keylas, or paradise, consisting of a conical edifice, separated from the rest, and hewn out of the solid rock, one hundred feet high, and upwards of three hundred feet in circumference, entirely covered with mythological sculptures.

Besides the excavated temples of India, there are several others of different forms which may here be noticed. First, those composed of square or oblong enclosures. The largest one remaining is that of Seringham, near Tritchinopoly. The circumference of the outward wall is said to extend nearly four miles. The whole edifice consists of seven square enclosures, the walls being 350 feet distant from each other. In the innermost spacious square are the chapels. In the middle of each side of each enclosure wall there is a gateway under a lofty tower; that in the outward wall, which faces the south, is ornamented with pillars of precious stones, 33 feet long, and 5 feet in diameter. Second, the temples in the form of a cross. The most remarkable of these is the temple of Benares, in the city of Casi, on the banks of the Ganges, down to which there is a flight of steps. It has been devoted to the religion and science of the Hindoos from the earliest periods of their history. The form of the temple is that of a great cross with a cupola in the centre, which towards the top becomes pyramidal. At the extremity of each branch of the cross, all of which are of equal length, there is a tower with balconies, to which the access is on the outside. Third, temples of the circular form. The temple of Juggernaut, which is that of a complete circle is considered the most ancient in India; the Bramins attribute its foundation to the first king on the coast of Orissa, who lived, according to their chronology, 4,800 years ago. The image of Juggernaut or Mahadeo, stands in the centre of the building, upon an elevated altar. The idol is described as being an irregular pyramidal black stone; and the temple lit up only with lamps. In the ancient Hindoo writings, another kind of temple is described of which now no vestige is to be found. The Ayeen Akberry relates that near to Juggernaut is the temple of the sun, in the erection of which the whole revenue of the province of Orissa, for 12 years, was entirely expended; that the wall which surrounded the whole was 150 cubits high, and 19 cubits thick; that there were three entrances; at the eastern gate were two elephants, each with a man on its trunk; on the west two figures of horsemen completely armed; and over the northern gate two tigers sitting upon two dead elephants. In front of the gate was a pillar of black stone, of an octagonal form, 50 cubits high; and after ascending nine flights of steps there was an extensive enclosure with a large cupola constructed of stone, and decorated with sculpture. Such are the ancient monuments of which India can boast, long before architecture had reached that proud eminence on which it stood in ancient Greece. In our next lesson we shall glance at those of Persia.

Questions on the preceding Lesson.

What gave rise to symmetry in Architecture? What to harmony and proportion? What two modes of creating edifices were followed in early Architecture? What is the simplest form of the column? What is the origin of cornices and entablatures? Where are the most ancient monuments of Egypt to be found? Wherein does the architecture of India differ from that of Egypt? How did the Egyptians ornament their columns? How their temples?

LESSONS IN ENGLISH.—No. XII.

By JOHN R. BEARD, D.D.

DERIVATION: PREFIXES (*continued*).

Hyper, of Greek origin (hyper, *upon, over, too much*), found in *hyper*critic; that is, one who is *too critical*, unjustifiably critical.

"The *hypercriticall* controuller of poets, Julius Scaliger, doth so severely censure nations, that he seemed to sit in the chaire of the scornfull."—*Camden*, "Remaines."

Hypo, of Greek origin, with the import of *under*, appears in *hypocrisy*, *acting under a mask*, acting an assumed character, involving both simulation or pretending to something you are not, and dissimulation or concealing what you are. *Hypo* appears also in *hypo*tenuse (Gr. teinein, *to stretch*).

"The square of the *hypotenuse* in a right-angled triangle is equal to the squares of the two other sides."—*Locke*, "Human Understanding."

Hypo appears also in *hypo*thesis (Gr. thesis, *a placing*), which by its derivation signifies *a placing under*, as is intimated in the Latin supposition (sub, *under*; and ponere, *to place*). An *hypo*thesis, then, is a supposition,—something put under certain phenomena or appearances in order to explain their cause or immediate origin.

"Any *hypothesis* which possesses a sufficient degree of plausibility to account for a number of facts, helps us to digest these facts in proper order, to bring new ones to light, and to make *experimenta crucis* (that is, decisive tests) for the sake of future inquiries."—*Hartley*, "On Man."

In, of Latin origin, signifying *in*, *into*, and *upon*, having also a negative force, appears in these forms, namely, *ig*, *il*, *im*, *in*, *ir*, *is*.

Ig, as in the Latin word *ig*noramus, denoting one who knows nothing. Here *ig* makes the statement in the verb equivalent to a negative proposition. *Ig*noramus properly signifies *we are ignorant*. An ignoramus once in a letter to me spoke of ignorami, fancying, with a smattering of Latin, that the plural of *mus* was *mi*. If ignoramus is used in the plural it must stand as ignoramuses; but Beaumont uses ignoramus itself as a plural.

"Give blockhead's beere,
And silly ignoramus, such as think
There's powder-treason in all Spanish drink."

Ignoramus is used also as an adjective; e. g.,

"Let ignoramus juries find no traitors;
And ignoramus poets scribble satires."

Il, as in *il*legal, *not* legal; *il*legitimate, *not* legitimate; the root of both being lex, legis, *a law*. In *il*lustrate (lux, Lat. *light*) the *il* denotes *upon*; *il*lustrate is to throw light *upon* a subject. In *il*lusory (ludo, Lat. *I play*, *cheat*), *deceptive*, the *il* seems to be little more than intensive.

Im, *into*, as *im*bibe (bibo, *I drink*), *im*body (embody).

"The soul grows clotted by contagion,
Imbodies and *imbrutes*, till she quite lose
The divine property of her first being." *Milton.*

In *im*bitter, the *im* is intensive or augmentive. In *im*mature (maturus, Lat. *ripe*), the *im* is negative,—*im*mature means *unripe*; *im* is negative also in *im*memorial (memor, Lat. *mindful*); *immemorial usage*, is *usage time out of mind*.

"And though some impious wits do questions move,
And doubt if souls *immortal* be or no,
That doubt their *immortality* doth prove,
Because they seem *immortal* things to know."

The root of *im*mortal is mors (mortis in the genitive), *death*; whence *mortal*.

In, *in*, as in *in*close (claudo, Lat. *I close*), to shut in; *in*, *into*, as, *in*come; *in* means also *not*, as, *in*cognito (abridged into *incog.*), a word coming to us from the Latin incognitus, *unknown*, through the Spanish *incognito*. *In*convenient is made up of in, *not*, cum, *with*, and venio, *I come*; inconvenient, therefore, is that which does not come with you, does not agree with your condition, position, or wishes. In *in*digent (indigeo, Lat. *I want*), *needy*, the *in* is augmentive.

"Themistocles, the great Athenian general, being asked whether he would choose to marry his daughter to an *indigent* man of merit, or to a worthless man of an estate, replied, that he should prefer a man without an estate, to an estate without a man."—*Spectator.*

Ir, *not*, as in *ir*reparable (from the Latin through the French; reparare, Lat. *to get again*), *not* to be got again, *not* to be regained, or restored.

"Nor does she this *irreparable* woe
To shipwreck, war, or wasting sickness, owe;
But her own hands, the tools of envious fate,
Wrought the dire mischief which she mourns too late."
Lewis, "Statius."

In *ir*ruption (rumpo, Lat. *I break*), the *ir* has the force of *into*; the opposite of *ir*ruption, *a breaking into*, is eruption, *a breaking out of*. Compare *cor*ruption, a breaking *together*, a breaking up, a crumbling.

Is passes into the form *is* in *is*olated (insula, Lat. *an island*), derived immediately from the French isolé; *is*olated, or rather *in*sulated, means *standing alone* like an island in the sea. The French form gains prevalence, and has given rise to the verb *is*olate, and the noun *is*olation.

Inter, of Latin origin (compare *enter* as above), signifying *between*, *among*; as *inter*marry, said of families, members of which marry one another; *inter* is found also in *inter*polate, *to introduce*. This is a word which has given trouble to the etymologists. Both Richardson and Du Cange connect it with polire, *to polish*. This view makes *inter*polation a sort of amendment, whereas the word carries with it the idea of corruption and depravation. *Inter*polation seems to me a low Latin word, whose root is the classical Latin pello (pulsus), *I drive*, so that *inter*polation is something thrust in, something foisted on. This is the sense in which the word is generally used, denoting the unjustifiable additions and insertions made to manuscripts by later hands than those by which they were originally composed.

"The very distances of places, as well as numbers of the books, demonstrate that there could be no collusion, no altering nor *interpolating* one copy by another, nor all by any of them."—*Bentley*, "On Freethinking."

"The larger epistles of Ignatius are generally supposed to be *interpolated*."—*Jortin*, "Ecclesiastical History."

Inter-minable is thus printed in "Richardson's Dictionary," as though the word was from inter, and minor, *I threaten*; whereas it it made up of in, *not*, and terminus, *a limit*, or boundary, and so is equivalent to *unlimited*, or unbounded; as in

"——— Plains immense
Lie stretch'd below, *interminable* meads
And vast savannahs, where the wandering eye,
Unfixt, is in a verdant ocean lost."
Thomson, "Summer."

Intra, of Latin origin, signifying *within*, occurs in the forms *intra* and *intro*, e.g., as in the recent word *intra*mural (murus, Lat. *the walls of a city*); *intra*mural interments; and *intro*duce (duco, Lat. *I lead*), *to lead within*; also *intro*mit (mitto, Lat. *I send*), to *send* or *let in*.

"So that I (Guido Reni) was forced to make an *introspection* into mine own mind, and into that idea of beauty which I have formed in my own imagination."—*Dryden*, "Parallel."

EXERCISES FOR PARSING.

July is a very hot month. In July the grass and flowers are burnt. Why do you not water your garden? The children go under the bushes. A bee is on the honeysuckle. The bee will carry the honey to the hive. Look at puss! She pricks up her ears. She smells the mice. Puss wants to get into the closet. The mice have nibbled the biscuits. February is a cold month. It snows. It freezes. The boys slide. Here is a pretty white snowdrop with a green stalk.

EXERCISES IN COMPOSITION.

HISTORICAL THEME.

Joseph and his brethren.

Form sentences having in them these words:—

Signification; prevent; incrustation; excommunicate; efflorescence; encamp; survey; office; entertainment; epitaph; equivocation; despot; forbid; pardon; hieroglyphics.

Describe a May morning. Report what you know of the chief river in the neighbourhood where you live.

ANSWERS TO CORRESPONDENTS.

A. M. (Holme-lane, near Bradford); W. R.; J. H. HARRIS (Stalybridge); S. (Newcastle); WESTMONASTERIENSIS; MAGISTER (Northaw, Herts); and many others, solve Learner's question correctly thus:—

A, B, and C do $\frac{1}{8}$ part of the work in 1 day.
A and B " $\frac{1}{12}$ " " " "
Therefore, C does $\frac{1}{8} - \frac{1}{12}$ or $\frac{1}{24}$ " " "
B and C do $\frac{1}{16}$ " " " "
Therefore, A does $\frac{1}{8} - \frac{1}{16}$ or $\frac{1}{16}$ " " "
And, B does $\frac{1}{12} - \frac{1}{16}$ or $\frac{1}{48}$ " " "

Wherefore A takes 16 days, B takes 48 days, and C takes 24 days, to do the work alone.—A. E. is right; they are misprints.—S. J. J. (Deptford): A manual of Arithmetic is preparing to accompany our Euclid.—M. C. CAREY (Dublin): Mr. Pitman *thinks* his system is the best.—E. M. DEAN (Preston): Geologists now-a-days *do not say* that the six days of creation mean six indefinite periods of time. They admit that they are *six natural days* and the *seventh day* was also a *natural day*, intended as a day of rest, and to be observed according to God's appointment. What they *do say* is, that *before* these natural days commenced, there were indefinite periods of time during which the great geological events took place, of which traces are left in the present crust of the earth. Your suggestions about answers to correspondents are impracticable, unless you wish one page of the book to swallow up *more time and labour* than all the rest of the pages!!—AMICA LITERARUM (Launceston): Her exercises in the three languages are very well done indeed, and we are equally pleased with the penmanship; we like something that we can read with ease in the midst of our grotesque correspondence.—T. B. K. (Taunton): We must have a Key to the French and the German too.—W. A. TOLL (Stonehouse): We shall have Mechanics in the POPULAR EDUCATOR soon. As to the Steam-Engine, buy Cassell's history of the same, price 7d. The letters N.B. signify *nota bene*,—that is, *mark well!*—A. B. C. (Pembroke Dock): We thank him for his remarks on Geometry, they are very shrewd; his explanatory defence of Euclid's definition of a point,—viz., "That (magnitude) which hath no (geometrical) parts," is, however, we fear still untenable. A point is not a *magnitude* either in idea or in reality.—CLEMENT R. NEEDHAM (Manchester) has sent us a very ingenious system of Logotypy, Logography, and Stenography. He seems to be a rival to Mr. Pitman. Those of our readers who take an interest in these matters, will find him at the Spread Eagle Hotel, Manchester.—HENRY BEDWIN (Salisbury) requests a solution of the following question: "If a hundred yards of string were wound round a stick an inch in diameter, what distance would a person have to walk (supposing him to keep at the end of the string, and the string to be kept always tight from the stick), in order to unwind it."

LATIN.—P. 207, right-hand column, line 11 from the bottom, after "Singular," add these words—and in the present tense active voice.—Dr. Beard's instructions in English will contain all that is necessary for a correct and thorough acquaintance with the language. E. W. is referred to the Latin Key. P. 255, right-hand column, line 5 from the bottom, for profuga read perfuga.

J. G. GRIMSBY: We thank him for his letter of congratulation.—A SUBSCRIBER (Kendal): His suggestions in regard to corrections will be referred to the end of the volume.—L. C. (Accrington): *No* is an adjective in the sentences quoted, and is like the Latin *nullus*; in other cases it is an adverb, and is used instead of *not*.—W. H. W. BOWLING (Bradford): "Whateley's Logic" is the best modern work; but there are some good things in old Watts's. It is necessary to learn the *Multiplication Table* at all events; we mean the first one in the P. E. You have too many things on hand, and might with great propriety leave out phonography. We certainly are gratified to find that Scripture is one of the subjects of your study. Oh that it were the study of all.—J. G., Jun. (Kelso): We regret that in his otherwise intelligent note, the question of p. 288 happens to be done wrong. The word *walked* in p. 204, line 59, is wrong, it should be *aliud*. In Fleet-street, London, you may get a second-hand German dictionary for three or four shillings.—C. T. PRICE (Frenchay): *Verbum sat sapientibus*, drop the "tagging" of rhymes.—W. WOOLNOUGH (Knockdown): Solution of Learner's query not right.—C. CHERTSEY: Lessons relating to poetry will be included in Dr. Beard's English Lessons.—IRWELL, for the customs, should learn gauging.—T. E. and R. P. (Paisley), for the sea, "Norie's Navigation," price 16s.—Y. R. (a working optician) should have shown more sympathy for Opifex; for a pair of globes even at half the price of 30 guineas, seems to us to be monstrous! And surely this is *one* hundred per cent.—R. C. TYPO (Oakham) proposes the following problem, which he has correctly solved, "In a given circle, to describe three equal circles, touching each other and the given circle." He most amusingly adds that "an architect in York has discovered that all the beautiful Gothic windows of the Cathedral were founded upon this problem; indeed all the arches from the lowest crypt to the highest tower; that it was the foundation of the Gothic arch itself, being founded on the *Athanasian Creed!!!*" We never knew before that the Athanasian Creed was a problem in Euclid. We may, after this, believe with the stonemason, that the veil of the temple was a brick wall.—A. proposes the following query, "A, B, and C can do a piece 10 days. A can do twice as much as B, and B twice as How long would each man take to do it alone?"—J. GASCOI head): With every wish to serve all our subscribers, we cann to insert any particular branch until we see our way. The the French will be pretty available in Sweden and Denma COWELL (Colchester): We recommend to him the "Frenc reprinted from the "Working Man's Friend" on the subject of tion.—VECTIS (Isle of Wight): His ingenious communica motion of the moon shall receive attention.—W. T. (Ol thank him for Mr. Pitman's alphabet.—R. A. (Scarire): Henry's Commentary.

DAVID HORNBY (Driffield): As he has given us so much p we feel that it is at present out of our power to give him any this, throw Shakspeare aside, and abandon caricature drawi BURROWS (Norwich): We thank him for his interesting lit book;" we shall endeavour to notice its contents soo W. (Manchester): For the law, study Blackstone; for financ join a debating society.—SOME STUDENTS (Accrington): &c., are preparing. Astronomy can be learned without a Geometry without Arithmetic, Music without a master, and without a grammar; but they can all be better learned helps.—G. H. TIMS (Hackney): All parts of Music will be You may begin with French as the easiest.—J. SUTHERLA mouth): We very much question the propriety of making Scriptures a text-book for any language. A serious individ so; but not the thoughtless many. You know the tr sentiment,

"But fools rush in, where angels fear to tread."

J. S. (Ayrshire): All his solutions are correct; in the extra 14th Prop. B. I. Euclid, there is a most extraordinary misp will be corrected when we come to that point in our Eu Euclid.—W. WALTERS (Manchester) will find the advertis wishes on the covers of the P. E. and French Extracts in th HELLUO LIBRORUM (Glasgow) has not found out the Dean's ONE of our subscribers at Blackburn points out the following in the French Lessons, p. 201, ex. 51, sentence 24, for on r W. (Preston): Husband and wife are the *nearest* relations to in the sight both of God and man.—A. DOUGLAS (Newcast get a Latin Dictionary.

LITERARY NOTICES.

We have great pleasure in directing the attention of the re POPULAR EDUCATOR *to the following announcement of the p* EUCLID'S ELEMENTS, *at One Shilling. As nothing less than t tensive circulation can possibly remunerate us for the necessar producing such a work at such a price, we trust that the large correspondents, at whose suggestions we engaged in the publicati now do their part, by making it as widely known as possible friends and acquaintances. We have no fear, if this be done, t mand will fully equal our most sanguine expectations, which, will inspire us with confidence to continue the series of sim tional works, of which this may be considered the pioneer.*

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LESSONS IN ARCHITECTURE.—No. IV.

Similar to the excavated temples of India, are the excavated tombs of Persepolis and Nakshi-Roustam. At the foot of the rock of Istakr, thirty miles south of Shiraz, stand the ruins of Persepolis, which, some critics think, was the ancient Pasagardæ. The platform, which first strikes the eye of the traveller, appears to have been surrounded by a triple wall; of the first two as described by ancient historians, no trace now remains; but the third, which still exists, is a square cut in the mountain, and is 60 cubits high. It is defended by palisades of copper, with doors of the same, 20 cubits high. The first wall was to inspire awe, the second was for strength, and the third for the defence of the palace. To the east of this at the distance of 400 feet, is the royal mountain containing the tombs of the kings. Here the rock is hollowed out into several chambers; to gain the entrance to which, the coffins are hoisted up by machinery; no other way of ascending them exists. This sacred enclosure, connected with the platform below comes within the bounds of what may be called the castellated palace. Fig. 11, is a sketch of one of the tombs in the Shah Kuh or Royal Mountain.

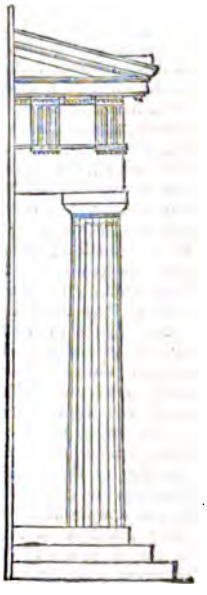
Fig. 11.

Tomb at Persepolis.

On the ground above, appear several mounds and rocky heaps, presenting the appearance of three distinct lines of walls and towns. The steep faces of this rocky palace are formed of dark gray marble, cut into gigantic square blocks, exquisitely polished and without the aid of mortar, fitted to each other with such closeness and precision, that the whole platform must have appeared as part of the rock itself. On the interior faces of the walls of the platform within the portal, are sculptured two colossal bulls, symbolical of power, and suitably placed at the gate of the great king. South of the portal, appears the magnificent terrace which supports the Hall of columns. This series of columns is called Chehilminar or palace of forty columns, and is approached by a flight of steps remarkable for their grandeur and the beauty of their decoration. But the columns themselves are the most surprising in these respects; they are each 60 feet high, the circumference of the shaft being 16 feet, and the distance from the capital to the tor, 44 feet. The shaft is finely fluted in 52 divisions; at its lower extremity, begin a cincture and a torus, the first 2 inches deep, the latter 1 foot,—whence devolves the pedestal in the form of the cup and leaves of a lotus or lily. This rests on a plinth of 8 inches, and in circumference 24½ feet, the whole from the cincture to the plinth being 5 feet 10 inches in height. The capitals which remain, though much injured, are sufficient to show that they were surmounted by the demi-bull. The heads of the bulls forming the capitals, look to the various fronts of the terrace.

But it is impossible in our limited space to indulge in the details of these extraordinary ruins; we can only refer our readers to the works which contain fuller descriptions of them, as those of Le Bruyn, Sir William Ouseley, Sir Robert Kerr Porter, and others. A few miles distant from Persepolis, stands the excavated hill of Nakshi-Roustam. It is about 1,200 feet high, and presents a precipitous face of whitish marble, nearly the whole of which is covered with sculptured tombs. The four most elevated are executed in a superior style and apparently coeval with Persepolis, and belonging to the early kings of Persia. The lower tombs appear to belong to the period of the Sassanian dynasty, and therefore to a considerably later period. The description of these remarkable tombs will remind us of the "new tomb" of Joseph of Arimathea "which he had hewn out in the rock," and of the "great stone" which was rolled to "the door of the sepulchre, wherein was never man yet laid," till the "King of kings" himself became the tenant of its walls. It explains also the meaning of the passage "she stooped down *and looked* into the sepulchre," which is so inaccurately translated in our version, and which ought to be simply "she peeped into the sepulchre;"—"to peep" is the exact translation of *parakupto*, and according to Johnson, signifies "to look closely or curiously; to look through any crevice;" the darkness of the interior of the tomb, requiring a close and narrow look, to ascertain if its tenant the "King of Glory" was there.

Fig. 12.



Doric style of the Parthenon.

Fig. 13.

The Parthenon at Athens.

After this short digression, we proceed to remark that the latest monuments discovered at Khorsabad, near Nineveh, having exhibited no example of a column or even of isolated pillars, no comparison can be instituted between the column

constructed by the Assyrians, if they did erect any, and those of the other people of Asia. The nations we have named in our preceding observations, were in the height of civilisation, while the Grecian arts were in their cradle; and it is difficult to admit that the Greeks had not learned their first lessons in architecture by the study of the Asiatic or African orders which we have described. In fact, the most ancient type of the Greek orders, the Doric, particularly at its commencement, is nearly the same as that exhibited in the tombs of the Heptanomis, and which Champollion called Proto-Doric or primitive Doric. The genius of Greece developed this first idea, enriched it with details which the Egyptians had neglected, and formed out of it the first basis of its national architecture. The principal character of the Greek Doric is the nobleness and dignity of the whole order, the severe simplicity of its details and the moderation of its ornaments. The columns have no base; the shaft is ornamented by wide and shallow flutings; the capital is composed of a large moulding in the form of a cup, or flat vase, resting upon two or three little fillets surmounted by a square tablet. The triglyphs, the fluted ornaments at the extremity of the architraves, which are seen in the frieze and entablature, belong exclusively to this order; the square spaces or metops between the triglyphs are frequently occupied with sculptures of isolated subjects; but the polished freeze, and consequently, the continued subject, are in this order very rare. Still this order does not exclude all decoration; and in buildings of a common character it loses its heaviness, and becomes very elegant; the mouldings then become finer, and some are decorated with various ornaments. See fig. 12.

According to Vitruvius, it was in the temple of Juno, at Argos, where the Doric order of architecture first rose to a marked eminence, and became the model for the magnificent edifices afterwards erected throughout Greece. It was next employed in the temple of Jupiter Nemeus, at Nemea, between Argos and Corinth; of Jupiter Olympius, at Olympia, in Elis, in a splendid triple portico in the city of Elis; and in three temples of the same city,—viz., those of Juno, Minerva, and Dindymene, or Cybele; at Eleusis, in the great temple to Ceres: in the temple of Minerva at Sunium; and in the temple of the same goddess at Athens, called the Parthenon (see fig. 13); in the entrance to the Acropolis, and in other public buildings of great magnitude and splendour at Athens. In many of the Islands of Greece and Magna Græcia, there were also temples of the Doric style of architecture; as that of Apollo, in Delos; of Juno, in Samos; of Jupiter Panellenius, of Ægina, and of Silenus, in Sicily; and many others in places of inferior note. Many of these temples were of great magnitude; they were universally of an oblong form; in some the porticoes were only at the end; in others they were extended quite round the interior of the building, some in single, and others in double ranges; some were covered with roofs, others were left partly uncovered, and some were divided by ranges of pillars along the middle of the interior. The superstructure was placed upon a platform composed of three steps, which surrounded the whole building, and upon which the columns were all placed without bases. The number of columns were either six along the ends, and thirteen along the sides, or eight along the ends, and seventeen along the sides. When built upon so large a scale, with the ranges of columns so distinctly isolated, the essential parts of the Doric order produced effects not surpassed for simplicity and majesty; and even the imperfect remains which have escaped the ravages of time and barbarity appear to have far exceeded the expectations of connoisseurs. In the earlier examples of this order the diameters of the Doric columns were very considerable in proportion to their height; for instance, the column of the temple of Silenus, in Sicily, was only five diameters in height; but in course of time, these relative dimensions were changed, and a proportion more adapted to the production of delicate effect was introduced. The Doric style of architecture was, with very few exceptions, the only one employed in Greece or its European colonies in Sicily, and Italy, and in Asia Minor, until after the period of the Macedonian conquest. In Asia Minor, and particularly in Ionia, there speedily arose, subsequent to that period, an order of architecture more elegant than the Doric. But our notice of this order must form the subject of our next lesson.

LESSONS IN LATIN.—No. XX

By John R. Beard, D.D.

ON PARSING.

In the following Latin exercises ascertain, write d
imprint on your memory the parts of the several ve
is, the mood, tense, person, and number, together
exact English meaning; at the same time tell th
tense, and mood endings, as well as give the stems.
should do very completely with each lesson in su
You thus make a commencement in what is called
that is, telling or assigning the parts (in Latin, par
Parsing applies to nouns and adjectives, as well as
indeed, to all parts of speech; it is also concer
syntax, or the combination of words into sentences
you cannot parse your lessons completely until
terminated. But you have now advanced far enough
parsing, and would be rewarded if every day be
attempt a new lesson, you were to take "a back les
parse it carefully; that is, go over again from the
you have done with the strictest regard to the f
rules.

I will give you an example of what I mean by par
Let us take the short Latin sentence—

Tullia patrem amat.

The first thing I have to do is to construe it, or p
corresponding English words. On looking at it, I
Tullia is in the nominative case. Consequently, Tu
subject, and with it I must begin. But, patrem co
am I to take patrem in the second place? This I c
for patrem is in the accusative case, and consequ
be dependent on some verb. The verb is there. A
comes after Tullia. Putting the two together I ha
amat. *Tullia loves.* What does Tullia love? Pa
father. The whole then is, *Tullia loves her father.*
see a departure in the English from the Latin idio
such deviations you should familiarise your mind by
and careful observation. The departure here is th
make good or idiomatic English, I am obliged to ad
noun *her*, "*her* father," there being in the Latin no
responding to *her*. Do not hence suppose that it
bad Latin to say Tullia amat patrem *suum*, *her* f
it is not customary to employ the pronoun in su
except it is wanted for the sake of emphasis.

Having translated the sentence, I must now pa
shall take each word in its grammatical order.

Tullia, Tulliæ, a noun feminine of the first d
nominative case, the subject to the verb amat.

The stem is Tullia (thus Tullia, G. Tulliæ, the
genitive being removed, Tullia remains as the stem).

After giving the parts and relations of a noun as a
should "go through" or decline the noun. So
nouns, pronouns, verbs, and adjectives.

Amat, from amo, is a verb transitive of the first co
indicative mood, present tense, third person singular,
with its subject Tullia, according to the rule "a ve
agree with its verb in number and person." The
parts of amo are—amo, amavi, amatum, amare. T
amo is am, the stem of the present tense is ama, th
endings are o, as, at, amus, atis, ant. Amao is contr
amo. Then go through the tense uniting the stem
person-endings. You would act wisely if, in addi
made amat the subject of inquiry; thus, what would
in the subjunctive mood? In the passive voice? In
junctive passive? By what change is amat made
What is the corresponding second person singular?
What does amat become in the future tense? In
perfect indicative? Go through the imperfect of am
the perfect subjunctive first person singular; thir
plural.

These things may seem minute and troublesome
they would, however, be required by any good teac
attention to them is, I assure you, requisite to make
scholar; it is also requisite for that mental discipli
the study of language may give, and which, in its perf
is of very high value.

Another word remains—patrem; patrem from pat

an imparisyllablic noun, of the masculine gender, the third declension, consonantal stem patr, in the singular number accusative case, being the object of the transitive verb amat, by which it is governed, according to the rule, "transitive verbs require their object to be in the accusative case."

Observe, that in thus setting before you a specimen of parsing, I have given you two rules in Syntax; thus—

I. A subject must agree with its verb in number and person.

II. Transitive verbs require their object to be in the accusative case.—Of these rules you will forthwith have need to make constant application. Commit them to memory, and repeat them memoriter whenever applied. A verbal and exact repetition of them, and of all rules, is desirable at first; afterwards, I wish that you should give the substance rather than the words of a rule, for if you express its substance you show that you understand its import.

Vocabulary.

Compăro 1, *I get together, acquire;* emigro 1, *I go out, quit* (E. R. *emigration*); flo 1, *I blow;* intro 1, *I go into, enter* (E. R. *entrance*); judĭco 1, *I judge;* latro 1, *I bark;* libero 1, *I set free* (E. R. *liberation*); numĕro 1, *I number;* observo 1, *I keep under my eye, observe;* occŭpo 1, *I fall upon, take possession of* (E. R. *occupation*); vigĭlo 1, *I watch, keep awake, guard* (E. R. *vigilant*); ventus i, m. *wind;* terror, ōris, m. *terror;* timor, ōris, m. *fear* (E. R. *timid*); narratio, ōnis, f. *a narrative;* interĭtus, ūs, m. *ruin;* placidus, a, um, *placid, tranquil;* ingens, ingentis, *very great;* vehĕmens, vehementis, *vehement, very strong;* jam, adv. *already;* nuper, adv. *lately.*

Latin-English.

Ego te laudabam, tu me vituperabas, frater judicabat; ego te laudabo, tu me vituperabis, frater judicabit; ego ambulavi, tu vigilavisti, ventus flavit; ego ambulaveram, tu vigilaveras, ventus flaverat; ego te laudavero, tu me vituperaveris, frater judicaverit.

Quum milites urbem intrabant, omnes cives timoris pleni erant; quum in silvâ ambulabamus, vehemens ventus per altas quercus flabat, dum nos placidus somnus recreabat. Vos vigilabatis; quamdiu eris felix, multos numerabis amicos; bonos semper laudabo, improbos semper vituperabo; si acriter pugnabitis, o milites, patriam interitu liberabitis; si virtutem amabis, omnes boni te amabunt.

Remark that sometimes an abbreviation takes place in the perfect tense, and the tenses formed from the perfect tense. Thus, instead of saying in full, vigilavisti, as above, the Latins shortened the word into vigilasti, leaving out the vi. This process is called syncopation, and verbs thus contracted (drawn together) are said to be syncopated. Other syncopated forms ensue; as laudasti for laudavisti; amasti for amavisti; amasse for amavisse; also in other conjugations, as complesti for complevisti; audieram for audiveram; audierunt for audiverunt. I resume the exercises; in which instances of syncopation will be found.

Quia semper virtutis præcepta observastis (for observavistis) magnam vobis laudem comparastis; cur per totam noctem vigilasti? Præceptores meos semper amavi; nonne amasti tuos? Acriter contra hostes pugnastis; quum milites urbem intraverant, ingens terror omnium civium animos occupabat; narratio quam mihi nuper narraveras, vehementer me delectaverat; quum exercitus hostilis urbem oppugnaverat, nos jam emigravĕrāmus; si animum virtutibus ornaveris (ornaris) semper beatus eris; quum hostes urbis nostræ agros devastaverint, urbem ipsam oppugnabant.

English-Latin.

We praised thee, thou didst blame me, father was judging; thou wilt praise me, he will praise thee, father will judge us; thou hast walked (syncopated form), I have watched, the winds blew; I will walk abroad; thou art watching; the wind was blowing; the soldiers will enter the city; the soldiers were entering the city; the soldiers are entering the city, the soldiers have entered the city; the soldiers had entered the city; a very strong wind blows through the house; dost thou number many soldiers? I have numbered many friends; he has liberated (set free) his country from ruin; hast thou watched all night? Love thy preceptors; let them love their parents; O boys, love virtue. The narrative delighted my brother; the narrative delights the girls; the narrative will delight father and mother; thou hast acquired fame by the narrative of the ruin.

Vocabulary.

Advento 1, *I come to, arrive at;* exhilăro 1, *I exhilarate, rejoice;* tolero 1, *I endure, bear;* expugno 1, *I capture;* gusto 1, *I taste;* obtempero 1, *I obey* (with the object in the dative); opto 1, *I wish* (E. R. *option*); pecco 1, *I sin;* rĕdămo, *I love again;* rogo 1, *I ask;* sano 1, *I heal* (E. R. *sanatory*); supero 1, *I surpass, overcome;* tracto 1, *I handle, treat;* evĕnit, *it happens;* conscientia, ae, f. *conscience;* uva, ae, f. *a grape;* adhibeo 2, *I apply;* adhibere curam, *to take care;* medĭcus, i, *a physician* (E. R. *medical*); honestas, ātis, f. *honesty, honour;* aegrotus, i, *a sick man;* immortalitas, ātis, f. *deathlessness;* utilitas ātis, f. *utility;* statio, ōnis, f. *a station, a post;* maturus, a, um, *ripe mature;* immaturus, a, um, *unripe;* religiose, *conscientiously;* acerrime, *very bravely;* vide, *see thou;* vide ne, *see thou do not.*

Rule: The conjunctions ut, *that, in order that, so that, so as* and ne *not to, so that not, to prevent,* require after them the subjunctive mood.

Latin-English.

Saepe evenit ut utilitas cum honestate certet; vide ne pecces contra virtutis praecepta; omnes parentes optant ut filii litteras diligenter tractent; ita vivere debemus ut in omni re rectam conscientiam servemus; medĭcus omnem curam adhĭbet ut aegrōtum sanet; amo te ut me redămes; dux imperavit ut milites stationes suas servarent; heri ambulabam ut tristem animum exhilarem; exercitus noster acerrime pugnabat ut urbem ab interitu servaret.

English-Latin.

See that your son does not sin; dost thou sin against the precepts of virtue? a wise father takes care that his children do not sin; the generals take care that the soldiers keep their posts; you take care to prevent your children from sinning (literally, *that they do not* (ne) *sin*); good mothers take care that their children obey their commands; thou oughtest to live so as to (so that you may) preserve honour.

Rule: After non dubito, the conjunction quin is used requiring the subjunctive mood; thus non dubito quin, *I doubt not but,* or *that.* In the same way, nemo dubitat quin, *no one doubts that;* quis dubitat quin? *who doubts that?* dubium non est quin, *there is no doubt that.*

Latin-English.

Non dubito quin milites nostri superaverint hostes; non dubitabam quin milites nostri hostes superavissent; quin milites nostri superavissent hostes non dubitabam; non dubito quin milites nostri hostes superaturi sint; non dubitabam quin milites nostri hostes superaturi essent; non dubitabam quin vos patrium servitute liberaturi essetis; dubium non erat quin exercitus noster omnes labŏres et aerumnas facile toleraturus esset; quis dubitat quin Hannĭbal contra Romanos fortissime pugnavĕrit? non dubitabĭtis quin ego vos semper amaverim; quis dubitat quin bonos semper laudaverĭmus, malos semper vituperaverĭmus? non est dubium quin semper fidem servarĭtis (syncop. for servaveritis) nemo dubitabat quin hostes urbem expugnavissent; nulli civium dubium erat quin pro patriâ libertate acerrime pugnavissetis; quum hostes urbem oppugnabant, non erat dubium quin ingens terror omnium civium animos occupavisset (sync. occupasset).

English-Latin.

No one doubts that you will fight bravely for the liberty of your country; no one doubts that he fought bravely; no one will doubt that he will fight bravely; no one doubted that he had fought bravely; who doubts that the soldiers will capture the city? There is no doubt that you endeavour (*studeo*) to preserve honour; I do not doubt that my father will come; who doubts that I shall conscientiously preserve the city?

Though non dubito quin, &c., requires the subjunctive mood in Latin, the verb must be Englished by an indicative mood; as may be seen in the English examples just given. In order to make this quite plain, I will give another instance:

Non dubito quin bonus *sit* avunculus tuus.
I doubt not that thy uncle is good.

Here, then, you see the verb which in Latin must be in the subjunctive mood, must stand in the indicative mood in English. Such is a by no means unusual fact.

Rule: With the imperative the negative ne is used, and not the negative non, as ne crede, *do not believe.*

Latin-English.

Diligenter cura, mi amice, valetudinem tuam; amate litteras O pueri! Ne dubitato de animarum immortalitate; semper serva mi fili, conscientiam rectam; discipulus amato praeceptores laudatote probos, vituperatote improbos; ne lauda malos pueros omnes homines amanto Deum.

My sons, take care of your mother; Charles, do not doubt of the deathlessness of the good; preserve, children, an upright conscience; let children love (their) preceptors; do you, my friends, love God; do not blame thy sister, Charles.

Rule: The first supine, that is, the supine in um, is used

after verbs denoting motion; the second supine, that in u, is used after certain adjectives.

Remark: The supines are supposed to have been nouns of the fourth declension, that in um, a noun in the accusative case; that in u, a noun in the dative case (u for ui).

LATIN-ENGLISH.

Parentes mei in urbem migraverunt habitatum; exercitus hostilis adventavit agros nostros devastatum; uva immatura est acerba gustatu; acrumnae sunt durae toleratu; sitis difficillima est toleratu; pira sunt dulcia gustatu; luscinia cantans animos nostros delectat; hostes adventant expugnaturi urbem; non est dubitandum de immortalitate animarum; obtemperandum est praeceptis virtutis.

ENGLISH-LATIN.

The soldiers approach to deliver (supine in um) the king; the hostile army approaches to capture the city; ripe grapes are sweet to the taste (supine in u), unripe grapes are difficult to be endured; they come to seize (fut. perf. act. of occupo) the fields; birds by singing (gerund) delight the mind; we must fight bravely for our native land (patria), the soldiers have approached to fight for their homes and their wives.

LESSONS IN ARITHMETIC.—No. XV.

CONTRACTIONS IN MULTIPLICATION.

ALTHOUGH the general rules previously given be adequate to the solution of all examples that occur in multiplication, yet in many instances, by the exercise of judgment in applying the preceding principles, the operation may be very much *abridged*.

DEFINITION.—Any number which may be produced by multiplying two or more numbers together, is called a *Composite Number*. Thus, 4, 15, 21, are composite numbers; for $4=2\times2$; $15=5\times3$; $21=7\times3$.

The *factors* which, being multiplied together, produce a composite number, are sometimes called the *component parts* of the number. The process of finding the factors of which a given number is composed, is called *resolving the number into factors*.

EXERCISES.

1. Resolve 9, 10, 14, 22, into their factors.
2. What are the factors of 35, 54, 56, 63?
3. What are the factors of 45, 72, 64, 81, 96?

Some numbers may be resolved into *more* than *two* factors; and also into *different sets of factors*. Thus, $12=2\times2\times3$; also $12=4\times3=6\times2$.

4. What are the different factors and sets of factors of 8, 16, 18, 20, 24?
5. What are the different factors and sets of factors of 27, 32, 36, 40, 48?

We have seen that the product of any two numbers is the same, whichever factor is taken for the multiplier, and that the product of any *three* or *more* factors will be the same, in whatever order they are multiplied. For, the *product* of two factors may be considered as *one number*, and this may be taken either for the multiplicand, or the multiplier. Again, the product of three factors may be considered as one number, and be taken for the multiplicand, or the multiplier, &c. Thus, $24=3\times2\times2\times2=6\times2\times2=12\times2=6\times4=4\times2\times3=8\times3$.

CASE I.—*When the multiplier is a composite number.*

EXAMPLE 1.—What will 27 bureaus cost, at 31 crowns apiece?

Analysis.—Since 27 is three times as much as 9; that is, $27=9\times3$, it is manifest that 27 bureaus will cost *three* times as much as 9 bureaus.

Operation.

Crowns 31 cost of 1 bureau.
9
Crowns 279 cost of 9 bureaus.
3
Crowns 837 cost of 27 bureaus.

Explanation.

Having resolved 27 into the factors 9 and 3, we find the cost of 9 bureaus, then multiplying that by 3, we have the cost of 27 bureaus.

EXAMPLE 2.—What will 36 oxen cost, at 43 crowns per head?

Solution.—$36=9\times4$; and $43\times9\times4=1548$ crowns. *Ans.*

Or, $36=3\times3\times4$; and $43\times3\times3\times4=1548$ crowns. *Ans.*

To multiply by a composite number. Rule:

Resolve the multiplier into two or more factors; multiply the multiplicand by one of these factors, and this product by another factor, and so on till you have multiplied by all the factors; the last product will be the answer required.

The *factors* into which a number may be *resolved*, must not be confounded with the *parts* into which it may be *separated*. The former have reference to multiplication, the latter to addition; that is, *factors* must be *multiplied* together, but *parts* must be *added* together to produce the given number. Thus, 56 may be resolved into two *factors*, 8 and 7; it may be separated into *parts*, 5 tens or 50, and 6. Now, $8\times7=56$, and $50+6=$

EXERCISES.

1. What will 24 horses cost, at 74 crowns apiece.
2. What cost 45 hogsheads of tobacco, at 128 crowns a head?
3. What cost 54 acres of land, at 150 crowns per acre?
4. At 118 shillings per week, how much will it cost a board 49 weeks?
5. If a man travels at the rate of 372 miles a day, how he travel in 64 days?
6. At 163 crowns per ton, how much will 72 tons of le
7. What cost 81 pieces of broadcloth, at 245 shillings a
8. What cost 84 carriages, at 384 crowns apiece?

CASE II.—*When the multiplier is 1 with ciphers annexed*

It is a fundamental principle of notation, that each remo figure one place towards the left, increases its value *ten time* sequently, annexing a *cipher* to a number will increase its v *times*, or *multiply* it by 10; annexing *two* ciphers will inc value a *hundred times*, or multiply it by 100; annexin ciphers will increase it a *thousand times*, or multiply it by &c. Thus, 15 with a cipher annexed, becomes 150, is same as 15×10; 15 with *two* ciphers annexed, becomes 15 is the same as 15×100; 15 with *three* ciphers annexed, 15000, and is the same as 15×1000, &c.

To multiply by 10, 100, 1000, &c. Rule:

Annex as many ciphers to the multiplicand as there are in the multiplier, and the number thus formed will be the required.

To *annex* means to place *after*, or at the *right hand*.

EXERCISES.

1. What will 10 boxes of lemons cost, at 63 shillings p *Ans.* 630 shillings.
2. How many bushels of corn will 465 acres of land p at 100 bushels per acre?
3. Allowing 365 days for a year, how many days are 1000 years?
4. Multiply 153486 by 10000.
5. Multiply 3120467 by 100000.
6. Multiply 52690078 by 1000000.
7. Multiply 689063457 by 10000000.
8. Multiply 4946030506 by 100000000.
9. Multiply 87831206507 by 1000000000.
10. Multiply 67856005109 by 10000000000.

CASE III.—*When the multiplier has ciphers on the right*

EXAMPLE.—What will 30 wagons cost at 45 crowns ap

Any number of ciphers on its right hand, is obviously a site number; the significant figure or figures being one fac 1, with the given ciphers annexed to it, the other factor. T may be resolved into the factors 3 and 10. We may th first multiply by 3 and then by 10, by annexing a cipher a

Solution.—Here $45\times3=135$, and $135\times10=$ crowns. *Ans.*

EXAMPLE.—How many acres of land are there in 3000 f each farm contains 475 acres?

Analysis.

First, $3000=3\times1000$. Now $475\times3=1425$; and adding three ciphers to this product, multiplies it by 1000.

Operation.

Multiplicand 475
Multiplier 3000
Product 1425000

To multiply when there are ciphers on the right hand multiplier. Rule:

Multiply the multiplicand by the significant figures of t tiplier, and to this product annex as many ciphers, as are on the right of the multiplier.

It will be perceived that this case combines the principles two preceding cases; for, the multiplier is a composite n and one of its factors is 1 with *ciphers annexed* to it.

EXERCISES.

1. How much will 50 hogs weigh, at 375 pounds apiece?
2. If 1 barrel of flour weighs 192 pounds, how much will 500 barrels weigh?
3. Multiply 14376 by 25000.
4. Multiply 350634 by 410000.
5. Multiply 4630425 by 6200000.

CASE IV.—*When the multiplicand has ciphers on the right hand.*

EXAMPLE 1.—What will 37 ships cost, at 29000 crowns apiece?

Analysis.

First, $29000 = 29 \times 1000$. But the product of two or more factors is the same in whatever order they are multiplied. We therefore multiply 29 by 37, and this product by 1000 by adding three ciphers to it.

Operation.

Crowns 29000 multiplicand
37 multiplier
203
87
Crns. 1073000 product.

To multiply when there are ciphers on the right hand of the multiplicand. Rule:—

Multiply the significant figures of the multiplicand by the multiplier, and to the product annex as many ciphers as are found on the right hand of the multiplicand.

EXERCISES.

1. Multiply 2370000 by 52.
2. Multiply 48120000 by 48.
3. Multiply 356300000 by 74.
4. Multiply 1623000000 by 89.

EXAMPLE 2.—Multiply 540000 by 700.

Analysis.

$540000 = 54 \times 10000$, and $700 = 7 \times 100$; we therefore multiply the significant figures, or the factors 54 and 7 together, and to this product annex six ciphers.

Operation.

540000 multiplicand
700 multiplier
378000000 product.

When both the multiplier and multiplicand have ciphers on the right, multiply the significant figures together as if there were no ciphers, and to their product annex as many ciphers as are found on the right of both factors.

EXERCISES.

1. Multiply 1563800 by 20000.
2. Multiply 31230000 by 120000.
3. Multiply 5310200 by 3400000.
4. Multiply 82065000 by 8100000.
5. Multiply 210909000 by 5100000.

There are *other methods of contracting the operations* in multiplication, which, in certain cases, may be resorted to with advantage. Some of the most useful are the following:—

CASE V.—*When the multiplier is any digit preceded by unity.*

EXAMPLE.—How many gallons of water will a hydrant discharge in 13 hours, if it discharges 2325 gallons per hour?

Operation.

2325×13
6975
Product 30225 gallons.

Explanation.

Multiplying by the 3 units, we set the first figure of the product one place to the right of the multiplicand. Now, since multiplying by 1 is taking the multiplicand *once*, we add together the multiplicand and the partial product already obtained, and the result 30225 gallons is the answer.

To multiply by 13, 14, 15, &c., or by 1, with either of the other digits *annexed* to it. Rule:

Multiply by the units' figure of the multiplier, and write each figure of the partial product one place to the right of that from which it arises; finally, add the partial product to the multiplicand, and the result will be the answer required.

This method is the same, in effect, as if we actually multiplied by the one ten, and placed the first figure of the partial product under the figure by which we multiply.

1. Multiply 3251 by 14.
2. Multiply 25039 by 16.
3. Multiply 4028 by 17.
4. Multiply 50389 by 18.

CASE VI.—*When the multiplier is any digit followed by unity.*

EXAMPLE.—If 21 men can do a job of work in 365 days, how long will it take 1 man to do it?

Operation.

365×21
730
Product 7665 days.

Explanation.

We first multiply by the 2 tens, and set the first product figure in tens' place, then adding this partial product to the multiplicand, we have 7665 days for the answer.

To multiply by 21, 31, 41, &c., or by 1 with either of the other significant figures *prefixed* to it. Rule:

Multiply by the tens' figure of the multiplier, and write the first figure of the partial product in the tens' place; finally add this partial product to the multiplicand, and the result will be the answer required.

The reason of this method of contraction is similar to that of the preceding.

1. Multiply 4275 by 31.
2. Multiply 38256 by 61.
3. Multiply 7504 by 41.
4. Multiply 70267 by 81.

CASE VII.—*When the multiplier is a decimal numberless unity.*

EXAMPLE.—How much will 99 carriages cost, at 235 crowns apiece?

Analysis.

Since one carriage costs 235 crowns, 100 carriages will cost 100 times as much, which is 23500 crowns. But we wished to find the cost of 99 carriages only. Now 99 is one less than 100; therefore, if we subtract the price of 1 carriage from the price of 100, it will give the price of 99 carriages. Hence,

Operation.

33500 cost of 100 carriages
235 cost of 1 carriage
23265 cost of 99 carriages.

To multiply by 9, 99, 999, or a number composed of any number of 9's. Rule:

Annex as many ciphers to the multiplicand as there are 9's in the multiplier; from the result subtract the given multiplicand, and the remainder will be the answer required.

The *reason* of this method is obvious from the fact that annexing as many ciphers to the multiplicand as there are 9's in the multiplier, multiplies it by a number *one more* than is required; consequently, subtracting the multiplicand from the number thus produced, must give the true answer.

1. Multiply 4791 by 99.
2. Multiply 7301 by 999.
3. Multiply 6034 by 999.
4. Multiply 463 by 9999.

CASE VIII.—*When the multiplier is composed of a digit and its multiples.*

EXAMPLE.—What is the product of 867 multiplied by 84?

Analysis.

We first multiply by 4 in the usual way. Now, since $8 = 4 \times 2$, it is plain, if the partial product of 4 is multiplied by 2, it will give the partial product of 8. But as 8 denotes tens, the first figure of its product will also be tens. The sum of the two partial products will be the answer required.

Operation.

867 multiplicand
84 multiplier
3468×2
6936
72828 product.

For the sake of convenience in multiplying, the factor 2 is placed at the right of the partial product of 4, with the sign × between them.

What is the product of 987 by 486?

Operation.

Multiplicand 987
Multiplier 486
5922×8
47376
Product 479682

Since $48 = 6 \times 8$, we multiply the partial product of 6 by 8, and set the first product figure in tens' place as before.

To multiply when part of the multiplier is a *composite* number of which the other figure is a *factor*. Rule:

First multiply by the figure that is a factor; then multiply this partial product by the other factor, or factors, taking care to write the first figure of each partial product in its proper order, and their sum will be the answer required.

When the figure in thousands, ten thousands, or any other column, is a factor of the other part, or parts of the multiplier, care must be taken to place the first figure of its product under the factor itself, and the first figure of each of the other partial products in its own order.

EXAMPLE 1.

2378 multiplicand
936 multiplier
21402 ×4
85608
2225808 product.

EXAMPLE 2.

256841 multiplicand
85632 multiplier
2054728 ×7×4
14383096
8218912
21993808512 product.

Exercises.

1. Multiply 665 by 82.
2. Multiply 876 by 396.
3. 324325×54426.
4. Multiply 783 by 93.
5. Multiply 69412 by 95436.
6. 256721×85632.

Example.—What is the product of 63 multiplied by 45?

By multiplying the figures which produce the same order, and adding the results mentally, we may obtain the answer without setting down the partial products.

Operation.	*Explanation.*
63	First, multiply the units into units, we set down
45	the result and carry as usual. Now, since the 6
2835 *Ans.*	tens into 5 units, and 3 units into 4 tens will produce the same order, viz. tens, we multiply them and add their products mentally. Thus, 6×5=30, and 3×4=12; now 30+12=42, and 1 (to carry) makes 43. Finally, 6×4=24, and 4 (to carry) make 28.

To multiply any two numbers together without setting down the partial products. Rule:

First multiply the units together; then multiply the figures which produce tens, and adding the products mentally, set down the result and carry as usual. Next multiply the figures which produce hundreds, and add the products, &c., as before. In like manner, perform the multiplications which produce thousands, ten thousands, &c., adding the products of each order as you proceed, and thus continue the operation until all the figures are multiplied.

Example.—What is the product of 23456789 into 54321?

Analytic Operation.

Multiplicand				2	3	4	5	6	7	8	9
Multiplier							5	4	3	2	1
Par. Products						2×1	3×1	4×1	5×1	6×1	7×1	8×1	9×1
					2×2	3×2	4×2	5×2	6×2	7×2	8×2	9×2	
				2×3	3×3	4×3	5×3	6×3	7×3	8×3	9×3		
			2×4	3×4	4×4	5×4	6×4	7×4	8×4	9×4			
		2×5	3×5	4×5	5×5	6×5	7×5	8×5	9×5				
		12	7	4	1	9	6	2	3	5	2	6	9

Explanation.—Having multiplied by the first two figures of the multiplier, as in the last example, we perceive that there are three multiplications which will produce hundreds, viz., 7×1, 8×2, and 9×3; we therefore perform these multiplications, add their products mentally, and proceed to the next order. Again, there are four multiplications which will produce thousands, viz., 6×1, 7×2, 8×3, and 9×4. We perform these multiplications as before, and proceed in a similar manner through all the remaining orders. *Ans.* 1274196235269.

In the solution above, the multiplications of the different figures are arranged in separate columns, that the various combinations which produce the same order, may be seen at a glance. In practice it is unnecessary to denote these multiplications. The principle being understood, the process of multiplying and adding may easily be carried on in the mind, while the final product only is set down.

When the factors contain but two or three figures each, this method is very simple and expeditious. A little practice will enable the student to apply it with facility when the factors contain six or eight figures each, and its application will afford an excellent discipline to the mind. It has sometimes been used when the factors contain twenty-four figures each; but the attempt to extend it so far is not profitable.

Exercises.

1. Multiply 25×25.
2. Multiply 81×64.
3. Multiply 194×144.
4. Multiply 4825×2352.
5. Multiply 54×54.
6. Multiply 45×92.
7. Multiply 1234×125.
8. Multiply 6521×5312.

By suitable attention, the critical student will discover various other methods of abbreviating the processes of multiplication.

Exercises.

Solve the following examples, contracting the operations when practicable, and prove them by the general rule, or by other methods.

1. 42634×63.
2. 508[illegible]5×56.
3. 721[illegible]6×1000.
4. 42000×40500.
5. 80000×25000.
6. 2567345×17.
7. 4300450×19.
8. 9803404×41.
9. 6710045×71.
10. 3456710×18.
11. 7000541×91.
12. 4102034×99.
13. 42304×999.
14. 50421×9999.
15. 67243×99999.
16. 78563×93.
17. 34054×639.
18. 52156×756.
19. 41907×54486.
20. 26397×24648.
21. 12900×14000.
22. 64172×42432.
23. 26815678×81.
24. 85×85.
25. 256×256.
26. 322×325.
27. 5234×2435.
28. 48743000×637.
29. 31890420×85672.
30. 80460000×2763.
31. 2364793×8485672.
32. 1256702×999999.
33. 6840005×91×61.
34. 45067034×17×51
35. 788031245×81×1
36. 61800000×23000.
37. 12563000×480000
38. 91300203×10000
39. 680040000×1000
40. 4000000000×100

LESSONS IN FRENCH.—No. XI

By Professor Louis Fasquelle, LL.D.

Section XLIV.

(See Section 35.)

1. The reflective or pronominal verb always takes it auxiliary [§ 46]:—

Votre cousin s'est promené.	*Your cousin has taken a walk.*
Nos amis se sont flattés.	*Our friends have flattered them*

2. Although the past participle of a reflective verb, jugated with être, it agrees with its direct regimen, w regimen precedes it, and is invariable when the regi lows it. The student should be careful to see, if the r pronoun be a direct or an indirect regimen [§ 135]:—

Vous vous êtes flattées, Mesdemoiselles.	*You have flattered yourse ladies.*
Elles se sont donné la main.	*They have given (to) eac hand.*

It will be easily perceived that *se* in the first sente *direct* regimen, and that the same word in the secon sents an *indirect* object.

3. Verbs essentially unipersonal, i. e., verbs which c conjugated otherwise, take avoir as an auxiliary:—

Il a plu, il a neigé, il a gelé.	*It rained, it snowed, it f*

4. Verbs occasionally unipersonal, take être as an auxi

Il lui est arrivé un malheur.	*A misfortune has happened*

5. Faire [4 ir.] used unipersonally, and Y avoir, t take the auxiliary avoir:—

A-t-il fait beau temps le mois passé?	*Was it fine weather las*
Y a-t-il eu beaucoup de monde?	*Were there many peop*

6. The participle past of a unipersonal verb is alway able [§ 135 (6)]:—

Les pluies qu'il y a eu cet été.	*The rains which we hav summer.*

Résumé of Examples.

Les Italiennes se sont elles promenées?	*Did the Italian ladies walk*
Oui, Monsieur, elles se sont promenées.	*Yes, Sir, they have taken a*
Nous nous sommes aperçus de cela.	*We perceived that, or we to of that.*
Votre mère s'est elle bien portée?	*Has your mother been well*
Vos sœurs se sont elles assises?	*Did your sisters sit down?*
Cette marchandise s'est elle bien vendue?	*Did that merchandise sell w*
Vos enfants se sont ils appliqués à l'étude?	*Did your children apply to s*
Il s'y sont appliqués.	*They applied to it.*
Nous nous sommes donné de la peine [§ 135 (1)]	*We gave (to) ourselves much*
Quel temps a-t-il fait ce matin?	*What weather was it this m*
N'a-t-il pas fait beau temps?	*Was it not fine weather?*
Quel malheur vous est il arrivé?	*What misfortune has happe you?*
Vous est il arrivé quelque chose?	*Has anything happened to yo*
Il ne m'est rien arrivé.	*Nothing has happened to me.*

Exercise 87.

Acier, m. *steel*;
S'adress-er, 1. ref. *to apply*;
S'aperc-evoir, 3. ref. *to perceive*;
S'asse-oir, 3 ir. ref. *to sit down*;
S'ennuy-er, 1. pec. [§ 49], *to grow weary*;
Grêl-er, 1. pec. *to hail*;
Hollandais, e. *Dutch*;
Neig-er, 1. pec. *to snow*;
Peine, *f. trouble*;
Plu, *from* pleuvoir, *rained*;
Plume, *f. pen*;
Se port-er, 1. ref. *to be* or *do*;
Se tromp-er, 1. ref. *to be mistaken*;
Se serv-ir, 2 ir. ref. *to use*;
Se vend-re, 4. ref. *to sell*;

1. A qui vos sœurs se sont elles adressées? 2. Elles se sont adressées à moi. 3. Ne se sont elles pas trompées? [Sect. 37. 1.] 4. Elles se sont trompées. 5. Vous êtes vous aperçu de votre erreur. 6. Je ne m'en suis pas aperçu. 7. Vous êtes vous ennuyés à la campagne? 8. Nous nous y sommes ennuyés [Sect. 37. 4). 9. Ces demoiselles se sont elles ennuyées chez vous? 10. Elles s'y sont ennuyées. 11. De quoi vous êtes vous servie pour écrire, Mademoiselle? [Sect. 38. 2] 12. Je me suis servie d'une plume d'or. 13. Ces écolières ne se sont elles pas servies de plumes d'acier? 14. Elles se sont servies de plumes d'argent. 15. La Hollandaise s'est elle assise? 16. Elle ne s'est point assise. 17. Lui est il arrivé un malheur? 18. Il ne lui est rien arrivé, elle ne se porte pas bien. 19. Ne s'est elle pas donné [§ 135 (1)] de la peine pour rien? 20. Cette soie ne s'est elle pas bien vendue? 21. Elle s'est très bien vendue. 22. N'a-t-il pas fait beau temps toute la journée? 23. Non, Monsieur, il a plu, il a neigé et il a grêlé. 24. N'est-il rien arrivé aux deux dames que nous avons vues ce matin? 25. Non, Madame, il ne leur est rien arrivé.

Exercise 88.

1. Has it rained to-day? 2. It has not rained, but it has hailed and snowed. 3. Has anything happened to your little boy? 4. Nothing has happened to him, but he is sick to-day. 5. Did your sister sit down at your house? 6. She did not sit down, she was sick. 7. Did that cloth sell well? 8. It sold very well, we have sold it all. 9. Did you perceive your error (*erreur*)? 10. We perceived it. 11. Were not your sisters mistaken in this affair? 12. They were not mistaken. 13. Were not your cousins weary of being in the country? 14. They were weary of being at my brother's. 15. What have you used to write your exercises? 16. I used a gold pen, and my brother used a silver pen. 17. Have you used my penknife (*canif*)? 18. I have used it. 19. What has happened to you? 20. Nothing has happened to me. 21. Has your mother been well? 22. She has not been well. 23. Did your brothers apply to their studies, at school? 24. They applied to their studies and have finished their lessons. 25. What weather was it this morning? 26. It was very fine weather. 27. Has your sister taken much trouble in this affair. 28. She has taken much trouble for nothing. 29. Did the Dutch ladies walk? 30. They walked this morning. 31. How far did they walk? 32. They walked as far as your brother's. 33. Have you given each other the hand? 34. We shook hands. 35. Those ladies flattered themselves very much (*beaucoup*).

Section XLV.

The passive verb (§ 54).

1. The passive verb is conjugated by adding to the verb *être* in all its tenses, the past participle of an active verb. See model, § 54.

2. This participle must agree in gender and number with the subject [§ 134 (2). Sect. 41, R. 6]:—

Ces vieillards sont respectés.	*Those old men are respected.*
Ces enfants sont aimés de tout le monde.	*Those children are loved by everybody.*

3. The genius of the French language seems to prefer the active to the passive voice. Many expressions which are in the passive in English, are accordingly rendered into French by the active or reflective [§ 128 (5), § 113 (1)]:—

Cette maison est à louer ou à vendre.	*That house is to be let or sold.*
Ma sœur est à plaindre.	*My sister is to be pitied.*
Cet homme est à craindre.	*That man is to be feared.*
Cet homme s'appelle H. [Sect. 35, R. 2].	*That man is called H.*
Cet homme se trompe [Sect. 37, R. 2].	*That man is mistaken.*
On dit que cela est ainsi [Sect. 34 R. 2].	*It is said that it is so.*
On nous a dit cela [Sect. 34, R. 2].	*We have been told that.*

4. In an answer to a question [*see* Sect. 23, R. 12], the pronoun *le* corresponds in signification with the English word *so*, or *it*, expressed or understood. *Le* refers then to a noun not determined (not preceded by an article or a possessive adjective), to an adjective, to a verb or even to a whole sentence:—

Ces enfants sont ils aimés?	*Are those children loved?*
Ils ne le sont pas.	*They are not (so).*
Ces demoiselles sont elles sœurs?	*Are those young ladies sisters?*
Elles ne le sont pas.	*They are not.*

5. When *le* refers to a determined noun, it often corresponds in signification to the pronoun *he*, *she*, or *they*, which may or may not be expressed in the English sentence. *Le* must then assume the gender and number of the noun to which it refers.

Etes vous la sœur de mon ami?	*Are you the sister of my friend?*
Je la suis.	*I am (she).*

Résumé of Examples.

Leur conduite est elle approuvée?	*Is their conduct approved?*
Elle n'est approuvée de personne.	*It is approved by nobody.*
Cette dame est elle estimée et respectée?	*Is that lady esteemed and respected?*
Elle n'est ni estimée ni respectée.	*She is neither esteemed nor respected.*
Ces marchandises sont à vendre.	*Those goods are to be sold (for sale).*
Ces enfants sont bien à plaindre.	*Those children are to be pitied.*
A-t-on dit quelque chose à mon frère?	*Has anything been said to my brother?*
On ne lui a rien dit.	*Nothing has been said to him.*
Savez vous comment cela s'appelle?	*Do you know how that is called?*
Madame, êtes vous maîtresse ici?	*Madam, are you mistress here?*
Je ne le suis pas, Monsieur.	*I am not (so), Sir.*
Etes vous la maîtresse de la maison?	*Are you the mistress of the house?*
Je la suis.	*I am (she).*

Exercise 89.

S'appel-er, 1. pec. *to be called* [§ 49 (4)];
Auteur, m. *author*;
Blâm-er, 1. *to blame*;
Car, *for*;
Conduite, *f. conduct*;
Croi-re, 4 ir. *to believe*;
Ecolier, m. *scholar*;
Jardin, m. *garden*;
Lou-er, 1. *to let, to praise*;
Mère, *f. mother*;
Paresseux, se, *idle*,
Pun-ir, 2. *to punish*;
Rarement, *seldom*;
Relieur, m. *bookbinder*;
Souvent, *often*;
Us-er, 1. *to wear out*;
Ven-dre, 4. *to sell*.

1. Votre mère est elle aimée de sa sœur? 2. Elle est aimée de son frère et de sa sœur. 3. Les Italiens sont ils aimés des Français? 4. Vos écoliers ne sont ils pas blâmés? 5. Ils sont blâmés quelquefois. 6. Sont ils souvent punis? 7. Ils sont rarement punis. 8. Par qui êtes vous puni quand vous êtes paresseux? 9. Je ne suis jamais puni. 10. Sa conduite a-t-elle été approuvée? 11. Elle a été approuvée de tout le monde. 12. Elle a été approuvée par* ses amis. 13. Cet auteur est il estimé? 14. Il est estimé de tout le monde. 15. Le jardin du relieur est il à vendre ou à louer? 16. On dit qu'il est à louer. 17. Le menuisier a-t-il fait faire un habit? 18. Il en a fait faire deux. 19. Les habits que vous avez achetés sont ils usés (*worn out*)? 20. Ils sont usés, j'en ai fait faire d'autres. 21. Dit-on que nos amis sont aimés de tout le monde? 22. On ne le dit pas, car on ne le croit pas. 23. Les dames que nous avons vues à l'église hier au soir, sont elles sœurs? 24. Elles ne le sont pas, on dit qu'elles sont cousines. 25. On dit que l'officier qui vient d'arriver s'appelle S.

Exercise 90.

1. Are you blamed or praised? 2. I am neither blamed nor praised. 3. Is not your cousin esteemed by everybody? 4. She is esteemed by nobody. 5. What has been said of my brother? 6. Nothing has been said of him. 7. Do you know if your brother's house is to be let? 8. I have been told (*on m'a dit*) that it is to be sold. 9. Is not an idle person to be pitied? 10. The idle man is to be pitied. 11. Is your son sometimes punished at school? 12. He is always punished when he is idle. 13. Are your scholars praised when they are diligent (*diligent*)? 14. They are praised when they are diligent, and they are blamed when they are idle. 15. Is that lady esteemed and respected? 16. She is loved, esteemed, and re-

* The propositions *de* and *par* are used indifferently after many passive verbs.

spected by everybody. 17. What has been told you? 18. We have been told that your brother is respected by everybody. 19. Madam, are you Mr. S.'s sister? 20. No, Sir, I am not. 21. Madam, are you pleased with your son's conduct? 22. No, Sir, I am not, for he is blamed by everybody. 23. How is that large (*gros*) man called? 24. It is said that he is called H. 25. What is your brother's name? 26. He is called James. 27. Have you been told that my brother is arrived? 28. We have been told so. 29. Are the goods which your brother has bought, for sale? 30. They are not for sale. 31. Has the bookbinder had a coat made? 32. He has had a coat made. 33. Is his other coat worn out? 34. The coat which he bought last year is worn out.

LESSONS IN GEOLOGY.—No. XI.

By Thomas W. Jenkyn, D.D., F.G.S., &c.

CHAPTER I.

ON THE ACTION OF VOLCANOES ON THE EARTH'S CRUST.

SECTION VII.

GEOLOGICAL PHENOMENA CONNECTED WITH EARTHQUAKES.

The changes which are produced in the globe by earthquakes are almost innumerable. It is by them that landslips most frequently occur on the sides of mountains; new lakes are formed in plains, and old ones disappear; new islands rise in the sea, and others are swallowed up; parts of continents subside and sink, and others are elevated; the relative positions of sea and land are changed; and rivers quit their former courses. During the earthquake which, in 1811, convulsed the district of New Madrid, South Carolina, new lakes were formed and others dried up. When that district was visited seven years after, there was found, near Little Prairie, a tract of land many miles in extent that had become covered with water, three or four feet deep. When that water disappeared, a stratum of sand was left in its place. On the same occasion, and in the same district, large lakes of twenty miles in extent were formed in one hour, and others were completely drained. By the earthquake of Bogota, South America, in 1827, a fissure opened in the earth, at a place called Costa, into v river Tunza immediately began to flow, quitting i bed. This explains a circumstance which the geolo stantly meets with; viz., he finds the ancient gravel river deserted, and a new one formed at a lower level.

The action of earthquakes, or the movements of t quake power, is threefold. It is vertical, from the dee of the earth up to its surface. It is horizontal, follo course of certain rocks and strata, whether level o It is also circular or gyratory, as if it went round cert in its course. In most earthquakes, the vertical and zontal movements have taken place together.

The VERTICAL action is a movement from below like the explosion of a mine in a stone-quarry. Th produces cracks and fissures in the earth, like th sented in fig. 2 of a former lesson. In many inst earth opens and closes rapidly; in others portions of slip down and disappear for ever. It was by an e movement of this description that the city of Messina was destroyed in the year 1783.

This vertical action of earthquakes has produced s remarkable results. During a late earthquake in Ital part of the pavement-stones of some towns were hurle the air, which, after descending, were found with th sides uppermost. This singular movement upward

Fig. 21.

The Earthquake at Messina, Sicily, 1783.

stanced in the terrific earthquake which destroyed Rio South America, in 1797. The corpses of the inhabitan had perished, and which were lying on the ground thrown up to the height of many hundred feet on th La Cullca, and beyond the small river Lican.

These vertical movements are felt, not on land only, at sea. During the celebrated earthquake of Lisbon, the shock was felt in different parts of the sea. The of a ship, when off St. Lucar, felt his vessel violently as if she had struck the ground. On taking soundin found a great depth of water. Another captain, with h far higher north than Lisbon, had his vessel so shak strained, as if she had struck upon a rock, so that the se the deck were opened, and the compass was overturned binnacle. Another ship, far out in the Atlantic, felt

cussion so violent from below, that the men were thrown up a foot and a half perpendicularly from the deck.

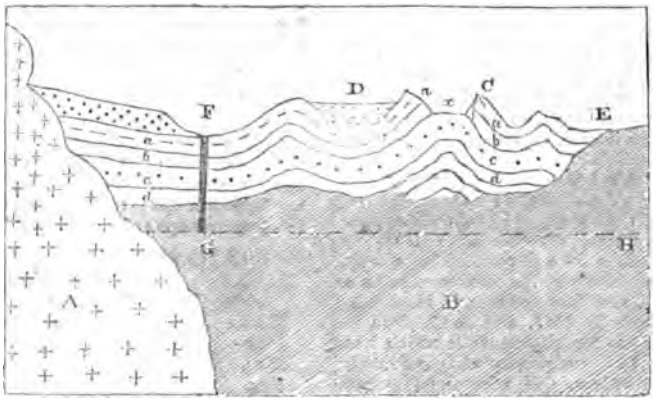
In the HORIZONTAL movement of earthquakes, the shock is propagated in a linear direction by undulations, or by an action which produces waves in the surface of the earth, not unlike immense waves of the sea in appearance. The sight of these earthy billows produce a swimming in the head like sea-sickness. In using the word "wave" or billow," it is not to be supposed that the earthy soil always changes place as the watery wave does. The undulatory appearances of the earth are probably the effects of vibrations which radiate upward from a deeply-seated point, each of which on reaching the surface lifts up the ground and allows it to sink again.

These shocks of undulation, in a linear direction, must be conceived to move, not like an electric spark, but in waves of great breadth as well as length. The earthquake which devasted Syria in 1837, was felt in a line five hundred miles long, and ninety miles wide.

It is a general law in mechanics that vibrations, which are transmitted through elastic bodies, have a tendency to burst, or snap asunder the superficies of such bodies. This law is found true in the undulations of earthquake power. The magnitude of the waves propagated in the earth's crust is increased the nearer they are to the surface, and, consequently, they crack the superficial soil and strata. In the earthquakes of South Carolina, to which I have already referred, between New Madrid and Little Prairie, the surface-earth rose in great undulations. When these terrible surface-waves reached a considerable height, the soil burst, and through the softened surface volumes of water and sand, and masses of pit-coal, were hurled up as high as the tops of the trees.

When these horizontal shocks proceed onward unresisted, they are not considered dangerous. The most dangerous earthquakes are those which occur where there are two sources or foci of earthquake action, which send forth their shocks in semicircular or transverse directions. In these cases, one earthquake wave meets the course of another, and strikes iton the side. When the actions from these two surfaces or foci are simultaneous, and come athwart each other, they produce, in the surface of the earth, the effects which are seen in the surface of the sea, when one wave dashes against the side of another, without either of them being displaced. You can easily imagine that a town, built on the ground at such a point of the earth, would be affected much like a loose raft happening to be at such a junction of two mighty billows.

Fig. 25.



Showing the transmission and interruption of earthquake shocks.

These statements are not so imaginary as the metaphors which I have used to explain them. Their truth is amply verified by the observation and experience of the inhabitants of South America. The city of Quito is situated at the foot of a volcano called Rucu Pichincha. The elevation of the city above the level of the sea is 9,539 feet, about twice the height of Ben Nevis or Snowdon. I keep these British mountains before your mind that you may always have a known scale of height in view. The houses of Quito are large, massive, and several stories high. Its churches are high-roofed, and adorned with magnificent cupolas. Here earthquakes of great violence are frequent, but they very rarely injure the buildings. The supposed reason of this is that the horizontal undulations of the earthquake shocks are propagated undisturbed along the rocks beneath. On the contrary, at a lower elevation on the plains of Peru, humble dwellings built of reeds and mud suffer exceedingly from what would be called gentle shocks. The reason of this is, the alternation of movements, which are propagated in cross or transverse directions from the different points or foci of the earthquake shocks.

There are some instances in which these earthquake undulations seem to have opened a permanent way for themselves, through which they pass without seriously disturbing the inhabitants above. The earthquake power seems to have cleared away the obstacles in the course which it took, and then, the way being opened, it always afterwards propagated its shocks in that direction. This clearance of the course would be the result of some one earthquake of great violence. Of this I will give two instances. After the destruction of Cumana, the capital of New Andalusia, South America, in 1797, every shock that has been felt on the south coast, which consists of calcareous rocks, extends itself to the mica slate rocks in the peninsula of Araya. Before that date the shocks were never felt in that peninsula. Also in North America, during the earthquakes of 1811, 1812, 1813, the undulations which began in the south were propagated northward through the immense alluvial valleys of the Mississippi, in the Arkansas (pronounced Ar-kan-sáws), and the Ohio.

It has been lately ascertained that the propagation of earthquake shocks does not depend on the nature of the rocks which they meet in their course. The shocks have been felt in the loose soil and mud of Holland and Flushing, and mountains of granite and mica slate, as well as limestone and sandstone rocks, have been shaken. Hence it is evident that the undulations or shocks are governed, not by the chemical constituents of rocks, but by their mechanical structure and position.

There are many instances in which earthquake undulations have intersected and passed athwart or across several chains of hills at right angles. In South America they are known to have passed across the two chains of Venezuela and Sierra Parime. In India also a shock was propagated in 1832 from Lahore to the foot of the Himalayas.

Neverthless, it is well known in volcanic districts, that there are rocks which modify and regulate the direction of the earthquake wave. It is found that the undulations proceed in a linear course along a coast, and at the foot of a mountain ridge, and in the direction of that ridge, without entering the chain of hills. As proofs of the limitation and interruption of earthquake waves, I may mention two very remarkable facts. Shocks have been felt in strata near the surface which have not been known in the mines in a rock at much greater depth. Shocks, also, have passed onward at greater depths below, without being felt in the rocks and strata near the surface. The inhabitants of Peru call such rocks "bridges," under which the earthquake wave passes along. Instances of this kind have happened in Saxony. At the beginning of this century, earthquake shocks were felt in the deep silver-mines of Marienberg, which drove all the miners in terror to the surface, where they discovered nothing of the kind had been experienced. On the contrary, in 1823, in the neighbourhood of the mines of Falun and Persberg, the workmen in the mines felt no movement whatever, whilst above their heads a violent shock of earthquake had alarmed all the inhabitants. The manner in which these facts might take place is represented in fig. 25. Adjoining the granite A, is the metalliferous rock B, covered by the curved strata *a b c d*. An earthquake wave passing along *a a* would pass under the rock D unfelt, and at C it would be unknown. Another wave passing along *c c* would be felt at *x*, but be unknown at C B. F G is a silver mine. To the miners at G, the earthquake waves in *a a* and *c c* would be unfelt; and the earthquake wave which came from H to G would be unknown to the inhabitants on the surface.

The theory concerning the undulations of this invisible power in earthquake shocks, will perhaps be made more intelligible to you by a few hints on the propagation of subterranean sounds, in rocks and strata that are convulsed.

Some earthquakes take place without any subterranean sounds whatever. The awful shock which destroyed Riobamba was not attended by any noise. On that terrible occasion deep detonations were heard at Quito and Ibarra, but not until twenty minutes after the catastrophe which had destroyed thirty thousand persons. Yet at Tacunga and Humbato, places much nearer the focus of the earthquake, the sound was not heard at all. In the earthquake of Lima, in 1746, a sudden noise, like a subterranean thunderclap, was heard so far as Truxillo, a quarter of an hour later, but it was not accompanied with any trembling. When the volcano of St. Vincent, on a small island in the West Indies, made an irruption of prodigious masses of lava, noises resembling thunder were heard far to the south-west, on the plains of South America, over many thousands of square miles, yet without any shaking of the ground.

There have been instances in which uninterrupted subterranean noises have been heard, unaccompanied by any trace of an earthquake. The city of Guanaxuato, in Mexico, is situated far from any active volcano; in January, 1784, the inhabitants heard deep noises like roaring thunders. This noise began at midnight of January 9, and lasted more than a month. From the 13th to the 16th it sounded as if there were heavy storm clouds underground, in which there was slow rolling thunder, frequently interrupted by a short thunderclap. It commenced gradually, and ceased as gradually. It was confined to a very limited space. A few miles off the city there was a district of basalt, where the sound was not heard at all. In this case, not only was there no trembling of the earth at the surface, but miners who were working in a mine five hundred *yards* deep felt no shaking. Nothing of the kind had ever been known in the mountains of Mexico before, nor, ever since that, has the phenomenon been repeated. This seems to intimate that by the action of earthquake power deep channels in the interior of the earth close or open, so as that the waves of sound are arrested in their course, or are propagated till they reach the ear.

At the commencement of this lesson, it was said that the earthquake wave moves in three directions. I have considered the vertical and the horizontal; we are now to have a sentence or two on the CIRCULAR, or gyratory movement. This means that the earthquake power moves in a circuit. This circuit may be small or very large. The circular movements, on a small scale, are the most rare, and they are always most dangerous, as was verified at Quito in 1797, and in Calabria in 1783. In those instances it was found that walls which had served for hedges in fields had completely changed their direction, without being overthrown, and with the masonry undisturbed. Also rows of trees, straight and parallel, had been inflected. One of the most remarkable phenomena of these circular earthquakes was, that whole fields, which had two sorts of grain growing in them, exchanged places and crops. This is difficult to account for, or to say whether the change was effected by a movement of translation, or by mutual penetration of the different soils. Perhaps a statement of Captain Fitzroy may assist us to understand this. He says that at Conception, in Chili, during the earthquake of February, 1835, the loose earth of the valley of the river Biobio was every where parted from the solid rock which bounded the plain. A circular earthquake would have moved this soil round.

Humboldt tells us that, at Riobamba, he was shown a place among the ruins, where the whole furniture of one house was found under the ruins of another. In this case the soil of the foundations must have moved in a wave of surface, as in a stream with a direction first downward, then horizontal, and again upward. That this is a fact is evident, from the legal disputes between the different owners of property which had been carried many hundred yards round, and by the awards of the courts of justice which settled the claims.

This circular movement is sometimes upon an immense scale. Take a map of the world in your hand, and read any account of the earthquake which destroyed Lisbon in November, 1775. That earthquake was felt in Spain—in North America—in the Alps—in Thuringia—in north of Germany—in Sweden—in Loch Lomond, in Scotland—in the great lakes of Canada and in the islands of the West Indies.

I conclude, by mentioning that this earthquake power is in perpetual activity at some point or other of the earth's crust. There are some regions of the globe where tremblings of the earth are felt every hour for months together. If our intelligence about earthquakes were as extensively communicated as that about meteorology, it is probable that we should find the surface of the earth is always being shaken at some point. This fact announces a great geological principle, which implies that the outward crust of the globe is incessantly affected by the agencies of the subterranean depths below.

LESSONS IN GERMAN.—No. XI.

SECTION XXI.

THE possessive pronouns mein, ſein, &c., as already seen (Sec. 15), are rendered absolute possessives by means of the characteristic endings er and es (§ 58. 4.)

I. The possessive pronouns are likewise converted into absolute possessives by prefixing to them the definite article and suffixing the terminations e or ige. Ex.: Mein Hut iſt weiß und deiner iſt ſchwarz; my hat is white and thine is black; meine iſt roth und das ſeinige iſt blau; her ribbon is red and his is blue. The termination ige is the more common.*

Observe, that the absolute possessives mein-er, &c., are inflected like an adjective of

THE OLD DECLENSION; AS,

	Masculine.	*Feminine.*	*Neuter.*
Nom.	Mein-er;	mein-e;	mein-es, mine:
Gen.	Mein-es;	mein-er;	mein-es, of mine
Dat.	Mein-em;	mein-er;	mein-em, to, for mine
Acc.	Mein-en;	mein-e;	mein-es, mine.

Note, also, that those preceded by the definite article, in respect to terminational inflection, varied like *adjectives* (Sec. 10. II.) in the same situation; that is, according to

THE NEW DECLENSION; AS,

	Masculine.	*Feminine.*	*Neuter.*
N.	Der mein-ige;	die mein-ige;	das mein-ige, mine;
G.	Des mein-igen;	der mein-igen;	des mein-igen, of mine
D.	Dem mein-igen;	der mein-igen;	dem mein-igen, to, for mine
A.	Den mein-igen;	die mein-ige;	das mein-ige, mine.

ABSOLUTE POSSESSIVES AS INFLECTED IN ALL GENDERS IN THE PLURAL.

	After the Old Declension.	*After the New Declension*
Nom.	Mein-e;	die mein-igen, mine;
Gen.	Mein-er;	der mein-igen, of mine;
Dat.	Mein-en;	den mein-igen, to, for mine
Acc.	Mein-e;	die mein-igen, mine.

II. When the *absolute* possessive pronouns do not refer to some noun previously mentioned, they refer, in the *plural*, to one's relatives or family,† and in the *neuter singular*, to one's property. Ex.: Das Meine or das Meinige, my property; das Deine or das Deinige, thy property; das Seine or das Seinige, his property; das Ihre or das Ihrige, her property, your property, their property. Die Meinen or die Meinigen, my family; die Deinen or die Deinigen, thy family, &c.; die Seinen or die Seinigen, his family, &c.

EXERCISE 21.

Allmächtig, adj. almighty;	Hemd, n. shirt;	Sonnenſchein, m. sunshine;
Eigenheit, f. peculiarity;	Kutſcher, m. coachman;	Stempel, m. stamp;
Fehler, m. mistake, error;	Nehmen, to take;	Waſſerfarbe, f. water-color;
General', m. general;	Oblate, f. wafer;	Weib, n. woman;
Gott, m. God;	Schickſal, n. fate, destiny;	Weltmeer, n. ocean;
Hand, f. hand;	Schloſſer, m. locksmith;	Wieſe, f. meadow;
	Schlüſſel, m. key;	Zwiſchen, between.

* In the same way are treated Deiner, Deine, Deines, ihrer, Ihrer, Ihre, Ihres, Seiner, Seine, Seines, his.

† They may likewise refer (when the connexion makes the application evident) to dependents, as servants, soldiers, subjects, &c.

Weſſen Uhr hat Ihre Mutter?	Whose watch has your mother?
Sie hat die ih'rige.	She has hers (or her own).
Haben Sie meine Brille oder die Ihrige?	Have you my spectacles or yours?
Ich habe die mei'nige.	I have mine (or my own).
Je'dermann ſchätzt das Sein'ige.	Every man prizes his own (property).
Liebt auch Je'dermann die Sei'nigen?	Does every man likewise love his family?

1. Hat der Capitän ſein oder des Generals Schwerdt? 2. Er hat das ſeinige. 3. Haben Sie meine Scheere? 4. Nein, ich habe die meinige. 5. Wer hat meinen Stock? 6. Herr S. hat ihn. 7. Hat meine Schweſter Ihren Regenſchirm? 8. Nein, ſie hat den ihrigen. 9. Hat der Schloſſer meinen Schlüſſel? 10. Nein, er hat den ſeinigen 11. Hat die Waſchfrau die Hemden meines Bruders und meiner Freunde? 12. Sie hat ſowohl die ſeinigen, als die ihrigen. 13. Alle Menſchen haben ihre Fehler und Eigenheiten—ich habe die meinigen, Sie haben die Ihrigen und er hat die ſeinigen. 14. Gott iſt allmächtig; die Schickſale des Menſchen ſind in ſeiner Hand, auch das meinige und das deinige. 15. Das Weltmeer iſt zwiſchen mir und den Meinigen. 16. Hat Herr A. Ihr Papier oder das meinige? 17 Er hat das ſeinige. 18. Mein Bruder hat mein Buch und ich habe das ſeinige. 19. Hat er Ihre Oblaten und Stempel oder die ſeinigen? 20. Er hat die meinigen. 21. Weſſen Wagen hat Ihr guter Freund, Herr G. 22. Er hat den ſeines Oheims. 23. Und weſſen Pferde hat er? 24. Er hat die meinigen 25. Weſſen Kutſcher hat er? 26. Er hat den ſeinigen. 27. Weſſen Schaafe ſind dieſe in der Wieſe? 28. Sie ſind die unſrigen. 29. Haben dieſe Deutſchen ihre Pferde und ihre Wagen, oder die unſrigen? 30. Sie haben die unſrigen. 31. Weſſen Bücher haben dieſe Schüler? 32. Sie haben die ihrigen. 33. Nehmen Sie immer das Ihrige? 34. Ja, Jedermann nimmt das Seine. 35. Wann haben Sie die Ihrigen geſehen? 36. Ich habe ſie vorgeſtern geſehen. 37. Haben Sie mich und die Meinigen geſtern Abend in dem Concert geſehen? 38. Ja, ich habe Sie und die Ihrigen geſehen. 39. Der Feldherr lobte die Seinigen.

des Grafen
1. The coachman of Count B. has my spectacles, but not
Töchter kranken ſteifer
yours. 2. The daughters of the infirm general are more proud
verloren Brief-Stempel
than mine. 3. I have lost my letter-stamp, but here is yours
Wem gehören
and his. 4. To whom belong these beautiful meadows, are
das
they yours? 5. No, they are not (the) mine; they are the
Eigenthum
property of my friend the coachman. 6. Have you his key or
denjenigen
mine? 7. I have neither his nor my own, but that of my wife.
entrecften Dieb an dem welches trug
8. They discovered the thief by the shirt which he wore, and
Wann
which was not his own 9. When did you see your (friends)?
ſeit jüngſten ſie
10. I have not seen them since last summer. 11. He loves too
ſehr
much his (property). 12. Have you seen me and mine, and
geſtern Abend Uhr der
Henry and his, last night between seven and eight o'clock in the
Allee
avenue?

Questions. 1. Can you name the different forms of absolute possessive pronouns? 2. What distinguishes both classes in form and declension? 3. What do absolute possessive pronouns refer to in the plural, when they do not relate to a preceding noun? 4. To what in the neuter singular? 5. Can you give examples? 6. What is the substance of the *note?*

Section XXII.

In compound *sentences*, connected by a relative, the verb stands at the end of the last clause, as well when the relative is in the nominative, as when in an oblique case. Ex.: Das Buch welches ich habe; the book which I have. Das Buch, welches hier iſt; the book that here is (is here). In compound *tenses* the *main verb* immediately *precedes* the *auxiliary*. Ex.: Das Buch, welches ich gehabt habe; the book that I had have (have had). Das Buch, welches ich haben werde; the book that I have shall (shall have).

The same position of the verb is required, when the second of two connected clauses is introduced by a conjunction or an adverb. Ex.: Ich kaufte es, weil es wohlfeil iſt; I bought it because it is cheap. Er wohnt noch, wo er gewohnt hat; he still resides, where he has resided. Er kommt, wenn er nicht krank iſt; he will come if he is not sick (he comes, if he is not sick).

I. Derjenige *(that or the one) always points to something specified by a relative in a succeeding clause. It is compounded of the substantive pronoun* der, die, das *and* jener *with change of termination. It is frequently used instead of* der, die, *or* das *for the sake of greater emphasis. Ex.:* Er liebt nur dasjenige (instead of das), was (Sect. 70. II.) er achtet; he loves only that which he esteems.

Derjenige *is inflected like* der meinige (Sect. 21.), *that is, its first component is declined like the definite article and its last like an adjective of the New Declension.*

DECLENSION OF derjenige, SINGULAR AND PLURAL.

	Singular.		
	Masculine.	*Feminine.*	*Neuter.*
N.	Derjenige,	diejenige,	dasjenige, that (the one);
G.	Desjenigen,	derjenigen,	desjenigen, of that;
D.	Demjenigen,	derjenigen,	demjenigen, to that;
A.	Denjenigen,	diejenige,	dasjenige, that.

Plural, all genders.

diejenigen, those;
derjenigen, of those;
denjenigen, to those;
diejenigen, those.

II. Welcher *(relative) usually adopts the genitive of the substantive pronoun* „der" (§ 65. 1. 2.)

The genitive of „Welcher" is only used interrogatively in the masculine and neuter singular, and is „Weſſen" whose, of whom, or which.

DECLENSION OF THE RELATIVE welcher.

	Singular.			*Plural.*
	Masc.	*Fem.*	*Neut.*	*All genders.*
N.	Welcher,	welche,	welches,	welche, who, which, that;
G.	Deſſen,	deren,	deſſen,	deren, whose, of whom, &c.;
D.	Welchem,	welcher,	welchem,	welchen, to whom, &c.;
A.	Welchen,	welche,	welches,	welche, whom, which, that.

Examples of welcher *(interrogative and relative) and* derjenige.

Welcher Mann iſt krank?	Which man is sick?
Derjenige, welcher im Hauſe iſt.	The one who is in the house.
Welche Feder haben Sie?	Which pen have you?
Ich habe diejenige, welche Sie gehabt haben.	I have the one that you have had.
Weſſen Buch haben Sie?	Whose book have you?
Ich habe das des Mannes, deſſen Stock Sie haben.	I have that of the man whose stick you have.
Welchen Knaben haben Sie das Geld gegeben?	To which boys have you given the money?
Ich habe es denjenigen gegeben, welchen Sie Brod gaben.	I have given it to those to whom you have given bread.

III. For both derjenige *and the relative* welcher, *the pronoun* der *may be substituted. Ex.:* Der Mann der krank iſt; the man that (who) is sick. Welches Buch haben Sie? which book have you? Ich habe das (dasjenige), das (welches) Sie gehabt haben; I have that (the one) that (which) you have had.

Der, *when substituted for* derjenige, *is in the genitive plural* derer (instead of deren). *Ex.:* Hart iſt das Schickſal derer (derjenigen), die ſich nicht ernähren können; hard is the fate of those, who cannot support themselves.

The use of derjenige *often corresponds to that of our personal pronoun, as well in the singular as in the plural. Ex.:* Derjenige den Sie ſuchen, iſt nicht hier; *he* that (whom) you seek is not here. Diejenigen die Sie ſuchen, ſind nicht hier; they (those) whom you seek are not here.

Exercise 22.

Amtmann, *m.* magistrate; Ar'beiter, *m.* labourer, workman; Ein'ſiedler, *m.* hermit; Friede, *m.* peace, tranquillity; Herz, *n.* heart; Hülflos, helpless; Kapel'le, *f.* chapel; Kaufen, to buy; Laſterhaft, vicious; Letzt, last; Lohn, *m.* reward; Narbe, *f.* scar; Scheune, *f.* shed, barn; Stirn, *f.* forehead; Verlaſſen, forsaken, left; Weinberg,* *m.* vineyard; Wohnhaus, *n.* dwelling.

Wir lieben Die'jenigen, die (welche) uns lieben. — We love those, who (that) love us.

Ich habe den Hut, den ich geſtern gehabt habe. — I have the hat, that I (have) had yesterday.

Sie haben die Aepfel, die reif ſind, und ich habe die'jenigen, die grün ſind. — You have the apples, that are ripe, and I have those that are green.

Der'jenige, den ich ſuche, iſt nicht hier. — He, whom I seek, is not here.

Der'jenige, deſſen Stock ich habe, iſt krank. — He, whose stick I have, is sick.

Die'jenige, zu der die Mutter geht, iſt krank. — She, to whom the mother is going, is sick.

Die'jenigen, die ſtolz ſind, ſind auch närriſch. — They (or those) that are proud, are likewise fooliah.

1. Welches Kind liebt der Oheim? 2. Er liebt dasjenige, welches er lobt. 3. Welches Kind liebt den Oheim? 4. Dasjenige, welches er liebt, liebt ihn. 5. Welchen Hut haben Sie? 6. Ich habe denjenigen, welchen Ihr Herr (Sect 17. V.) Bruder gehabt hat. 7. Welchen Knaben liebt der Vater? 8. Er liebt denjenigen, welchen die Mutter lobt. 9. Welcher Knabe liebt die Mutter? 10. Derjenige, welchen der Vater lobt. 11. Welches Pferd hat Ihr Bruder gekauft? 12. Er hat dasjenige gekauft, welches Sie geſtern gehabt haben (Sect. 18. VIII.) 13. Welchen Mann loben Sie? 14. Ich lobe denjenigen, deſſen Sohn Sie lieben. 15. Welche Bücher haben Sie gekauft? 16. Ich habe diejenigen gekauft, welche mein Bruder in den (Sect. 17. III.) Händen gehabt hat. 17. Weſſen Bücher haben Sie? 18. Ich habe die Bücher derjenigen Knaben, deren Hüte Sie haben. 19. Diejenigen, welche laſterhaft ſind, haben keinen Frieden des Herzens. 20. Derjenige, welcher die Narbe an der Stirne hat, iſt der alte Amtmann. 21. Dasjenige iſt gut, was (§ 65. 5.) nützlich iſt. 22. Dieſe Männer ſind dieſelben, deren Scheunen, Ställe und Wohnhäuſer Sie geſtern geſehen haben. 23. Der Arbeiter in dem Weinberge desjenigen, welcher den letzten Lohn gibt, ſind wenige. 24. Der Einſiedler jener Kapelle iſt ein Freund derer (III.), die hülflos und verlaſſen ſind. 25. Der (III.) iſt weiſe, der tugendhaft iſt.

1. The friend whom I have is faithful (treu). 2. Whose (Weſſen) key have you? 3. I have that of the woman whose (deren) daughter you know. 4. I shall give this book (geben dieſes) to that (man), who will be first (zuerſt) here. 5. Have you seen my book? 6. No, I have not seen the one which you mention (erwähnen). 7. The joy (Freude) which I shall have. 8. I came, because I had promised (verſprechen) it to him.† 9. Where (Wo) do you live? 10. I live in the same house in which I lived when you called upon me (beſuchten). 11. Which of these ladies (Damen) is your wife? 12. The one who is talking (ſpricht) with the old gentleman (Herrn). 13. The friend whom I have lost was very dear (theuer) to me. 14. I have bought (gekauft) that coat which you saw (ſahen) in the window (Fenſter) of my tailor (Schneiders). 15. Remember me (Empfehlen Sie) to that gentleman who is so very polite (höflich).

* Literally "Wine-mountain;" so called because most vineyards in Germany are upon hills or smaller mountains; the sunny sides of these being much more favourable to the growth of the vine.

† Translate, "Because I it to him had promised."

Questions. 1. In compound *sentences* connected with a relative, where does the verb stand? 2. Is the verb, in English, when used with a relative in the nominative, placed as in German? 3. When is it so placed? 4. In compound sentences what is the position of the main verb? 5. What of the auxiliary? 6. Examples? 7. What is the position of the verb when the second of the two connected clauses is introduced by a conjunction or an adverb? 8. To what does derjenige always point? 9. Of what compounded and how declined? 10. Like what is the genitive of welcher as a relative? 11. What is ter in the genitive plural, when substituted for derjenige? 12. To what does the use of derjenige often correspond? 13. Examples?

LESSONS IN NATURAL HISTORY.—No. VIII.

THE FOX.

[*Order* CARNIVORA, *species* CANIS VULPES.]

Though the habits of the fox are generally known, an acquaintance with his structure is less common. He is larger and stronger when found in hilly, than in flat, districts. The average length of the head and body is two feet four inches; of the tail, or "brush," as sportsmen call it, one foot four inches. His general colour is the tawny, usually termed fulvous, with a combination of white and black distributed in different proportions, over various parts of the body. The shoulders are reddish-gray; the throat and chest are gray; the belly, the inner surface of the limbs, the cheeks, the upper lip, and the tip of the tail are white; a black mark runs along from the eye to the mouth; while the anterior part of the limbs, and the back of the ears, are black. His offensive smell comes from the secretion of a gland under the tail. The fox is remarkable for the brilliancy and expression of his eye, which evinces much intelligence. His senses of hearing and of smell are exquisitely perfect. In winter his fur is fuller and deeper than in summer, the fulvous becoming grizzled. A grizzled tone pervades the whole, when the fox, escaping from the dangers to which he is generally exposed, is permitted to reach old age. He is not confined to particular districts, but is an inhabitant of almost every temperate country on the face of the globe, and everywhere maintains his character sometimes applied to man—"Crafty as a fox."

Of his cunning he gives evidence in the choice of a dwelling-place. Not unfrequently he appropriates to himself the burrow of a badger, or a rabbit, easily enlarging it for his own convenience. At other times he excavates a burrow in some secluded place, generally on the edge of a forest or copse, but always in a situation abounding with his favourite food. Accordingly he displays his strong preference for the neighbourhood of a warren, a preserve of game, or a farm-yard; especially if his concealment be favoured by tangled brushwood, with rough and broken ground. Often he dwells in a place where we should not commonly expect he would be found. We have heard of a stock of poultry being sadly thinned by a fox, and of search being made for its burrow in vain, till it was accidentally discovered, not at some considerable distance from the dwelling-house, but actually in a part of the garden appropriated to pea-sticks, and various kinds of rubbish. Thus he lived, quite unmolested, in the very centre of the area of his depredations.

In his burrow, often called his "earth," the fox usually secludes himself during the day. But when dusk is coming on, he leaves his dwelling-place with an appearance strikingly expressive of his actual disposition. His sharp ears and muzzle, his oblique eye with a linear pupil adapted to his nocturnal habits, his peculiar curl of the upper lip, showing the canine teeth, and especially obvious when he is excited and ready to snap at his prey; all indicate his cunning, vigilance, and ferocity. Warily does he examine the limits of the farm-yard, and become acquainted with its sheds and buildings. Does he reach a high wall? Over this he instantly bounds. Are palings in his way? Under these he stealthily creeps. With noiseless tread he enters the poultry-house, often seizing on his victim without disturbing the rest, but sometimes putting all to death, as he provides for his future, as well as for his present, appetite.

For poultry the fox, has, indeed, a strong liking. Not many years ago, a mischievous person unchained, during the night, a tame fox that was confined in a courtyard belonging to Mr. Wilcox, at Hatfield, in Hertfordshire. Reynard, finding himself at liberty, was not long in making his way out of the premises, and proceeding but a short distance, he discovered a hen-roost, and destroyed *thirteen* fine fowls, which he dragged to his box. The crafty thief, not being contented with such an enormous booty, went a little farther, and found a quantity of fine ducks, *seven* of which he killed; and leaving six of them heaped up together, he brought the other home, and was detected entering the courtyard with his prey.

Rabbits, too, are a favourite food with the fox; and, failing these, he is quite content to regale himself on pheasants and partridges. For want of better food he will destroy serpents, lizards, toads, moles, frogs, rats, and mice; and when greatly pressed by hunger, he will feed on roots, or other vegetable substances, as a last resource. On the continent he finds even greater luxuries than in England; there he visits the vineyards when the fruit is ripe, its sweetness being, no doubt, very grateful to his nice palate, and commits the most serious ravages. He is also said, by Buffon, to be fond of honey, and will boldly attack hives and wild bees' nests, frequently robbing them of their stores, but not always with impunity; for, issuing from their castles, the enraged insects fasten on the invader, and compel him to retire. When they stick to his back, he takes his revenge by rolling on the ground and crushing them to death; then, returning to the charge, he devours the wax as well as the honey.

THE FOX.

Not only is it said that the fox will eat shrimps, crabs, and other shell-fish, but that he will resort to a singular device to obtain some of the finny tribes. Observing an otter enter the water to fish, he will place himself behind a bush or a stone, and there lie concealed till he sees the otter safely on shore. Instantly he makes a violent spring at the booty, which surprises and frightens the otter so much, that he rushes into the water, leaving the fish behind.

His cunning, however, like that of human beings, is often void of success. We mention one of many instances. A farmer in Essex having suffered much from the depredations of a fox, determined to lay wait for him. Well-knowing his track, he took his stand on a fine moonlight night, and soon espied him padding along a clover-field, with a young goose which he had just stolen, slung across his neck. At the moment the gun was levelled Reynard caught sight of a hare, feeding a little on one side, and nearer to the farmer. Dropping, therefore, the goose, he began some curious gambols, rolling over and over on the ground, and jumping up into the air, but gradually getting nearer to poor puss, who was totally unconscious that so wily an enemy was just at hand. At length the crisis came: with one enormous spring he captured the hare; but the moment of his triumph was his last; the farmer shot the fox, and then carried home his double prize, not forgetting the goose.

On the female devolves all the labour of rearing the cubs, for which she prepares a nest at the bottom of her burrow, lining it with dry leaves, moss, and hay. For her young she strongly manifests her maternal anxiety, employing every artifice to conceal them from discovery, defending them with indomitable courage, and, if she suspects her retreat to be known, carrying them away, one by one, to a place of safety.

Some years ago, a fox was fairly hallooed from its hiding-place, amidst a ledge of rocks, high, secluded, and apparently inaccessible, yet, withal, conveniently situated for those nightly forays, by which he had laid half the henroosts of the district under repeated contribution. As the hounds were at hand, the fox bounded away through bush and brake, and so far distanced his pursuers, that they had the prospect of a long-continued chase. But it was gradually found that violent exertions were exhausting his energy, and the increased yelling of the pack showed that it was every moment gaining on the enemy. At this juncture, a gentleman who rode foremost in the chase, observed the animal pause, look round, and then bound away with seemingly fresh vigour, and at a greatly increased speed. Struck by this circumstance, he rode up to the spot, and there found a very young cub, which the affectionate mother had carried at least two miles in her teeth, and only abandoned at the very last extremity. Situated as they were, the party had no means of restoring the cub, but as a reward for the fidelity of the mother the whipper-in was immediately ordered to call off the dogs, and recommence the sports of the day in a totally different quarter.

The cubs of the fox are very playful. Like the puppies and kittens we have often seen, they are fond of endeavouring to catch their own tails, turning round and round in the attempt. At about the age of four months they leave the mother's protection, and look after themselves. If a fox be taken at the earliest age, and brought up in confinement, with every kindness, it will still retain its suspicious character, and though it may, perhaps, show some familiarity with the person who attends it, it will never manifest the attachment or gratitude of the dog, and will either conceal itself on the approach of strangers, or repel any advances with a bite. A fox is, in fact, a wild animal, and not to be domesticated. So dear to him is liberty that if one of his legs be caught in a trap, he will bite it off to effect his deliverance.

LESSONS IN ENGLISH.—No. XIII.

By John R. Beard, D.D.

DERIVATION: PREFIXES *(continued)*.

In the preceding prefixes and quotations, we may find a species of indirect history. The facts I have set forth in connexion with them, show us how much ours is a composite language, a language that is, like the composite order in architecture, made up of elements derived from different sources. The facts also inform us that the English nation has been closely connected with the French, and so is much indebted to the ancient Latins. To the corrupt Latin of the middle ages, we are also obviously indebted; and from the Greek tongue we have derived words and parts of words. Nor

have Italy and Spain failed to contribute to the enrichment of our language. In historical or genealogical relations, we Englishmen of this day are connected with the Norman baron as well as the Saxon churl; with the monk and the schoolmen, no less than with the conquerors of the world; and may fancy the line of our relationship to stretch from the Thames to the Rhine, and from the Rhine even to the Indus and the Ganges. If every sentence that has been written to convey to the world a history of England had totally perished, still scholars out of the fossil remains of the nation discoverable in its words, would, after the manner of the geologists, be able to reproduce the great outlines of our English life. Even single words are full of the elements of history. Those elements are often beneath the surface; at least they are not obvious to the common eye. I give you, however, an instance, the historical value of which is clear to all. When, in the early part of the reign of Charles the First, the Puritan party began to rise against the royal authority, the more demure members of the party wore their hair cropt so close and short, as, in contrast with the full and flowing locks of the courtiers, to give their heads the appearance of so many bowls. Queen Henrietta Maria, the spouse of Charles, observing this marked peculiarity graphically as well as wittily, termed them roundheads. The particular occasion was the following:—"Samuel Barnadiston, a noted republican, was, in his youth, the leader of a deputation of London apprentices, for the purpose of communicating to parliament their notions regarding civil and religious government. The queen, who saw this posse arrive at Whitehall, then first noticed the extraordinary roundness of their closely-clipped heads, and saw at the same time that Samuel was a personable apprentice; upon which she exclaimed, 'La! what a handsome young roundhead!' The exactness of the descriptive appellation fixed it at once as a party name; *roundheads* they were called from that moment, and roundheads they will remain while history endures."[a] You thus see that the term 'Roundhead" contains a history. It also paints a picture. In roundhead we possess an historical picture; and the picture which it paints all can appreciate. Why? Because the word consists of Saxon terms, nursery terms. Translate the Saxon into Latin, *rotunda capita*, and so far from painting a picture, the term does not convey any meaning to the mere English scholar. If, then, you would be understood by the people, use words of Saxon origin. But if you would be well acquainted with the English language, study its Latin, and generally its foreign elements, as these are they with which you do not become familiar in the nursery, and which consequently present difficulties, and obstruct the pathway to knowledge. These remarks suggest reasons why we are entering so fully into the composition of English words.

Magn, of Latin origin (magnus, *great*), in the forms *magna*, and *magni*, enters into the composition of the following words: *magn*animity (animus, Lat. *mind*), greatness of mind; *magn*ify (facio, Lat. *I make*), to make great, extol; *magni*loquence (loquor, Lat. *I speak*), great talk. *Magn*ify is connected with the words *magni*ficence, *magni*ficent, *magni*fier. From magnus, *great*, comes also *magni*tude.

> "——— To these, thy naval streams,
> Thy frequent towns superb, of busy trade,
> And ports *magnific* add, and stately ships,
> Innumerous." *Dyer.*

Mal, or *male*, of Latin origin (malum, *evil*), forms a set of words the opposites of words containing *bene*; as, *mal*evolence, *benevolence*; *male*diction, *bene*diction. *Mal* is found in *mal*-administration, and *mal*treat; *male*factions (facio, Lat. *I do*), are misdeeds.

> "——— I have heard
> That guilty creatures sitting at a play,
> Have, by the very cunning of the scene,
> Been struck so to the soul, that presently
> They have proclaim'd their *malefactions*."
> *Shakspeare*, "Hamlet."

Melan, of Greek origin (melas, *black*), to disorder, presents itself in *melan*cholly (literally, *black bile*), whence it was thought came habitual sadness.

> "But hail, thou goddess, sage and holy,
> Hail divinest *melancholy*,
> Whose saintly visage is too bright
> To hit the sense of human sight;
> And therefore to our weaker view
> O'erlaid with black, staid Wisdom's hue."
> *Milton*, "Il Penseroso."

Meta, of Greek origin, signifying *after*, and denoting *change*, *transference*, is found in *meta*phor (phero, Gr. *I bear*), a figure of speech in which there is a transference of the literal meaning of the word. Words originally represented objects of sense. It is only by accommodation or transference that the word which set forth some sensible objects has come to denote a state of mind or feeling. Thus acute, which now describes a shrewd, clever mind, properly signifies sharp, piercing—from the Latin acu, *a needle*. In this view, all words now applied to mental or moral phenomena, contain metaphors. Instances may be given in *reflect* (re, Lat. *back*; and flecto, *I bend*); *abstract* (ab, Lat. *from*; and traho, *I draw*), *conceive* (cum *with*, and capio, Lat. *I take*); and of course their corresponding nouns: also, in hard (*hard*-heart), open (*open* disposition), light (*light*-hearted). The term metaphor, however, is specially given to more marked and striking, not to say artificial instances of transference, on the ground of some real or supposed resemblance between the material and the mental objects. Thus, the sun is termed *the king of day*; and the moon, *the queen of night*.

"An horn is the hieroglyphick of authority, power, and dignity, and in this *metaphor* is often used in Scripture."—*Brown*, "Vulgar Errors."

Meta forms the two first syllables of *meta*physics (in Greek, meta ta physica, *after the physics*). The force of the word will be learnt in these quotations:—

"The one part which is *physic* (physics, relating to matter) inquireth and handleth the material and efficient causes; and the other, which is *metaphysic* (metaphysics, the plural is now generally used) handleth the formal and final causes.—*Bacon*, "Advancement of Learning."

"From this part of Aristotle's logic, there is an easy transition to what has been called his *metaphysics*; a name unknown to the author himself, and given to his most abstract philosophical works by his editors, from an opinion that these books ought to be studied immediately *after his physics*, or treatises on natural philosophy."—*Gillies*, "Analysis of Aristotle's Works."

Meta also enters into the Greek word *meta*empsychosis (en, *in*, and psyche, *the soul*), the passage of the soul from one body to another.

"The souls of usurers after their death, Lucan affirms to be *metempsychosed*, or translated into the bodies of asses, and there remain certain years, for poor men to take their pennyworth out of their bones."—*Peacham*.

Meter, *metro*, a mother, of Greek origin, enters as the first two syllables into the word *metro*polis (polis, Gr. *a city*), a mother-city, the capital of a country, the chief city of a province.

"By consent of all churches, the precedency in each province was assigned to the bishop of the *metro*polis, who was called the first bishop, the *metropolitan*."—*Barrow*.

Micro, of Greek origin (mikros, Gr. *little*) is seen in *micro*cosm (kosmos, Gr. *the world*),—that is, a little world.

"Because in the little frame of man's body there is a representation of the universal, and (by allusion) a kind of participation of all the parts there, therefore was man called *microcosmos*, or the little world."—*Raleigh*, "History of the World."

Micro appears also in *micro*scope (skopeo, Gr. I *look at*, *see*).

"The works of art do not bear a nice *microscopical* inspection; but the more helps are used, and the more nicely you pry into natural productions, the more do you discover of the fine mechanism of nature."—*Berkeley*, "Siris."

Mid, of Saxon origin (compare middle), *halfway*, makes a part of several English words, as *mid*land, *mid*night, *mid*day, *mid*ship, *mid*summer; the meaning of which is very plain. *Midriff* (rif, rib, Sax. *division*) is the diaphragm, the skin or membrane which separates the heart and lungs from the lower belly.

Mid, though belonging to the Saxon, is an Indo-Germanic word. It appears in the Greek, in mesos, *middle*; meta, *in the midst of*, *among*; in the Latin, in medius, *middle*; medium, *the middle*, *the half*, *the means* or *medium*; in the German mitte, mit, *with*; in the Sanscrit, madhya.

The term *mid*wife is given, by Richardson, as "med-wife, a woman hired for *meed* or reward." But how does the meed distinguish the midwife? Are not all servants hired for meed or reward? And do not all professions receive a meed or reward?

[a] "Lives of the Queens of England, by Agnes Strickland," vol. viii. p. 22.

The proper meaning of *mid-wife* is evidently, from our preceding remarks, *medium-wife*, a woman who from having been *married* herself, which the word *wife* denotes, becomes useful as a *medium* or *means* of assisting other married women at childbirth.

"Nor need I claim the Muses' *midwifry*,
To bring to light so worthless poetry."—*Bp. Hall.*

FRENCH EXTRACTS.

PENSEES MORALES ET MAXIMES.

BIENFAIT.

Celui-là peut prendre, qui goûte un plaisir aussi délicat à recevoir que son ami en sent à lui donner.—*La Bruyère.*

BONHEUR.

Il en est du bonheur comme des montres: les moins compliquées sont celles qui se dérangent le moins.—*Chamfort.*

Il y aurait de quoi faire bien des heureux avec tout le bonheur qui se perd en ce monde.—*Livie.*

N'entretenez pas de votre bonheur un homme moins heureux que vous.—*Pythagore.*

On n'est jamais si heureux ni si malheureux qu'on s'imagine.—*La Rochefoucauld.*

A mesurer le bonheur des hommes seulement par le nombre et la vivacité des plaisirs qu'ils ont dans le cours de leur vie, peut-être y a-t-il un assez grand nombre de conditions assez égales, quoique fort différentes. Celui qui a le moins de plaisirs les sent plus vivement, il en sent une infinité que les autres ne sentent plus ou n'ont jamais sentis, et à cet égard la nature fait assez son devoir de mère commune.—*Fontenelle.*

Si l'on vouloit n'être qu'heureux, cela serait bientôt fait; mais on veut être plus heureux que les autres; et cela est presque toujours difficile, parce que nous croyons les autres plus heureux qu'ils ne sont.—*Montesquieu.*

CAPRICIEUX.

Il se multiplie autant de fois qu'il a de nouveaux goûts et de manières différentes, il est à chaque moment ce qu'il n'était point, et il va être bientôt ce qu'il n'a jamais été; il se succède à lui-même. Ne demandez pas de quelle complexion il est, mais quelles sont ses complexions; ni de quelle humeur, mais combien il a de sortes d'humeurs.—*La Bruyère.*

CARACTERE.

Quiconque n'a pas de caractère n'est pas un homme, c'est une chose.—*Chamfort.*

Diseur de bons mots, mauvais caractère.—*Pascal.*

CHARITE.

Celui-là est vraiment grand qui a une grande charité.—*Thomas-a-Kempis.*

Faites part de votre pain à celui qui a faim, et faites entrer en votre maison les pauvres qui ne savent où se se retirer: lorsque vous verrez un homme nu, revêtez-le, et ne méprisez point votre propre chair.—*Isaïe.*

Celui qui ferme l'oreille au cri du pauvre criera lui-même, et il ne sera point écouté.—*Salomon.*

N'attristez point le cœur du pauvre, qui est déjà accablé de douleur, et ne différez point de donner à celui qui souffre.—*Ecclésiastique.*

Lorsque vous faites l'aumône, que votre main gauche ne sache point ce que fait votre main droite.—*Evangile.*

Ayez pitié même des pauvres qui se laissent aller à l'impatience et à la colère. Pensez que c'est une chose bien dure pour le malheureux de souffrir toutes les misères dans un taudis ou dans un chemin, tandis qu'à quelques pas de lui passent des hommes parfaitement vêtus et nourris.—*Silvio Pellico.*

La charité, c'est tout le christianisme.—*Bossuet.*

CLEMENCE.

Si votre ennemi a faim, donnez-lui à manger; s'il a soif, donnez-lui à boire.—*Salomon.*

COEUR.

Les grandes pensées viennent du cœur.—*Vauvenargues.*

La pire de toutes les mésalliances est celle du cœur.—*Chamfort.*

L'on n'est estimable que par le cœur, et l'on n'est heureux que par lui; car notre bonheur ne dépend que de la manière de sentir. *Pascal.*

COLERE.

Il n'est passion qui nuise plus au raisonnement que la colère. Aucun ne ferait doute de punir de mort un juge qui, par colère, aurait condamné son criminel. Pourquoi est-il plus permis aux pères et aux pédants de fouetter les enfants et les châtier, étant en colère? Ce n'est plus correction, c'est vengeance. Le châtiment tient lieu de médecine aux enfants, et souffririons-nous un médecin qui fût animé et courroucé contre son patient?—*Montaigne.*

Quand Socrate était en colère, c'était alors qu'il parlait et plus rarement et plus doucement: on voyait bien qu'il était ému; mais on voyait aussi qu'il se rendait maître de sa passion.—*Plutarque.*

Les effets de la colère ressemblent à la chute d'une maison qui en tombant sur une autre, se brise elle-même.—*Sénèque.*

La colère commence par la folie et finit par le repentir.—*Maximes des Orientaux.*

La force ne consiste pas à renverser un ennemi par terre, mais à dompter sa colère.—*Ibidem.*

COMMERCE.

Il n'y a pas de membres plus utiles à la société que les commerçants; ils unissent les hommes par un trafic mutuel; ils distribuent les dons de la nature; ils occupent les pauvres, et remplissent les désirs des riches.—*Raynal.*

Ce sont les gains légers qui rendent la bourse pesante; car les petits gains reviennent souvent, au lieu que les grands arrivent rarement.—*Bacon.*

COMPLAISANCE.

La complaisance est une monnaie à l'aide de laquelle tout le monde peut, au défaut de moyens essentiels, payer son écot dans la société. On vous en tient toujours compte.—*Voltaire.*

Si vous voulez vous acquérir de l'autorité sans peine, soyez complaisant.—*Maximes des Orientaux.*

CONDUITE.

L'âme n'a point de secret que la conduite ne révèle.—*Pensée Chinoise.*

Mes enfants, ne méprisez jamais personne; regardez celui qui est au-dessus de vous comme votre père; votre égal, comme votre frère; et votre inférieur, comme votre fils.—*Ali.*

CONFIANCE.

La confiance fournit plus à la conversation que l'esprit.—*La Rochefoucauld.*

L'envie d'être plaint ou d'être admiré fait souvent la plus grande partie de notre confiance.—*Idem.*

LITERARY NOTICES.

THE SCIENCE OF BOTANY beautifully Illustrated by upwards of Three Hundred Engravings from Drawings from Nature.—In THE ILLUSTRATED EXHIBITOR AND MAGAZINE OF ART, for September 4th, will be commenced a series of chapters on the instructive science of Botany. Each chapter will be profusely illustrated with engravings, carefully executed. These chapters on Botany will not interfere with the general character of the work, which contains first-class engravings, including portraits and specimens of the works of the great masters, in painting, sculpture, and architecture; portraits of eminent characters; views of cities, palaces, and public buildings; natural history; manufacturing processes; machinery and inventions; scientific, including the elements of design, perspective, hydraulics, the stereoscope, &c.; ornamental sculpture, needlework, &c.; with original literary articles, including biographies, descriptions of works of art, details of manufacturing processes and machinery, papers on natural history and other branches of science; and much interesting fragmentary matter. The ILLUSTRATED EXHIBITOR AND MAGAZINE OF ART is published in weekly Numbers, twopence each, or in monthly Parts, 9d. or 11d. each, according to the number of weeks in each month.

CASSELL'S SHILLING EDITION OF EUCLID.—THE ELEMENTS OF GEOMETRY, containing the First Six, and the Eleventh and Twelfth Books of Euclid, from the text of Robert Simson, M.D., Emeritus Professor of Mathematics in the University of Glasgow; with Corrections, Annotations, and Exercises, by Robert Wallace, A.M., of the same university, and Collegiate Tutor of the University of London, is now ready, price 1s. in stiff covers, or 1s. 6d. neat cloth.

CASSELL'S EMIGRANT'S HANDBOOK, a Guide to the Various Fields of Emigration in all Parts of the Globe, Second Edition, with considerable Additions, and a Map of Australia, with the Gold Regions clearly marked, is now ready, price 9d.

SCRIPTURE LIBRARY FOR THE YOUNG, in Shilling Volumes.—The first two volumes of this instructive series of works, "The LIFE OF JOSEPH," illustrated with sixteen choice engravings and maps, and The TABERNACLE, its PRIESTS, and SERVICES," with twelve engravings, are now ready. The "LIFE OF MOSES" will shortly appear.

ANSWERS TO CORRESPONDENTS.

Our readers will please to put *last month* for *yesterday*, p. 307, col. 2, line 28; and add *s* to *nephew*, line 48.

J. FAULKNER (Smethwick): Man and mankind are general terms including every individual of the human race; male and female, young and old, servant and master, king and subject, negro and negro-driver.—J. J. NEWTON (Bridgewater): His solutions to the queries in No. 14, are nearly correct.—A. LEARNER (Greenock): His observations on Geometry are good: let him read our answer to J. S. (Ayrshire). His demonstration of the 47th B. I. contrary to his own maxim, depends on "Euc. B. I., 46, Cor. 2," by his own citation. This cor. is not Euclid's, but Dr. Thomson's, and even *he* refers to "Euc. B. I., 34, Cor. 2," for its demonstration; neither is the latter Euclid's, but Dr. Thomson's again, for *he* has added a demonstration. Euclid's demonstration is, therefore, on Learner's own showing, not complete. Neither is it on another ground; for, whichever of the six ways of constructing the diagram, a student happens to take, the demonstration ought to apply to that way; a thing which has not yet been satisfactorily made out on *Euclid's* principles, of the 47th.—A. SKERRIT (Holbrook): His solutions are correct, and very ingenious.—D. M. F. (Bradford) wishes us to put the following query: "How many acres of the earth's surface may be seen from the top of a steeple 400 feet high, the earth being perfectly spherical, and its diameter 7,920 miles."—LUPUS is right on the education of females of the middle class; it is preposterous.

A. W. (Edinburgh) wishes us to assist him in dividing $x^2+2+\frac{1}{x^2}$ by $\frac{x+\frac{1}{x}}{a}$. First, put unity under the dividend to make a fraction of it; then invert the divisor, and multiply the two fractions together; the result will then be $\frac{a(x^2+2+\frac{1}{x^2})}{x+\frac{1}{x}}$, which can be reduced to its lowest terms. This may be easily done by observing that the part of the numerator in parenthesis, is the square of the denominator; hence, dividing both terms by the denominator, the fraction in its lowest terms is $\frac{a(x+\frac{1}{x})}{1}$; now multiplying both numerator and denominator by x, and removing the parenthesis according to rule, you have $\frac{ax+a}{x}$ for the answer in another form.

S. Y. B. (Tiverton): The method of putting down this sum in a ciphering-book is of little moment, provided the student shows that he thoroughly understands it. "From July 18th, 1823, to April 18th, 1850, how many years and days?" It might be done thus:—

Remaining days of 1823	166 days
Leap years from 1824 to 1848 inclusive	7 years
Common years from 1824 to 1849 inclusive of 1849	19 years
Days of 1850 included in the question	108 days.

Answer: 7 leap years, 19 common years, and 274 days. But if the answer be required in days, thus:—

Days of 1823	166
Days in 7 leap years	2562
Days in 19 common years	6935
Days of 1850	108
Answer: number of days	9771 in all.

A JERSEYMAN should read both the P. E. and the "French Lessons," republished at 6d., beginning with the latter.—R. G. (Dundee): Thanks for his solution. We *intend* to go as far as the diff. and integ. calculus, and the Oriental languages too; but it is really impossible to say *when*.

The following correspondents have correctly answered the question of LEARNER, p. 288:—MISS ANN WALTON (Leeds); JOHN JAMES N. (Bridgewater); JOSEPH BAGSHAW (Willenhall); JAMES POLAND (William-street); J. B. M'COLLAN (York); φ, *Un Lecteur constant*; SAMUEL HOLMES (Bingley); T. H. (Durham); and others.

PHILO (Berwick-upon-Tweed): Had we not inserted the solution of LEARNER'S question, p. 288, in our last Number, we should have gladly inserted that of our friend, who tells us he has done it *by reason* and not *by rule*; in order to show our readers that REASON and RULE are the same thing, or in other words, that rules are the dictates of reason. We are delighted to think that our P. E. should interest an old man 59 years of age, and that at this age he should begin to learn Latin from our pages, a thing which he has wished to do all his life, but was never able to do till the P. E. appeared. We cannot help quoting his words, as an example and encouragement to others. He says, "I am eagerly learning Latin, not with the expectation of benefiting *myself alone*, but to be an example of perseverance and industry to my children and grandchildren." What a noble and praiseworthy feeling! It cannot, it will not, lose its reward.—PETER HAY (West Allerdean): E. FINIGAN (Manchester): Correct.—M. W. DICKSON (Dublin): Yes.—A WELL-WISHER, rates us soundly for using the subjunctive mood after the particle *if*!—NOVI YELSOM (Manchester) makes the extraordinary request of us, to send him songs, "lively songs with choruses," in about 50 different languages, and he will discharge the debt in postage stamps!—G. H. CHELTENHAM, is right, Strabo was a Roman writer of Greek Geography.—W. H. B. should study Cassell's Euclid, and the lectures in the P. E. together. Zumpt's Latin Grammar can be obtained of any respectable bookseller.—E. EVANS (Abergele): We cannot condescend to copy other people's plans in the management of our correspondence. Our earnest desire is to do ALL THE GOOD we can to EVERY INDIVIDUAL, believing that by so doing we shall benefit the mass in the long run; "a little leaven leaveneth the whole lump."—THOMAS KNOTT (Gateshead) is right; our religious readers should get "The Pathway;" therefore we send him to its editor for an answer to his religious question.—J. B. (Long Benton) should pronounce *Montague* thus: *Mont-a-gue*, with the emphasis on *Mont*, with the *a* short, the *u* long, and the *e* silent.—H. A. (Liverpool): In the French lessons, *m.* means masculine, and *f.* feminine.—MOLESTUS (Liverpool): The names of the cases in Latin shall be explained.—AN ASPIRANT to the profession of civil engineers, will ascertain how a person becomes a M. I. C. E. by calling at the institution, Great George-street, Westminster, and getting a copy of its rules and regulations.—C. F. P. (Dunmanway): we are obliged by his interesting communication, and shall keep it in view for the benefit of our readers. His solutions are correct.—A. SCOTSMAN is too wide an appellation; never mind the arrangement of the Latin words at present, if your translation be correct. You will see in the KEY, that the same sentence is arranged two or three different ways.—E. A. B. (Bellington): His solutions to the queries, p. 223, are very good. No. 4. is a geometrical query.—J. M. L. (Edinburgh) wishes a solution to the following query: Subtract $\frac{x}{x-1}$ from $\frac{2x^2-2x+1}{x^2-x}$. Bring the fractions to a common denominator by multiplying the terms of the first by x. Subtract its numerator, then, from that of the minuend, and the result is $\frac{x^2-2x+1}{x^2-x}$; which, when separated into factors is $\frac{(x-1)\ (x-1)}{x\ (x-1)} = \frac{x-1}{x} = 1 - \frac{1}{x}$ by cancelling like terms and dividing.—H. E. his question has been answered.—AMICUS VERITAS (Glasgow), who should have put VERITATIS, will find Entick's Latin Dictionary serve his purpose for a time.—H. B. (London): Spier's French Dictionary is a very good one.—G. (Liverpool): correct.—J. H. (Shelton): Brande's Chemistry or Graham's.—ARITHMOS (Plymouth): the brick 9 inches long, 4½ broad, and 2½ thick, contains 101¼ cubic inches; for $9\times4\frac{1}{2}\times2\frac{1}{2}=101\frac{1}{4}$.—GEORGE AUGUSTUS (Temple): the subject he proposes of inquiry into the meaning of proper names of persons, is both legitimate and interesting; but we doubt whether at the present stage of our progress, it would be acceptable to the majority of our readers, who seem more bent on the acquisition of positively useful knowledge, than upon that of the merely ingenious, entertaining and agreeable. In an old and valuable book, called Cruden's "Concordance to the Holy Scriptures," you will find an explanation of the meaning of all Scripture names, such as *Michael*; which by the way, is one of the names of the Lord Jesus Christ, he being the only *archangel*, or *prince, chief*, and *ruler* of angels. In some editions of Ainsworth's Latin Dictionary, you will find an explanation of non-scriptural names, such as *Robert*, &c. On the subject of surnames, there are also some books extant; the only one we remember at present is Buchanan on "Scottish Surnames;" and the *Lowland Scots* boast of a similar origin to the Saxons, repudiating, in the matter of ancient history, all connexion with the *Gael*.—AIA-KOPTOU (Fulham): Malte-Brun's or Mrs. Somerville's Physical Geography are among the best, and Lyell's Geology.—J. F. S. The one rule is that one noun governs another in the genitive whatever case the former may be in; and the other is that an active verb governs the accusative.

A WARM FRIEND: If he will consult the previous chapter of the prophecies of Jeremiah, he will find that the princes of Judah took offence at the prophet's fidelity, and threw him into prison. Ebed-melech, an Ethiopian servant of Zedekiah, king of Judah, effected his release, and saved him from death by famine. To this pious and humane man, the prophet was sent with a special message from God, and the words to which our friend refers in the close of the thirty-ninth chapter, are to be applied not to Jeremiah, but to Ebed-melech, and are meant to assure him of his personal safety in the midst of public calamity. As to the introduction of the name of NECHO in the questions subjoined to the fourth lesson on Ancient History, it is simply a misprint, for the Apries or Pharaoh-Hophra of the text.

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LESSONS IN PHYSIOLOGY.—No. IX.

MAN.

We go on with our lesson on the nerves. You must keep in mind that the whole nervous system divides itself into distinct classes according to the functions or offices which the nerves have to perform. The following is the simplest arrangement which we can give:—

I. The CEREBRO-SPINAL NERVES, or those which have their root in the spine and the brain, and serve the purpose of sensation and motion. By far the greater number of the nerves which supply the body generally, arise from the spinal marrow, and are possessed of double power. This double power is owing to the subdivision of the nerve into two parts or roots. One root passes to the posterior portion of the spinal cord, and has a ganglion on it. This bestows sensation alone. The other root goes to the anterior portion of that cord. And this gives motion alone.

II. The EXCITO-MOTORY NERVES, or those which pursue their course from internal surfaces to the medulla oblongata or true spine, or that portion of the spinal marrow which in its ascent unites with the brain itself. These nerves are characterised by peculiar excitabilities; and when once excited pursue a reflex course from the medulla oblongata to the particular muscles on which they are designed to act,—the muscles concerned in the taking of food into the stomach, and then in throwing out whatever is not required for the nutrition and building up of the body.

III. The RESPIRATORY NERVES, or those which pass off from this same medulla oblongata, and diverge to different parts of the head, neck, throat, and chest, as the divinely-prepared mechanism for respiration, and to which, as the organ of speech, voice, and expression, man owes so much of his superiority to all other portions of this earthly creation.

IV. The GANGLIONIC OR SYMPATHETIC NERVES, or such as unite in sympathy those organs of the body by which the various organic functions are performed:—such as secretion, absorption, assimilation of the food, and so on.

Now as no animal can be compared with man in the number and range of his faculties, so there is not one which approaches him in the development and perfection of his nervous system. The connexion between this nervous system and the brain is very close; and not less close is the relation between the brain and the mind. The mind becomes conscious of external objects only by the influence which they exert on that part of the brain which is called THE SENSORIUM, from its being the peculiar seat of sensation. An impression is made upon any part of the surface of the body by mechanical contact, by heat, by electricity, or by any other external agent; this impression is conveyed by the nervous system to the sensorium, a certain change takes place in the condition of the brain, and the impression is then said to be felt,—that is to say, the mind becomes conscious of it. Now it is not the impression made on some remote organ of the body by which the mind is influenced, but simply and immediately by the change which has taken place in the brain. This admits of easy proof. Let us sup-

Description of the Engraving.

I. Frontal branch of the fifth nerve of the brain which bestows sensation alone.
II. Superior maxillary, or that branch of the fifth nerve which supplies the upper jaw, and which, like the last, arising from the sensitive root, bestows sensation alone.
III. Mental or inferior maxillary branch of the fifth nerve. This also comes from the sensitive root. It is called mental, because it is involved in that expression which indicates the emotions of the mind.
IV. Temporal branches of the same fifth nerve. They are distributed on the temples, and are for sensation.
V. The only branch of the fifth nerve which arises from the smaller or motor root, and assists in the motion of those muscles which are employed in mastication or chewing.
VI. VII. VIII. IX. These are spinal nerves; the first of the series which come out between the vertebræ, in the whole length of the spine, to supply the body generally with motion and sensation.
A. The facial nerve. It is situated in the front of the ear, and is the motor nerve of the features. It sends branches (*a*) to the muscles of the forehead and eyebrows. Branches (*b*) to the eyelids. Branches (*c*) to the muscles which move the nostrils and upper lip. Branches (*d*) to the lower lip. Branches (*e*) going down to the side of the neck. Connexions (*f*) with the spinal nerves of the neck. A nerve (*g*) to a portion of the muscle that is in the back of the head, and to muscles of the ear.
B. The nervus vagus, or the wandering nerve, so named from its extensive distribution. This is the grand respiratory nerve.
C. The spinal accessory nerve. D. The ninth nerve, which is the motor nerve of the tongue. E. The nerve which supplies the diaphragm.
F. Branch of the sympathetic nerve.
G. A branch of the nervus vagus, which goes to the superior portion of the larynx or windpipe.
H. Another branch of the vagus, which goes to the inferior portion of the larynx.
I. The nerve which goes to the tongue and upper part of the gullet called the pharynx.

pose, as is really the case, that the mind remains perfectly capable of receiving any impression, but that all communication with the brain is cut off. What is the consequence? Let the pressure which is applied to any distant part of the nervous system be what it may, no impression is felt, we have no consciousness of it. For example:—"The surface of the eye—a part so exquisitely sensible, that if a fine hair touches it, there will be severe pain and spasm of the eyelids—may, when the nerve is destroyed, be rudely pressed with the finger, and the patient will nevertheless be unconscious of pain; or, if the surface be inflamed, and it be necessary to scarify it with the point of the lancet, in order to withdraw blood, the patient will submit to the operation without pain, and without even winking, although the eyelids retain their power of closing." It follows from this, that in the process by which the mind is rendered conscious of external objects, there are three distinct steps or stages:—

i. The reception of the impression which is made at the extremity of the nerve of sensation.

ii. The conducting of this impression along the trunk of the nerve to the sensorium or the brain.

iii. The change excited by this impression in the sensorium itself, through which sensation is produced.

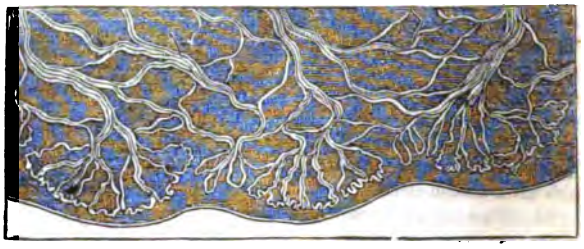
The sensitive extremities of the cerebro-spinal nerves transmit all their impressions to the brain under the form of sensations. "Although we commonly refer our various sensations to the parts at which the impressions are made; as, for instance, when we say that we have a pain in the hand, or an ache in the leg, we really use incorrect language; for though we may refer our sensations to the parts where the impression is first made on the nerves, they are really *felt* in the brain. This is evident from two facts:—first, that if the nervous communication between the part and the brain be interrupted, no impressions, however violent, can make themselves felt; and, second, that if *the trunk* of the nerve be irritated or pinched anywhere in its course, the pain which is felt is referred, not to the point injured, but to the surface to which these nerves are distributed. Hence the well-known fact, that for some time after the amputation of a limb, the patient feels pains which he refers to the fingers or toes that have been removed. This continues until the irritation of the cut extremities of the nervous trunks has subsided."

But while there is this common sensibility which is diffused over the greater part of the body, there are organs of special sense, endowed with the property of receiving impressions peculiar to themselves. These senses are five—touch, taste, smell, sight, and hearing—while the impressions derived from them not only differ from all our other sensations, but differ the one from the other. The sense of touch would never give us the idea or knowledge of those properties which are discovered by taste; nor would the idea of form, shape, or bulk, ever be derived from the sense of smell. The eye would never distinguish sounds, nor would the ear ever discriminate colours. Who would ever think of saying that he hears a beautiful flower, or sees an enchanting sound, or smells a square body, or grasps a disagreeable odour? Each sense has its own nerve, and though "we can acquire a knowledge of the shape and position of objects by the touch, we could form no notion of their colour without sight, of their sounds without hearing, or of their odours without smell." Have, then, these nerves of special sense nothing in common? Are they not all susceptible of impressions inseparable from a feeling of pain? It cannot be denied that any violent or excessive impression may occasion a certain degree of discomfort. For example:—The effect of strong dazzling light, or of any sudden unexpected sound, or of any powerful odour, or of any very decided taste, would be followed by corresponding uneasiness. But mark, this is only a question of degree. These very sensations, in a more or less degree, might afford a certain pleasure or delight, or even in the same degree in a different condition of the body. Our feeling of pleasure or of pain very much depends on the previous condition of the part affected, as also upon the extent of surface on which an impression is made. For example:—If you put one hand in hot water, and the other in cold, and then transfer both to tepid water, this tepid water will seem cool to the one, and warm to the other. The second fact may be proved thus:—Hot water, into which you might introduce a single finger without any unpleasant sensation, would, on plunging the whole hand into it, not only scald the hand, but give you the feeling of pain.

Touch is the most general and the most diffused of our external sensations. It is common to nearly the whole surface of the body; but nowhere is the sensibility so keen or acute as at the end of the fingers. The following cut shows the distribution of the nerves of touch at the extremity of the thumb;

and the human hand, both by reason of being endowed with a larger supply of sensitive fibres, and of its peculiar conformation, is, *par excellence*, the organ of touch. But the sense of touch in the hand would have been of little use without the power of motion. It is in that wondrous variety of movement of which the hand of man is capable, that we see his physical superiority to every other animal. Remember, moreover, that while the greatest sensibility is felt at the extremities of the fingers and in the lips, the least sensibility is in the skin of the trunk, the arm, and the thigh. Besides, it is a question, whether the sense of temperature is not conveyed by a set of fibres altogether distinct from those which minister to the proper sense of touch or resistance.

Taste.—This sense has for its organ that portion of the nervous membrane which covers the tongue and the throat. The nerve which is distributed to this membrane, terminates in little bodies or accumulations called papillæ, or clusters of papillæ, as you see in the cut, which represents the fungus-like papillæ of the tongue.

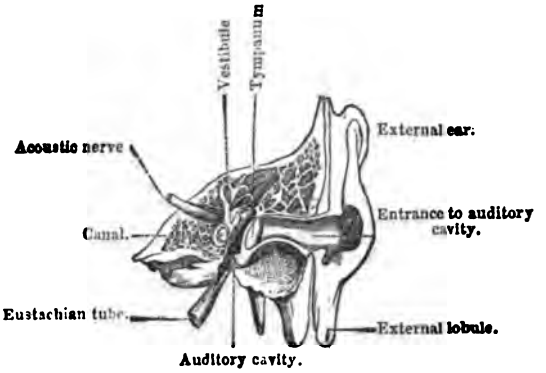


Its chief purpose is to direct animals in their choice of food, and hence the wisdom of placing its organ at the entrance to the digestive canal. The sense of taste is of a much more refined nature than that of touch; but, like that of touch, is excited by direct contact with particular substances. This contact produces either an agreeable or a disagreeable sensation. The savour may be strong, or slight, or insipid, and the impression will correspond. But the impression produced by every substance taken into the mouth, depends as much on smell as on taste. If you take some decidedly aromatic body into the mouth, and press the nostrils close together, you will scarcely be conscious of any taste. Withdraw the pressure from the nostrils, and leave their passage perfectly free, and immediately you become conscious of a certain impression or sensation.

Smell.—If the thousand varieties of savour, may, in relation to the sense of taste, be all resolved into agreeable and disagreeable, then analogous characters pertain to these various odours, which, in relation to the sense of smell, are either pleasant or repugnant. This sense of smell depends upon the diffusion of the particles of the substance through the surrounding air, in a state of extreme minuteness. These particles proceeding or flying off from larger bodies, take on a certain degree of volatility, and coming into contact with the mucous membrane which lines the nasal cavities, and in which the olfactory nerve is distributed, we become conscious of a corresponding sensation. The atmospheric air, in its passage through the nostrils, is, during inspiration, the vehicle of those odorous particles into the olfactory organ, and by coming into immediate contact with its mucous membrane, informs the animal of the presence, at a greater or less distance, of the bodies which are the source of these odours. In proportion to the extent of this membraneous surface, is the acuteness of the sense. In this respect man is far surpassed by many of the lower animals.

Hearing.—The ear presents a very beautiful, but very complicated apparatus. With the form and the situation of the external ear you are already familiar. The apparatus more properly consists of the tympanum or drum, with its membrane and chain of bones; and which is adapted to direct itself, more or less com-

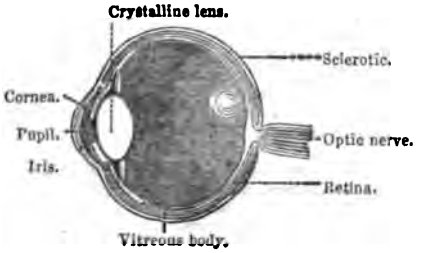
pletely, towards the point from which the sound proceeds, so as to give it a certain degree of preparatory concentration. The tympanum is situated between the external ear, and the membrane which covers the entrance to the real auditory cavity, and is designed to receive the sonorous vibrations from the air, and transmit them to



Auditory cavity.

that membrane. Beyond the membrane is this auditory cavity, which is filled with the air which it receives through the Eustachian tube; and behind this cavity, and opposite to the membrane of the tympanum, is a membrane of the same kind with two apertures, the one oval, and the other round, and these two membranes are united by a chain of little bones. The vibrations produced in the membrane of the tympanum, are transmitted to the membrane with the oval aperture by means of this little chain of bones, from the air contained within the osseous walls of the cavity. This cavity, again, is in communication with the vestibule, which borders upon a system of semicircular canals, which together form the labyrinth or internal ear. These canals contain a watery liquid, into which the fibres of the auditory nerve plunge. The vibrations of the membrane with its apertures are transmitted hither; and the nerve conveying these impressions to the brain, we have the sensation of hearing.

SIGHT.—The eye, as the organ of vision, is made up of an assemblage of parts even more complex than those of the ear. It is an optical instrument of wonderful completeness. This beautiful instrument presents the form and appearance of a globe, and consists of a spheroidal envelope—THE SCLEROTIC—which offers to its anterior part, a transparent circular segment—THE CORNEA—for



the passage of the rays of light,—and to its posterior portion, a round opening for the introduction of the optic nerve, which at once developes itself in a nervous membrane—THE RETINA—doubling within the sclerotic in a manner to curtain three-fourths of the posterior of the spheroidal cavity of the globe. It is upon this nervous expansion that the luminous rays fall, and penetrating through it, terminate upon an absorbent membrane, impregnated with a black matter. This membrane is named THE CHOROID, and is that coat which is found immediately under the sclerotic. At the level of the union of the cornea with the sclerotic, the cavity of the eye is separated into two parts by a moveable, vertical, and diversely-coloured partition—THE IRIS—which is pierced in the centre by a round opening—THE PUPIL. The anterior parts of the cavity of the eye is filled by a transparent liquid—THE AQUEOUS HUMOUR. The posterior part contains THE CRYSTALLINE LENS; situated behind the iris, enclosed in a concavity of the vitreous body, which is a transparent mass made up of little cells full of watery liquid, and this liquid fills all the posterior cavity, even to immediate contact with the retina.

Through the various transparent media of the cornea, the aqueous humour, the crystalline lens, and the vitreous body, the rays of light which diverge from the several points of any object, must pass to reach the retina. Falling upon the front of the cornea, they are refracted by its convex surface, while passing through it into the eye. Here they slightly converge; but are brought more closely together by the crystalline lens, which they reach after passing through the pupil. The refracting influence of the lens, together with that produced by the aqueous humour, is such as to bring these rays to a focus on the retina, where is formed a complete inverted image of the object. Then to prevent the light that forms the picture from being reflected from one part of the interior of the globe to another, which would mar and confuse the picture, the retina, which is almost transparent, is spread over the layer of black pigment which lines the choroid coat, and is designed to absorb the rays as soon as they have passed through the retina. The impression of the image is then transmitted by the optic nerve to the brain, and we become conscious of a certain sensation.

According to Sir Charles Bell's theory and arrangement, the distribution of the nerves to the face and neck is seen in the figure p. 353. An arrangement this which again proclaims the infinite skill and love of Him whose hands fashioned our wondrous frame, and in whom we live, and move, and have our being.

QUESTIONS FOR EXAMINATION.

What do you mean by the cerebro-spinal nerves?
Can you describe the character of the excito-motory nerves?
What is the office of the respiratory and sympathetic nerves?
Explain the connexion between the nerves and the brain.
Prove that our sensations are owing to a certain change in the brain itself.
Which are the organs of special sense?
Which is the grand distinguishing organ of touch in man?
Describe how we get our impression of objects by the sense of sight.
How are the rays of light kept from being reflected from one part of the globe of the eye to another?
Where are the nerves of voice and expression distributed?
To whom are we indebted for this discovery?
Is there any animal which approaches man in the development and perfection of his nervous system?
What feelings should this awaken in us towards the great Creator?

LESSONS IN LATIN.—No. XXI.

By JOHN R. BEARD, D.D.

REGULAR VERBS.

THE SECOND CONJUGATION.

ACTIVE VOICE.

EXAMPLE.—Moneo 2, *I remind.*

Chief Parts; moneo, monui, monĭtum, monére.

Characteristic letter, E long.

THE corresponding parts and signs having been given under the first conjugation, need not be repeated; in the Latin, the student will easily make the alterations required by the difference of conjugation, and the English is unaffected by conjugation.

MOODS, TENSES, &c. OF MONEO, *I remind.*

		Indicative.	*Subjunctive.*	*Imperative.*	*Infinitive.*	*Participle.*
PRESENT.	*Sing.*	moneo	moneam			
		mones	moneas	mone or mon-	monére	monens
		monet	moneat	monĭto [ĕto		
	Plural.	monémus	moneámus	monéte or mone-		
		monétis	moneátis [tóte			
		monent	moneant	monénto		
IMPERFECT.	*Sing.*	monébam	monérem			
		monébas	monéres			
		monébat	monéret			
	Plural.	monébamus	monerémus			
		monébatis	moneréris			
		monébant	monérent			
I. FUTURE.	*Sing.*	monébo			monĭturus	
		monébis			[esse	monĭturus
		monébit				
	Plural.	monébimus				
		monébitis				
		monébunt				

		Indicative.	*Subjunctive.*	*Infinitive.*	*Participle.*
Perfect.	*Sing.*	monui	monuerim	monuisse	
		monuisti	monueris		
		monuit	monuerit		
	Plural.	monuimus	monuerimus		
		monuistis	monueritis		
		monuerunt	monuerint		
Pluperfect.	*Sing.*	monueram			
		monueras			
		monuerat			
	Plural.	monuerâmus			
		monuerâtis			
		monuerant			
II. Future.	*Sing.*	monuero			
		monueris			
		monuerit			
	Plural.	monuerimus			
		monueritis			
		monuerint			

Gerunds. Gen. Monendi; Dat. Monendo; Acc. Monendum; Abl. Monendo

Supines. 1. Monitum; 2. Monitu

Exercises:—Like moneo form doceo, *I teach*; and habeo, *I have*.

Vocabulary.

Exerceo 2, *I exercise*; gaudeo 2, *I rejoice*; gaudeo quod, *I rejoice that*; valeo 2, *I am well*; pareo 2, *I obey*; placeo 2, *I please*; displiceo 2, *I displease*; oblivio, ónis, f. *forgetfulness*; deleo 2, *I blot out*; floreo 2, *I flourish*; probe, *honestly, properly*; taceo 2, *I am silent* (E. R. *tacit*); repente, adv. *suddenly*; aditus, ûs, m. *access, entrance* (E. R. *an adit*); pateo 2, *I lie open, I am open*; timeo 2, *I fear* (E. R. *timid*); noceo 2, *I injure*; venio 4, *I come*; occido 3, *I fall, die*.

☞ Observe that, occasionally, forms of other conjugations, &c., than the one immediately under treatment, are introduced with a view to keep up the student's attention, exercise his ingenuity, and test his progress.

Rule.—After verbs expressive of fear, *ne* is used with the subjunctive of the following verb. Ne is, in Latin, a negative, and may be often rendered by *lest*; it may, however, in construing into English, be altogether dropped, the ordinary connecting particle *that*, or that not, being put between the two verbs; e. g.,—

Timeo ne tibi displiceam,
I fear lest I should displease thee; that is,
I fear displeasing thee.

In this case, the second verb may be considered as the object of the first, as is seen in the second rendering, which is equivalent to *I fear to displease thee*. The force may be more clearly seen if the meaning is put into other words. Plainly the import of the sentence is, *I wish not to displease thee*. Take another example:—

Metuo ne Cæsar vincat,
I fear Cæsar may conquer; or,
I wish Cæsar may not conquer.

After verbs of fearing, *ut* is also employed, but with an import the reverse of that which is given by *ne*; e. g.,—

Metuo ut Cæsar vincat.
I fear that Cæsar may not *conquer*; or,
I wish Cæsar may conquer.

Hence, you see, that in putting similar sentences into English, you must drop the negative where it is found in the Latin, and use it where it is not found in the Latin.

Exercises.—Latin-English.

Exerceo; exercebam; exercebat; exercebo; gaudeo quod tu vales; præceptor gaudebat quod vos ejus præceptis parebatis; tibi placebas, aliis displicebas; virtutis honorem nulla oblivio delebit; exercui; Græcia omnibus artibus floruit; laudo vos quod mentes vestras studio probe exercuistis; cur tacuistis? Tacuit puer reperte; tacebat mater; tacent omnes; nisi virtutis præceptis, paruerîtis, aditus in cœlum vobis non patebit; si cupiditates tuas coercueris, beatus eris; curo ut pueri mores emendem et corpus exerceam; moneo vos ut patris præcepta observetis; timebam ne vobis displicerem; cura ut pueri mores emendes et corpus exerceas; timebam ne inimícus mihi noceret; timuit puer ne tacuerît mater; curabam ut pueri mores emendarem et corpus exercerem; curabam ut pueri mores emendares et corpus exerceres; curabam ut præceptor pueri mores emendaret et corpus exerceret; timeo ut venias; timet marítus ne uxor occidat; timuit præceptor ne discipulus ejus verbis pareret; malus puer timet ut veniat præceptor.

English-Latin.

He reminded me; they reminded the king; I might remind you; you might remind me; they have reminded the boy; thou wast reminding the woman; I will remind the teacher; be silent; do you be silent; let them be silent; the woman was suddenly silent; take care to improve; that thou improvest the morals of the citizens; I fear he may displease thee; the boys feared to displease their father; he pleases all (persons); a good man will displease the bad; why art thou silent? they fear that Cæsar will conquer their country; good sisters fear (their) brothers will not be well; art thou well? I fear thou wilt not be well; if thou exercisest thy body thou wilt be well; my mother fears an entrance into heaven will (may) not lie open to me.

In reply to some inquiring correspondents, the following information is added to the subject of nouns:—

The names of the cases in Latin are of Greek origin, as is the term case (ptosis, *fall*) itself. The nominative is so called because it assigns the name (*nomen*) of the agent; the genitive denotes the relation of genus, origin or birth, that out of which a thing arises, and to which therefore it belongs; the accusative points out that which is caused (*causa*) or effected, that which receives the action implied in the verb, the result of that action, the object or thing on which the action falls; the dative case is the giving (do, dare, dedi, datum, *to give*) case, signifying the person (or thing) to which something is given or assigned; the vocative (voco, *I call*) is the case of calling on or addressing; and the ablative (ablatus, *taken from*) bears the name because it involves the idea of separation. In the Greek there is no ablative, the relations implied in that case being expressed partly by the genitive, partly by the dative.

LESSONS IN GEOMETRY.—No. X.

LECTURES ON EUCLID.

Definitions. Book I. From VIII. to XII. inclusive.

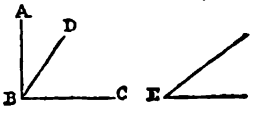
VIII.

[*A plane angle is the inclination of two lines to one another in a plane, which meet together, but are not in the same direction.*] This definition is put in brackets, as useless, and unnecessary to be remembered.

IX.

A plane rectilineal angle is the inclination of two straight lines to one another, which meet together, but are not in the same straight line. When two straight lines meet at a point, so that if produced they would intersect (cross) each other, the indefinite space between them is called an angle.

N.B. "When several angles are at one point B, any one of them is expressed by three letters, of which the letter that is at the vertex of the angle, that is, at the point in which the straight lines that contain the angle meet one another, is put between the other two letters, and one of these two is somewhere upon one of those straight lines, and the other upon the other straight line: thus the angle which is contained by the straight lines, A B, C B, is named the angle A B C, or C B A; that which is contained by A B, D B, is named the angle A B D, or D B A; and that which is contained by D B, C B, is called the angle D B C, or C B D; but, if there be only one angle at a point, it may be expressed by a letter placed at that point; as the angle at E." This explanation is put in inverted commas, as being Dr. Simson's addition; it is very necessary to be remembered.



X.

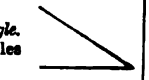
When a straight line standing on another straight line makes the adjacent angles equal to one another, each of these angles is called a right angle; and the straight line which stands on the other is called a perpendicular to it. By borrowing the terms vertical and horizontal from the language of Physics, we may define a right angle to be that which is formed by the meeting of a vertical and horizontal line.

XI.

An obtuse angle is that which is greater than a right angle.

XII.

An acute angle is that which is less than a right angle. The term oblique angles is applied both to obtuse angles and to acute angles.



On the eighth definition, Dr. Simson remarks that it seems he who made it, intended that it should comprehend not only a plane angle contained by *two straight lines*, but likewise the angle which some conceive to be made by *a straight line and a curve*, or by *two curve lines* which meet one another in a plane. Now, though the words, *in the same direction*, are easily understood when applied to two straight lines, it does not appear clearly what ought to be understood by them, when applied to a straight line and a curve, or to two curve lines. Besides, all the angles that are considered and treated of in the Elements of Geometry, are those made by straight lines only; and, therefore, the definition and consideration of such other angles as are above described, is wholly unnecessary and uncalled for. It may be further remarked, that as the doctrine of curves belongs to the Higher Geometry, sometimes called Transcendental, it is plain that the consideration of curvilinear or mixtilinear angles must be deferred until the student has made himself master of the Elements of Euclid. Dr. Simson seems to imply, in the preceding observation, that this eighth definition is not Euclid's, although found in the Greek text; indeed, he asserts, in another place, that it is the addition of "some less skilful editor;" by this, he evidently means an editor less skilful than the author; but wherever any error is found in the Greek text, Dr. Simson never admits that it is Euclid's error, for Euclid is his hero; but always throws the blame upon his editors.

The ninth definition is one of very great importance to the student, as upon the right understanding of what an angle really is, all his future progress in Geometry depends. Various modes have been proposed in order to convey the idea of an angle clearly to the mind by words; but, at first, it is always surrounded with a haze of indistinctness, whatever words may be employed. An angle (or a rectilineal angle) is sometimes said to be the degree of *opening* or *divergence* of two straight lines which meet one another. This definition plainly implies that the lines have been at first shut together, or coincident with each other, and that they have been separated at one end, while they were kept together at the other. Hence, Dr. Thomson throws himself at once upon this idea, and says, "a clear idea of the nature of an angle is obtained by gradually opening a carpenter's rule or a pair of compasses; as the angle made by the parts of the rule or the legs of the compasses, will become greater as the opening widens." This illustration will do very well for a class, if the members, while listening to the lecturer, do not imitate the operation of the compasses with their mouths, that is, in plain English, do not yawn over it, as they are very apt to do. In an edition of Euclid's Elements, formerly referred to, and which we shall in future call the Gower-street edition, the editor plunges at once into the idea of an angle generated by motion, and endeavours to enlarge our conception of an angle to a degree far beyond that contemplated by Euclid. He very truly says that "*angles* might not improperly be considered as a fourth species of magnitude;" the other three species being *lines*, *surfaces*, and *solids*. "Angular magnitude evidently consists of parts, and must therefore be admitted to be a species of quantity. The student must not suppose that the magnitude of an angle is affected by," or depends upon "the length of the straight lines which include it," or by which it is formed, "and of whose mutual divergence it is the measure. These" straight "lines, which are called the *sides* or the *legs* of the angle, are supposed to be of indefinite length. To illustrate the nature of angular magnitude, we shall recur to motion." This illustration, which is given by many editors, consists in supposing a straight line to be fixed at one end, and extended indefinitely in one given direction; it is then supposed to leave this initial, or first position, and to revolve round its fixed extremity in the same plane; as it revolves, the indefinite space between its initial position and every successive position, constitutes an angle; and this angle increases in magnitude from zero, or nothing, to an entire revolution; it may also be stopped at any point in the course of this revolution, it may be carried to any point beyond this revolution, or it may be made to perform any number of revolutions from the same point, or from one point to another, and in all these cases it will generate what is called an angle. Hence, an angle may consist of any part of such revolution, a whole revolution, a whole revolution and part of a revolution, any number of revolutions, or any number of revolutions and a part of a revolution. This idea of an angle was certainly not contemplated in the Elements of Euclid. It is even asserted that no angle greater than half of such a revolution was considered or contemplated by him. To this, we demur; for we think there are traces in the third book of his having taken into consideration angles which are greater than those formed by half a revolution, as well as those which are formed by less than half a revolution. With the idea of revolution in our hands, we can give very easy explanations of some subsequent definitions: thus, a right angle is one-fourth of an entire revolution; an acute angle is less, and an obtuse angle greater than this quantity. Two right angles are half of an entire revolution; three right angles, three-fourths of an entire revolution; and four right angles, an entire revolution.

Useful, however, as the idea of revolution is, in thus explaining the nature of angles, it is foreign to geometry, and not strictly admissible into a logical treatise. The reason of this is evident; it is only physical or natural objects that can be put in motion; and therefore motion belongs to Natural Philosophy and not to Geometry. A straight line is not a physical object, but a mental or ideal object, and therefore it cannot be put in motion; it may nevertheless be conceived to be put in motion; but this would require a new *postulate* in geometry; and this postulate being admitted, new postulates would be required at every step, in order to carry on the reasoning. Euclid foresaw this, and therefore excluded motion as much as possible from his Elements. It is true that the idea of revolution occurs in the definitions of the twelfth Book; but there its introduction is of less importance, seeing that he has so firmly established the principles of geometry in the preceding books; and it is admitted that the first six books are more logically reasoned and elegantly demonstrated than the subsequent books.

We cannot avoid calling the attention of the student most particularly to the N.B. or *Nota Bene* (that is, "mark well") added by Dr. Simson. It is plain that when two straight lines drawn in different directions, meet at any point in a plane they form, according to the usual interpretation of Euclid's definition, only one angle at that point; and therefore only one letter is necessary to be placed at that point in order to enable us to speak of that angle or to describe it. But when three straight lines drawn in different directions meet at any one point in a plane, they form at least three different angles, according to the usual interpretation of Euclid's definition; and, therefore, more letters than one are necessary to distinguish these three angles from one another. Now, if besides the point where the two straight lines forming any angle meet, which is called *the vertex of the angle*, two other points be taken, one on each of these straight lines or legs of the angle, at any convenient distance from the vertex, and letters be put at these three points, we shall be enabled to speak of that one angle individually without confusing the mind with the other two angles. And in order that the nature of the angular space may be clearly presented to the mind's eye by the language employed, *the letter at the vertex of the angle* is always placed in the middle *between the other two letters*, and the three letters are then read in succession, *not as a word*, but as letters of the alphabet. Thus, in the diagram above, the three straight lines A B (*a-bee*), D B (*dee-bee*), and C B (*see-bee*) meet in the same point or common vertex B, and form the three angles A B D (*a-bee-dee*), D B C (*dee-bee-see*), and A B C (*a-bee-see*); or, which is the same thing, the three angles D B A (*dee-bee-a*), C B D (*see-bee-dee*), and C B A (*see-bee-a*); where the B, the letter at the vertex in each angle, is carefully preserved *in the middle between the other two letters*; so that it is quite immaterial to the sense, whether you begin to name an angle by the letter on the one leg, or the letter on the other leg, provided you keep the letter at the vertex in the middle between them. The utility

of observing this rule most pointedly, will be more clearly seen when we come to speak of the angles of a triangle. We are the more impressed with the necessity of enforcing these observations on the attention of our students, because we know how much their future progress really does depend on it. We have had pupils in a large class, who have read, studied, and repeated the demonstrations of Euclid before the class, in such a manner that no one could detect an error in their lesson, whether they were delivered in writing, or *viod voce* (by the mouth), and yet it was afterwards discovered that they knew no more of Euclid, or of what they had uttered or written, than the babe unborn. We have seen such persons most laboriously striving and racking their brains to no purpose, in order to remember the exact words of Euclid, and the precise order of the letters used in speaking of the angles, without caring one straw to understand the meaning—the real meaning of the demonstrations in which they occurred. And when we have offered to explain the matter to some, we have been repulsed, as if we thought them deficient in common understanding—which was in fact invariably the case. We do not mean, however, that their deficiency arose from actual inability to comprehend the meaning of the demonstration, but from their pride of understanding, and their indocility or unwillingness to be taught by one that knew better than themselves, and one that was appointed to teach them. This obstinacy and pride we have often witnessed in colleges where better things were to be expected; and we have wondered whether those who showed such a degree of indocility themselves were fitted to teach others, and especially in doctrines of more lasting importance than those of Euclid. We strongly advise our students to lay aside this haughtiness of mind, this absurd pride of understanding, so natural to man, and to study with all humility and lowliness of mind, if they wish to acquire a real knowledge of science, and especially of the exact sciences, by which we mean the mathematical, as defined in the extract from Lord Bacon, p. 11, No. 1. But, indeed, this humility of spirit is necessary to every learner, let the subject be what it may; and in no case is it more needful, than in the study of the doctrines of our holy religion.

But to return from this digression, it seems strange that we cannot obtain a definition of *one* right angle without bringing in the consideration of *two* right angles, yet such is the case in the tenth definition of Euclid. We have endeavoured to supply this deficiency by borrowing the physical terms vertical and horizontal, but these themselves require explanation. To explain the term vertical we may say that this is the position which a plumb-line takes when held up above the surface of the earth, and yet this would not, even physically speaking, be strictly true; for it is well known that the attraction of large masses on the earth's surface have an influence on the plumb-line so as to deflect it, or draw it away, from the true vertical position. From the experiments of Dr. Maskelyne, made on the mountain Schehalien, in Scotland, it was ascertained that the attraction of that mountain caused the plumb-line to deflect from its true position no less than five seconds and eight-tenths of a second, or about the two hundred and twenty-three thousandth part of an entire revolution round the point by which it was suspended. To explain the term horizontal, we may say that this is the position which stagnant water assumes when left free in a vessel, pond, or lake on the surface of the earth; or rather it is the straight line joining two points in the opposite edges of the surface of such a piece of water, supposing that capillary attraction is not in operation on the edges of this surface. Thus we see that if physical terms are brought in to explain geometrical ones, we are obliged to hem them in, and surround them with explanations in such a manner as to make them lose all their force as definitions. Returning, therefore, to abstract ideas, let us see if we cannot reach the definition of one right angle without calling in the idea of two right angles. Perhaps the following might answer some minds. If two straight lines meet each other in a point, and the one stands on the other *precisely mid-way* between the position of complete coincidence and the greatest degree of divergence or separation, they form a right angle. If any of our students or readers can improve upon this mode of explaining a right angle without introducing the idea of two right angles, as Euclid does, we shall be glad to insert it in our pages.

LESSONS IN FRENCH.—No. XXII.

By Professor Louis Fasquelle, LL.D.

Section XLVI.

1. In the compound tenses of the verb s'en aller, *to go away* [Sect. 39. 1, 2], the pronoun *en* will of course keep its general place, after the other pronouns and *before* the auxiliary. It must never come between the auxiliary and the participle:—

Je m'en suis allé,	*I went away;*	Nous nous en sommes allés,	*We went away,*
Tu t'en es allé,	*Thou wentest away;*	Vous vous en êtes allés,	*You went away;*
Il s'en est allé,	*He went away;*	Ils s'en sont allés,	*They went away.*
Les dames s'en sont allées.		*The ladies are gone away.*	
Les messieurs s'en sont allés.		*The gentlemen are gone away.*	

2. The verb aller when referring to articles of dress answers to the English *to fit, to sit*:—

Mon habit va bien.	*My coat fits or sits well.*

3. Seoir [4 ir. *see* table § 62] answers to the English *to suit, to become*:—

Ce chapeau ne vous sied point.	*That hat does not become you.*

4. Essayer (§ 49) corresponds in signification to the English *to try on*:—

J'ai essayé mon gilet, il me va bien.	*I have tried my waistcoat, it fits me well.*

5. Etre is often used in French for appartenir, *to belong* [§ 106 (3)]:—

A qui est cette maison.	*To whom does that house belong? Whose house is that?*
Elle est à mon cousin.	*It is my cousin's.*

Résumé of Examples.

A quelle heure vous en êtes vous allé?	*At what hour did you go away?*
Je m'en suis allé à neuf heures.	*I went away at nine o'clock.*
Vous en êtes vous allées trop tôt, Mesdames?	*Did you go away too soon, ladies?*
Nous nous en sommes allées trop tard.	*We went away too late.*
Cette robe vous va-t-elle bien?	*Does that dress fit you well?*
Elle ne me va pas bien	*It does not fit me well.*
Cet habit vous sied il fort bien?	*Does that coat become you very well?*
Je l'ai essayé, mais il ne va pas bien.	*I have tried it on, but it does not fit me.*
Il lui va bien (régime indirect).	*It fits him well.*
Il me gêne, il me serre trop.	*It hurts me, it presses me too much.*
Cette robe ne lui va pas bien.	*That dress does not fit her well.*
Ces livres sont ils à vous ou à moi?	*Are those books yours or mine?*
Ils ne sont ni à moi ni à vous.	*They belong neither to me nor to you.*
A qui sont ils donc?	*Whose are they then?*
Les livres de qui, avez vous apportés?	*Whose books have you brought?*
J'ai apporté ceux de mon frère.	*I have brought my brother's.*

Exercise 91.

Beau-frère, m. *brother-in-law;*	Foncé, e, *dark;*	Neuf, ve, *new;*
Botte, f. *boot,*	Gên-er, 1. *to hurt, to press;*	Où, *where;*
Clair, e, *light;*	Gilet, m. *waistcoat;*	Serr-er, 1. *to press;*
Court, e, *short;*	Large, *wide;*	Ten-ir, 2 ir. *to hold;*
Etroit, e, *narrow, tight;*	Mieux, *better;*	Vers, *towards, about.*

1. Vos bottes ne vont elles pas bien? 2. Elles ne me vont pas bien, elles me serrent trop. 3. Sont elles trop étroites? 4. Elles sont trop étroites et trop courtes, elles me gênent. 5. Le cordonnier s'en est il allé? 6. Il ne s'en est pas encore allé. 7. A quelle heure les compagnes de votre sœur s'en sont elles allées? 8. Elles s'en sont allées vers six heures de l'après-midi. 9. L'habit que vous tenez, est il à vous ou à votre frère? 10. Il n'est ni à lui ni à moi, il est à mon beau-frère. 11. Lui va-t-il bien? 12. Il lui va fort bien, et il lui sied bien. 13. Où l'a-t-il fait faire? 14. Il l'a fait faire en France ou en Allemagne. 15. A qui sont les livres que lit Mademoiselle votre sœur? 16. Ils sont à moi. 17. Votre gilet va-t-il mieux que celui de votre beau-frère? 18. Il me va beaucoup mieux. 19. Votre habit ne vous géne-t-il pas? 20. Il ne saurait (*cannot*) me gêner, il est de beaucoup trop large. 21. Avez vous essayé votre habit neuf? 22. Je l'ai essayé, mais la couleur

ne me sied pas. 23. Est elle trop claire? 24. Elle est trop foncée. 25. Les couleurs foncées ne me siéent jamais.

Exercise 92.

1. Are your friends gone away? 2. They are not yet gone away, they are still here. 3. At what hour did your mother go away? 4. She went away early this morning. 5. Did your little sister go away late? 6. She went away too soon. 7. Does your sister's new dress become her? 8. It does not become her. 9. Why does it not become her? 10. Dark colours never become her. 11. Do light colours become your brother's wife? 12. They become her very well. 13. Are your new boots too narrow or too wide? 14. They are neither too narrow nor too wide, they fit very well. 15. Does your brother's waistcoat fit him? 16. It fits him, but it does not become him. 17. Light colours never become him. 18. Does your coat press you? 19. It does not press me, it is by far too wide. 20. Whose house is that? 21. It is my father's and brother's. 22. Whose books have you brought this morning? 23. I have brought my brother's and my sister's. 24. Whose dresses are those? 25. They are my mother's, my sister's, and my cousin's. 26. Are not those German book yours? 27. They are not mine, they are my friend's. 28. Are those pens yours or mine? 29. They are neither yours nor mine, they are my brother's. 30. Does this hat fit you? 31. Yes, Sir, it fits me, but it does not become me. 32. Is your hat too small? 33. It is too large (*grand*). 34. Are your gloves too large? 35. They are too small, I cannot put them on.

Section XLVII.

1. The verb falloir [3 ir.], *to be necessary*, is always conjugated unipersonally. See table, § 62.

Il faut, il a fallu.	*It is necessary, it was or has been necessary.*
Il faut étudier tous les jours.	*It is necessary to study every day.*

2. As *falloir* has always a unipersonal pronoun for its nominative or subject, a pronoun in the indirect regimen (dative—me, te, lui, nous, vous, leur), placed before the verb, will be equivalent to the pronoun used as nominative to the English verbs *must, to be obliged*, &c.:—

Il me faut écrire un thême.	*I must write an exercise.*
Où nous faut il aller?	*Where must we go?*

3. Falloir is used in the signification of *to want, to need, to be under the necessity of having*:—

Il me faut un livre.	*I need a book.*
Il lui faut de l'argent.	*He is in want of money.*

4. When *must* is used in the last acceptation, and has a noun as its nominative, the noun in the corresponding French sentence should be in the indirect regimen preceded by à:—

Il faut un livre à ma sœur.	*My sister must have a book (needs a book).*

Résumé of Examples.

Pour apprendre une langue il faut étudier.	*To learn a language it is necessary to study.*
Il faut aller à l'église et à l'école.	*It is necessary to go to church and to school.*
Il faut rester à la maison.	*It is necessary to remain at home.*
Il me faut lire un bon livre.*	*I must read a good book.*
Il lui faut aller voir sa mère.	*She must go and see her mother.*
Que nous faut-il faire?	*What must we do?*
Que leur faut-il lire?	*What must they read?*
Que leur faut-il?	*What do they want* or *need?*
Il leur faut de l'argent ou du crédit.	*They need* or *must have money or credit.*
Vous faut-il cinquante francs?	*Do you want* or *must you have fifty francs?*
Il me faut cinquante-cinq francs?	*I must have* or *I need fifty-five francs.*
Combien d'argent faut-il à votre père.	*How much money does your father want?*
Il lui en faut beaucoup.	*He wants much (of it).*
Nous avons ce qu'il [R. 3] nous faut.	*We have what we want.*

Exercise 93.

Aller trouver, *to go to a person*;	Centime, m. *100th part of a franc*	Combien, *how much, how many?*
Chirurgien, m. *surgeon*;	Davantage, *more*;	Fin-ir, 2. *to finish*;
Désir-er, 1. *to wish, to desire*;	Dette, f. *debt*;	Fort, *very, very much*;
Envoy-er, 1 ir. [§ 49 (2)], *to send*;	Modiste, *milliner*;	Ouvrage, m. *work*;
Payer, 1. pec. [§ 49 (2)], *to pay*;	Peine, f. *trouble*;	Quand, *when.*

1. Que faut il faire aujourd'hui? 2. Aujourd'hui il faut travailler. 3. A-t-il fallu travailler fort pour finir l'ouvrage à temps? 4. Il a fallu travailler toute la journée. 5. Quand faut il écrire à notre ami? 6. Il faut lui écrire aujourd'hui. 7. Me faut il aller trouver mon père? 8. Il vous faut aller le trouver, il désire vous parler. 9. A-t-il besoin de quelque chose? 10. Il lui faut des livres, des plumes, et de l'encre. 11. Ne lui faut il pas aussi de l'argent? 12. Il lui en faut beaucoup pour payer ses dettes. 13. Vous faut encore quelque chose? 14. Il ne me faut plus rien, j'ai tout ce qu'il me faut. 15. Ne faut il pas du papier à votre sœur? 16. Il ne lui en faut pas davantage.* 17. Que faut il envoyer au chirurgien? 18. Il faut lui envoyer de l'argent, il en a grand besoin. 19. La modiste a-t-elle tout ce qu'il lui faut? 20. Elle n'a pas tout ce qu'il lui faut. 21. Combien vous faut il? 22. Il me faut cinq francs. 23. Ne vous faut il pas davantage? 24. Il ne me faut pas davantage. 25. Que lui faut il pour sa peine? 26. Il demande un franc vingt-cinq centimes.

Exercise 94.

1. What must we do? 2. You must bring your book and learn your lesson. 3. Is it necessary to write to your brother to-day? 4. It is not necessary to write to him. 5. Has it been necessary to speak to your father? 6. It has been necessary to speak to him. 7. Is it necessary to go to D. to-day? 8. It is necessary to go there (*y*). 9. Must I go to your sister? 10. You must go to her, she wishes to speak to you. 11. How much money must your brother have? 12. He must have ten francs fifty centimes. 13. How many books does your sister want? 14. She must have many books, she reads (*lit*) much. 15. What will you send to the surgeon? 16. We must send him our horse; his own (*le sien*) is sick. 17. Must he not have paper? 18. He must have some; he has letters to write. 19. Must he have much? 20. He must have a quire (*main*, f.). 21. Do you want anything more? (*See No.* 13, *in the French exercise above.*) 22. I need something more. 23. I need nothing more. 24. Must you have one hundred francs? 25. I must have ten dollars. 26. What does the surgeon want? 27. He must have money to (*pour*) pay his debts. 28. Has the tailor all that he wants? 29. He has not all that he wants. 30. The milliner has received all that she wants. 31. What must you have for your trouble? 32. How much do you want? 33. How much do we want? 34. What must I do? 35. You must write a letter. 36. What must she write? 37. She must write four pages. 38. She must go to church.

* Another construction of these sentences will be found Section 21. 1, 2.

LESSONS IN ARCHITECTURE.—No. V.

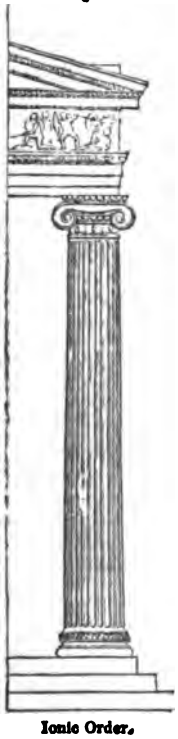
The temple of Apollo Panionius, in Ionia, was built according to the Doric style; but the Ionians dissatisfied with the simplicity of this order, invented another of a more delicate character, and called it the Ionic order, after the name of their country. They made the height of the column in this order greater in proportion to its diameter than in the Doric order; the form of the capital was totally different, having large volutes at its corners, of which the spiral is often very finely sculptured; the entablature was changed in its parts and proportions; and a base was added to the bottom of the column, in harmony with its capital (see fig. 14.) Of the origin of this order of architecture we have no distinct account. Vitruvius states, that as the Doric order was considered strong and masculine like the form of Hercules, the Ionians modelled their new order according to the elegance and delicacy of the female figure, and that the volutes were taken from the curls of the hair on each side of the face. It is not easy to conceive how the proportions of a Greek order of architecture could be borrowed from that of the human figure, to which it has so little natural resemblance; and it has been ingeniously remarked that it is more natural to trace the form of the volute in the Ionic order, to the curling of the bark of a rude upright

* This adverb can never be placed before a substantive.

post, crushed by a superincumbent weight greater than it could bear. In this order, continued subjects began to appear on the frieze, which in the Doric were considered the exception to the rule. The cornice of the entablature was also enriched with exquisite mouldings, and decorated with sculptured ornaments.

The edifices constructed after the Ionic order were numerous and magnificent: such as the temples of Bacchus, at Teos; Apollo, at Miletus; Minerva, at Priene and Tegea; and of Diana, at Magnesia and Ephesus. This order was also employed in the construction of the Erectheum, or the temples of Minerva Polias and Pandrosus, in the Acropolis at Athens; of the Delphic Apollo and of Æsculapius, in the same city; and in that of Juno, in Attica. The temple of Diana, at Ephesus, was justly deemed one of the seven wonders of the world. The architect who traced the plan of this temple was Ctesiphon, who flourished about 540 B.C., and it was partly executed under his direction and that of his son Metagenes; but it was completed by other architects, who worked upon it after these, for the space of more than two centuries. Vitruvius says that the form of this temple was *dipterick* (two-winged),—that is, surrounded with two rows of columns in the form of a double portico. It was about 426 feet long, and 216 broad. In this temple there were a hundred and twenty-seven columns of marble each sixty feet high, given by as many kings! Thirty-six of these columns were carved by the most excellent artists of their times. Scopas, one of the most celebrated sculptors of Greece, executed one which was the finest ornament of this magnificent structure. All Asia had contributed with incredible ardour to the erection and decoration of this temple.

Fig. 14.



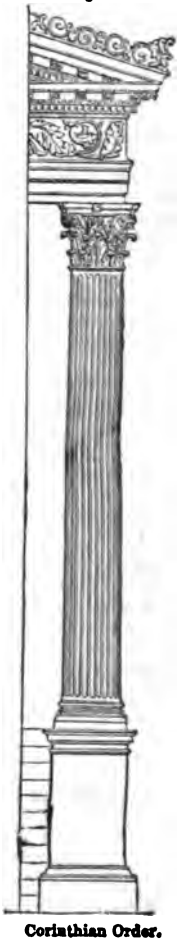
Ionic Order.

Vitruvius informs us that Demetrius, whom he calls the servant of Diana, and Paconius, the Ephesian, finished this temple, which was of the Ionic order. History records the remarkable fact that this temple was burned to the ground on the day that Alexander the Great was born; which suggested the waggish conceit to an historian, that Diana was so busy at the labour of Olympia, the mother of the hero, that she could not spare time to preserve her temple. This same Alexander, it is said, offered to rebuild it at his own expense, provided the Ephesians would consent that he should have the sole honour of it, and that no name should be added to his in the inscription to be put upon it. The Ephesians, not approving this condition, concealed their refusal of his offer by saying, "that it was not consistent for one god to erect a monument to another." This temple was rebuilt with still greater magnificence than at first. The truth of this may be gathered from the words of the sacred historian, in reporting the speech of Demetrius the silversmith, who made silver shrines for Diana, to the workmen of like occupation: "Sirs, ye know that by this craft, we have our wealth. Moreover, ye see and hear, that not alone at Ephesus, but almost throughout all Asia, this Paul hath persuaded and turned away much people, saying, 'that they be no gods which are made with hands:' so that not only this our craft is in danger to be set at nought; but also that the temple of the great goddess Diana should be despised, and her magnificence should be destroyed, whom all Asia and the world worshippeth." Such was the glory that attended the worship of "the thing that fell down from Jupiter," and such was the terror of the Ephesians that their temple would be destroyed a second time, that, in the words of the sacred historian, "when they heard these sayings they were full of wrath, and cried out: Great is Diana of the Ephesians;" and having assaulted Paul, and created a violent uproar, the mob continued to utter the same cry without intermission, for "the space of two hours," in the chief city of Asia.

The temple of Diana at Magnesia was built under the direction of Hermogenes. He made its general dimensions the same as for a double range of columns; but, in order to afford more space in the porticoes, he omitted the inner range. Thus a clear space was left between the outer range and the body of the building; and thus he established the style called the *pseudo-dipterick*. Vitruvius speaks with great veneration of this architect. The temple of Minerva Ulea at Tegea, designed and erected under the direction of Scopas, was of singular construction. The peristyle of the temple was of the Ionic order; the interior was divided into three aisles by two rows of Doric columns, and over these were placed others of the Corinthian order. The sculpture upon the two pediments were executed by the artist himself.

The simplicity and severity of the Doric order having now been abandoned, the artists of Greece Proper, not to be behind the inventors of the Ionic order, by an effort of genius, gave birth to a third order, which surpassed the Ionic in delicacy of proportion and richness of decoration; this order was named the Corinthian. The merit of its invention is ascribed to Callimachus, a sculptor of Athens, who lived about the period when the Peloponnesian war was brought to a close (B.C. 404). He is said to have taken the idea of this order from observing the leaves of the acanthus growing round a basket which had been placed, with some favourite trinkets, upon the grave of a young Corinthian lady; the stalks which rose among the leaves having been formed into slender volutes by a square tile which covered the basket. In the Corinthian order, the column is more elegant, and the capital longer and more ornamented than in the Ionic, spreading in the form of a basket and commingling the richest and lightest vegetation with the decorations of preceding orders. The top of the capital, instead of being square, assumes the curvilinear form, having angular projections supported by elegant volutes. The mouldings possess more beautiful ornaments than those of the Ionic or the Doric; the frieze is usually ornamented with scrolls of foliage; in the cornice, the corona is supported by modilions, which represent the extremities of the beams of the roof, and are usually carved into a scroll (see fig. 16). These elegant improvements introduced into their orders, rendered the Greeks the real masters of architecture; because, previous to their invention, the Egyptians and the Asiatic nations in general, followed no precise rule in their constructions; but, as soon as the orders were founded on rational proportions, of an exact and invariable nature, they were imitated in the edifices of every other nation.

Fig. 15.



Corinthian Order.

While awarding every credit to the ingenuity of the Greeks, however, it must not be forgotten that in the columns of several temples in Upper Egypt, whose shafts represent bundles of reeds or lotuses bound together in several places by fillets, the capitals are formed by several rows of delicate leaves. In the ruins of Ellora, in India, the capitals of the columns are also composed of similar ornaments; and the Persians, at their great festivals, were accustomed to introduce ornaments of flowers at the tops of the pillars in their public apartments. From tradition, report, or personal observation, Callimachus might be made acquainted with these examples, and might be led to the composition of the Corinthian capital, the chief ornament of the Greek school. The Corinthian order, although distinguished for its richness and even luxuriousness of decoration in all its details, is essentially the most simple in its

general character, and easiest in execution. The finest examples of this order were to be seen at Athens, in the monument of Lysicrates, the Tower of the Winds, the Stoa or public piazzas, and the Arch of Adrian, at Athens; the Pantheon of Agrippa, and the three columns of the Campo Vaccino, at Rome. The Corinthian order appears to have been but partially employed in Greece before the time of the Roman conquest; but the Romans themselves employed it to a great extent in every part of their empire; hence, it is in edifices constructed under their influence that the most perfect specimens are found. It was only in the construction of temples that the turbulent states of Greece could unite; and in consequence of this union, they constructed edifices of great magnitude and splendour. Many of this description were built and maintained at the expense of confederate states, and even of all Greece: such were the temples at Delphi, Delos, Ephesus, Olympia, Eryx, &c., and these temples had territorial revenues, besides being enriched by private donations. The Greeks appear to have made the greatest progress in the arts, and to have constructed the most admirable of their edifices, during the period from the age of Solon and Pythagoras to the era of Alexander the Great. Their architecture prevailed in the countries where they extended their influence along the coast of Asia. Alexander and his successors introduced it into Egypt, and probably in the cities he built on his route to India. To the westward it extended to Sicily, Italy, and the south of France. After the brilliant period to which we have alluded, the manners of the Greeks became Asiatic; their sublime spirit of independence was subdued; and though they continued for ages to be the instructors of their Roman conquerors, their glory in the arts declined, and with the purity and elegance of the Greek architecture.

LESSONS IN GERMAN.—No. XII.

Section XXIII.

Sein, like the corresponding English verb, is very irregular in conjugation; its different parts having been derived from words now obsolete.

It is used as the auxiliary to many active intransitive verbs, such as kommen, gehen, &c., where haben cannot (like *have* for *be* in English) be substituted. Ex.: Er ist gekommen; he is come. Er ist gegangen; he is gone. (§ 71. 8. 4.)

Sein is employed as the auxiliary in its own conjugation; as, Ich bin gewesen; I have been; literally, I *am* been. For complete conjugation, see § 72. II.

CONJUGATION OF THE PERFECT TENSE OF sein, kommen, AND gehen.

Ich bin gewesen, I have been;	wir sind gewesen, we have been;
Du bist gewesen, thou hast been;	ihr seid gewesen, you have been;
Er ist gewesen, he has been;	sie sind gewesen, they have been.
Ich bin gekommen, I have come;	wir sind gekommen, we have come;
Du bist gekommen, thou hast come;	ihr seid gekommen, you have come;
Er ist gekommen, he has come;	sie sind gekommen, they have come.
Ich bin gegangen, I have gone;	wir sind gegangen, we have gone;
Du bist gegangen, thou hast gone;	ihr seid gegangen, you have gone;
Er ist gegangen, he has gone;	sie sind gegangen, they have gone.

Exercise 23.

Berlin', *n.* Berlin;	Käfig, *m.* cage;	Schnee, *m.* snow;
Bleiben, to remain;	Kennen, to know, to be acquainted with;	Schreiben, to write;
Bringen, to bring;	Kommen, to come;	Sprechen, to speak;
Da, there;	Laufen, to run;	Vogel, *m.* bird;
Dresden, *n.* Dresden;	Markt, *m.* market;	Wetter, *n.* weather;
Fliegen, to fly;	Nachricht, *f.* news;	Wien, *n.* Vienna;
Friedrich, *m.* Frederick;	Preußen, *n.* Prussia;	Wissen, to know;
Glauben, to believe;	Rindfleisch, *n.* beef;	Wohnen, to reside, to dwell.
Jemand, somebody, anybody;		

Die Werke Gottes sind mannigfaltig; seine Liebe ist unendlich und an allen Orten sichtbar.	The works of God are manifold; his love is infinite and in all places visible.
Ich war in der Stadt, als der König da war.	I was in the city, as the king was there.
Der Kronprinz ist vorgestern hier gewesen.	The crown-prince was here, day before yesterday.
Wer ist mit der Schwester auf das Land gegangen?	Who has gone to the country with your (the) sister?
Dieselbe, die vorgestern mit ihr hierher gekommen ist.	The same, that came here (hither) with her, day before yesterday.
Gehen Sie heute auf das Land?	Do you go to the country today?
Nein, weil ich soeben von dem Lande gekommen bin.	No, for I have just come from the country.

1. Ist dieser junge Mann krank? 2. Nein, aber er ist vorgestern krank gewesen. (Sect. 18. VIII.) 3. Wer ist in dem Garten Ihres Vaters gewesen? 4. Niemand ist in dem Garten gewesen, aber Jemand ist in seinem Hause gewesen. 5. Wie lange bleibt der alte Bauer noch in der Stadt? 6. Ich kenne den alten Bauern nicht und weiß nicht, wie lange er bleibt. 7. Ist Ihr alter Freund, der Kaufmann, nach Wien gegangen? 8. Ich glaube, er ist nach Berlin zu seinem Bruder gegangen. 9. Von wem haben Sie heute diese Nachricht gehört? 10. Ich habe einen meiner Freunde gesprochen, welcher von Dresden gekommen ist und mir einen Brief von meinem Vater gebracht hat. 11. Ich wohne bei meinem Oheim und gehe mit ihm nach dem kleinen Dorfe. 12. Mein schöner Vogel ist aus dem Käfig geflogen, und mein kleines Pferd ist nach dem Walde gelaufen. 13. Was hat Ihr Herr Vater Ihnen geschrieben? 14. Er hat mir einen langen Brief geschrieben. 15. Wann sind Sie auf dem Markte gewesen? 16. Ich bin vorgestern Abend da gewesen, und habe Rindfleisch gekauft. 17. Wir haben diesen Nachmittag schönes Wetter gehabt. 18. Diese Schüler sind faul und jene fleißig gewesen. 19. Der Schnee ist vorgestern sehr tief gewesen. 20. Ich bin nie krank gewesen. 21. Friedrich der Große war ein König von Preußen.

1. Is your sister, who gave me these flowers[1], at home? 2. No, she has gone into the country. 3. There has been somebody in the garden. 4. Do you reside in Berlin? 5. No, I reside in Dresden. 6. The Queen has returned[2] from Belgium[3]. 7. Do you know the merchant who came from Vienna? 8. Yes, I know him. 9. You have had little pleasure[4] on your journey[5]; you have not been far[6]. 10. You had more pleasure than we had, but we have been as much pleased[7] as you.

[1]Blume. [2]zurückgekommen. [3]von Belgien. [4]wenig Vergnügen. [5]Reise. [6]weit. [7]ebenso vergnügt

Section XXIV.

The word Haus, without the article, when preceded by nach, answers to our "*home*" after verbs of motion. Ex.: Er geht nach Hause; he is going *home*.

Zu Hause answers to our "*at home*." Ex.: Er ist zu Hause; he is *at home*.

Bei (with), is commonly used with verbs of rest, and signifies (with a pronoun following) at one's house or place of business. Ex.: Er wohnt bei uns; he lives at our house. Ich kaufte es bei meinem Vetter; I bought it at my cousin's.

Mit (with), is chiefly used with verbs of motion. Ex.: Ich gehe mit ihm; I am going with him.

Zu Jemanden gehen, signifies, frequently, to go to the house or residence of some one. Ex.: Ich gehe zu meinem Oheim; I am going to my uncle's. Wollen Sie heute Abend zu uns kommen? Will you come to our house this evening? (§ 112. 8. 7. 8. 13.)

I. Derselbe *(the same) is compounded of* der *and* selber. *It is inflected precisely like* derjenige.

DECLENSION OF der-, die-, das-selbe.

	Singular.			*Plural.*
	Masculine.	*Feminine.*	*Neuter.*	*All genders.*
Nom.	Derselbe,	dieselbe,	dasselbe,	dieselben, the same;
Gen.	Desselben,	derselben,	desselben,	derselben, of the same;
Dat.	Demselben,	derselben,	demselben,	denselben, to the same
Acc.	Denselben,	dieselbe,	dasselbe,	dieselben, the same.

II. Derſelbe *is often used in place of a personal pronoun to avoid repetition or ambiguity. Ex.:* Haben Sie dieſelbe (ſie) geſehen? Have you seen (the same) her? Der Mann lobt den Knaben, weil derſelbe ſeine Mutter ehrt; the man praises the boy because the same (he) honours his mother. Er liebt ſeinen Bruder, aber nicht die Kinder deſſelben; he loves his brother, but not his children (he loves his brother, but not the children of the same).

The genitive of the substantive pronoun der *is also thus used. Ex.:* Er liebt ſeinen Bruder, aber deſſen Kinder nicht; he loves his brother, but not (that one's) his children.

Exercise 24.

Blei, *n.* lead;	Laden, *m.* shop, store;	Taſch'enuhr, *f.* watch;
Brauchen, to require, to need;	Lahm, lame;	Truppen, troop;
Eltern, parents;	Ring, *m.* ring;	Un'dankbar, unthankful;
Krieg, *m.* war;	Schicken, to send;	Weil, because.
	So, so, as;	

Wo iſt der Fremde, der vor'geſtern bei uns war?	Where is the stranger who was at our house day before yesterday?
Er iſt geſtern nach Wien gereiſt'.	He went yesterday to Vienna.
Iſt dieſes Buch daſſel'be, welches Sie geſtern Abend geleſ'en haben?	Is this book the same that you read last evening?
Ich liebe dieſen Schüler, weil er ſo fleißig iſt.	I love this scholar, because he is so diligent.
Meine Freundin aus Ame'rika war geſtern hier; haben Sie dieſel'be ſchon geſe'hen?	My friend from America was here yesterday; have you seen her yet?
Ich habe des Lehrers Buch, aber nicht das Meſſer deſſel'ben.	I have the teacher's book, but not his knife.

1. Wo iſt das Blei, welches Sie gekauft haben? 2. Es iſt noch im Laden, wo ich es gekauft habe. 3. Haben Sie dieſelbe Feder, welche ich gehabt habe? 4. Wem werden Sie dieſe goldene Taſchenuhr ſchicken? 5. Ich werde ſie demſelben Manne ſchicken, welcher ſie mir geſchickt hat. 6. Wie viel Geld braucht dieſer alte Soldat? 7. Er braucht viel, weil er immer krank iſt. 8. Iſt es derſelbe, welcher geſtern hier war. 9. Nein, jener iſt heute ſehr lahm. 10. Wem ſchicken Sie den ſchönen Ring? 11. Ich ſchicke ihn dem Manne, welchen Sie ſo ſehr gelobt haben. 12. Haben Sie die Freunde meines Bruders gelobt? 13. Ja, ich habe ſie gelobt. 14. Haben Sie dieſelben nicht geliebt? 15. Ich habe eine kleine Schweſter, welche ich liebe; lieben Sie dieſelbe? 16. Der Oheim liebt ſeinen Neffen, aber derſelbe iſt undankbar. 17. Der Vater liebt ſeinen kleinen Sohn, weil derſelbe gut iſt. 18. Warum ſind ſo viele Truppen in der Stadt? 19. Weil ſie aus dem Kriege gekommen ſind. 20. Warum lieben uns unſere Eltern? 21. Weil wir ihre Kinder ſind. 22. Zu wem gehen Sie? 23. Ich gehe zu meinem Vetter. 24. Mit wem gehen Sie? 25. Ich gehe mit meinem Bruder.

1. Is your brother at home? 2. Yes, but he is ill. 3. Where have you bought this watch? 4. I bought[1] it of the watchmaker. 5. These rings are beautiful, will you give me one of them. 6. The troops, which went to Leipsic, returned yesterday. 7. The teacher loves the boy because he writes beautifully. 8. Do you go to your parents? 9. I go with my brother. 10. These children love their teacher because he is good to them. 11. Do you require my books any longer? 12. I will give you them back[2] to-morrow.

[1] gekauft. [2] zurück.

BIOGRAPHY.—No. VII.

JOHN HARRISON: THE FIRST CHRONOMETER MAKER.

John Harrison, the son of a carpenter, was born at Foulby, near Pontefract, in Yorkshire. He received but little instruction in his youth, and was brought up to his father's business, at Barrow, in Lincolnshire, whither he had been removed soon after his birth. When young, he met with a manuscript copy of Professor Saunderson's lectures, from which he acquired [illegible]owledge of mathematics. The bent of his genius led [illegible]vote himself to mechanics, and especially to [illegible]hat is, the art of constructing machines for measuring and indicating time, such as clocks and watches. Such machines, in his day, presented a strange contrast to those now in daily use. A great improvement in the construction of clocks was effected, when Clement, a London clockmaker, in 1680, introduced an invention of Dr. Hooke, by which a less maintaining power, than was previously in use, was employed to carry a heavier pendulum, which, making smaller swings or arcs of vibration, met with less resistance from the air, and, therefore, performed its motions with greater regularity. Nor was Hooke less successful in improving the watch. To him is justly attributed the first idea of the balance-spring, one of the extremities of which is fastened to a point, independent of the balance, while the other is attached near its axis; thus regulating the beat and producing equable motion; and answering the same purpose in *watch*-work that the pendulum does in *clock*-work. This improvement was not gained, however, without difficulty. Hooke's first balance-spring was straight, and acted very imperfectly; but he soon perceived its defects, and set himself steadily to obviate them, by adopting first the cylindrical, and afterwards the flat spiral spring.

To find the longitude at sea—that is, the distance of the meridian of any place eastward or westward from the first or fixed meridian of any country—was meanwhile a problem, to which the attention of mariners and mathematicians had been anxiously directed. Indeed, so long ago as 1598, Philip III. of Spain offered a reward of 1,000 crowns for its solution. Not long afterwards, the States-General of Holland promised 10,000 florins to any one who should achieve the solution of the same problem. The British parliament, in 1714, went beyond these premiums, and empowered commissioners to introduce a bill for a sum not exceeding £20,000 for defraying the cost of the necessary experiments for ascertaining the longitude; and still further, for granting a proportionate reward to any one who should make a satisfactory advancement towards this grand object. With wealth and fame in prospect, innumerable and unsuccessful attempts were made to gain the prize.

Previous to this period one experiment had been made by Major Holmes, in a voyage from the coast of Guinea in 1665, which answered so well that the celebrated Huygens, who had paid great attention to watches, and had written a treatise on their use in finding the longitude at sea, determined to improve the structure of the watch as an instrument for this purpose; but the variations of heat and cold caused such irregularities of action that, unless these could be remedied, he found that a watch would be of little use in determining the longitude. Far more, indeed, is involved in the production of such a machine than is ordinarily imagined. To become a good watchmaker it is necessary to be an arithmetician, in order to find accurately the revolutions of each wheel; a geometrician, to determine correctly the curve of the teeth; a mechanician, to find precisely the forces that must be applied; and an artist, to be able to put into perfect execution the principles and rules which these sciences prescribe. He must know how fluids resist bodies in motion; and be well acquainted with the effects of heat and cold in different metals; in addition to these acquirements, he must be endowed by nature with a happy genius, to be able to apply them all in the construction of an accurate measurer of time.

No one in pursuit of such a rare combination of qualities would probably have gone to a young carpenter, with no advantages of education, and whose knowledge of mathematics appears to have been derived solely from a manuscript, as above mentioned. And yet, before Harrison was twenty-one years of age, he had constructed two clocks made entirely of wood, and without any instruction whatever in the art; while his residence on the coast had directed his mind to the formation of timekeepers, adapted to the purposes of navigation. On this subject he appears to have reflected for many successive years, and to have become perfectly acquainted with the difficulty which Huygens felt, but was unable to surmount. For though every part of a clock were constructed with the greatest perfection, its performance would manifestly, be very inaccurate, unless it were provided with the means of compensating for those changes which result from a variation of temperature, since almost all substances expand by heat and contract by cold. Accordingly a very minute difference in the length of a

pendulum, arising from this natural cause, will produce a serious influence on the rate of the going of a clock. For, if this alteration be so trifling as to cause either an increase or decrease of the time of each vibration of only 1-1440th part of its whole duration, it will occasion the clock to lose or gain a minute in every twenty-four hours—a minute being the 1440th part of a day.

The problem, therefore, involved in the instance before us is, How shall a timekeeper be constructed so as neither to lose nor gain during a voyage from our temperate climate, to the torrid or the frigid zone? The solution of this problem was practically effected by Harrison, in his invention of the *gridiron* pendulum. This pendulum takes its name from its form, which consisted of a frame of nine parallel bars; four of steel, and four of brass, while the centre bar of steel is fixed at top to the cross bar connecting the two middle brass bars, slides freely through the two lower bars, and bears the pendulum bobs. The remaining bars are fastened to the cross piece at both ends, and the uppermost cross piece is attached to the axis of suspension. It is easy, therefore, to see that the expansion of the steel bars tends to lengthen the pendulum, while that of the brass ones tends to shorten it; and consequently, if the two expansions exactly counteract one another, the length of the pendulum will remain unchanged. The relative lengths of the brass and steel bars are determined by the expansions of the two metals, which are found by experiments to be, generally, nearly as 100 to 61.

With equal ingenuity, and as the result of long-continued and careful thought, Harrison applied the compensatory principle to a watch, by the construction of the compensation balance, dependent also, on the unequal expansion of two different metals. In this instance, the circular arms of the balance is a compound bar of brass and steel, the brass being on the outside: this combination was attended with precisely the same successful result.

After having given himself, for a long time, exclusively to the construction of timepieces, Harrison came to London in 1728, at the age of thirty-five, bringing with him descriptive drawings of a machine for determining the longitude at sea, in expectation of being engaged to make one for the Board of Longitude. His invention was examined by Graham, the celebrated mathematical instrument maker, who advised Harrison, instead of presenting merely his drawings, first to complete the machine, and then to apply to the Board of Longitude. He therefore went home, and *seven years after*, returned to London, with the *first chronometer;* in fact, a large watch, by which he considered the longitude at sea might be correctly determined; its variations during several years, not exceeding a second in a month; thus incomparably surpassing all *time-measurers* previously constructed, in this or any other country.

In 1736 its accuracy was fully brought to the test in a voyage to and from Lisbon, during which it corrected an error of a degree and a half in the computation of the ship's reckoning. Public encouragement was now given to him, and, by the year 1761, he had completed three chronometers—the last being the most accurate. So satisfied was he with this one, that he applied to the commissioners of longitude for leave to make an experiment with it in a voyage to the West Indies, in compliance with the act of parliament. The solicited permission was granted; but, in consideration of Harrison's advancing years, his son was allowed to proceed to Jamaica instead of himself.

In order that our readers may understand the utility of this machine, we may just glance at its application. When a chronometer is set to the time of Greenwich, which is that of our *first meridian*—now the invariable practice with all captains sailing to a great distance—and is carried abroad in a vessel sailing from this meridian, a chronometer affords the means of ascertaining the longitude of any place, by simply observing the instant that the sun reaches the meridian of that place,—that is, when it is midday there, or twelve o'clock at noon, and then observing the difference between this time and that shown by the Greenwich chronometer, which must necessarily be different, if the meridian of the place be different from that of Greenwich; for this difference at once gives the mariner his longitude, by allowing 15 *degrees* east or west for *each hour* of time, or 15 minutes of a degree for *each minute* of time; the place being in *east longitude*, when the time at the place is later than that at Greenwich; and in *west* longitude when it is earlier. Thus, suppose the mariner takes the meridian altitude of the sun at sea, and finds that it is noon at the ship, while it is *eleven* o'clock by the Greenwich chronometer, then the meridian of the place at which he has arrived must be 15 degrees *east* of Greenwich; while, if the chronometer tells it is *one* o'clock at Greenwich, the longitude of the place must be 15 degrees *west* of Greenwich. By the same mode of observation and comparison, the longitude of all other places where the ship may be found, is readily determined; but this mode of determining the longitude requires as the indispensable condition, the *accurate-going* of the chronometer.

When, therefore, after eighteen days sailing in the voyage which was to test Harrison's chronometer, the vessel was supposed by the captain to be 13 degrees 50 minutes west of Portsmouth, and the chronometer gave 15 degrees 19 minutes, or about a degree and a half more, the variation was considered to be fatal to the invention, and the instrument was condemned as useless. But the son of the maker felt that the actual error might be in the chart, and so firmly did he maintain that Portland Island would be seen on the following day, that the captain was induced to continue in the same course, and the island was actually discovered the next day at seven o'clock. The confidence in the chronometer, previously destroyed, was now restored, and it was increased by the complete fulfilment of Harrison's successive predictions of the times when the several islands would be passed during the remainder of the voyage. When the vessel arrived at Port Royal, after a voyage of 81 days, the chronometer was found to be about five seconds too slow, and on his return to Portsmouth, after a voyage of five months, it had kept time within about one minute and five seconds, which gives an error of about 16 miles—a variation greatly within the limits prescribed by the act of parliament. From this experimental voyage it was rendered evident that peril and ruin would be avoided by those who trusted themselves to the guidance of an instrument like that of Harrison's, so wonderfully improved in comparison with all that were constructed before his time.

A further test was now allowed the chronometer, in a voyage undertaken by the younger Harrison to Barbadoes; and having now fully complied with the requirements of the act of parliament, the first chronometer-maker applied for, and received the proposed reward of £20,000. Large as the sum appears it was only an appropriate reward for the devotion of extraordinary talents, with unwearied perseverance during a space of forty years. The success which accompanied this invention resulted in the present highly advanced state of horology, the perfection of which as a scientific art is, perhaps, only paralleled by the perfection of astronomy as an artistic science deeply indebted to it. Indeed, to the perfection of both may be ascribed in almost every respect, the present improved condition of society.

Harrison employed the latter part of his life in constructing a fifth chronometer, which he executed so well that after a ten weeks' trial in the king's private observatory at Richmond, it was found to have erred only four-and-a-half seconds. He died at his house in Red Lion-square, London, March 24th, 1776; leaving behind him an impressive lesson of arduous, and successful perseverance.

How accurately chronometers have since been made to go, and with what utility to navigation, will be evident from the statement of the following facts by Dr. Arnott:—"After several months spent at sea, in a long passage from South America to Asia, my pocket chronometer and others on board announced one morning that a certain point of land was then bearing north from the ship, at a distance of fifty miles; in an hour afterwards, when a mist had cleared away, the looker-out on the mast gave the joyous call of 'Land ahead!' verifying the reports of the chronometers almost to *one mile*, after a voyage of *thousands* of miles. It is allowable at such a moment, with the dangers and uncertainties of ancient navigation before the mind, to exult in contemplating what man has now achieved. Had the rate of the wonderful little instrument, in all that time, been quickened or slackened ever so slightly, its announcement would have been useless, or even worse; but in the night and in the day, in storm and in calm, in heat and in cold, its steady beat went on, keeping exact account of the rolling of the earth and of the stars; and, in the midst of the trackless

waves which retain no mark, it was always ready to tell its magic tale, indicating the very spot of the globe over which it had arrived." To this may be added the words of Dr. Carpenter: "Not unfrequently must it occur," says he, "that the knowledge of the exact position of the ship, which may be obtained by the chronometer, produces a great saving of time, as well as contributes to the avoidance of danger. A remarkable instance of this was mentioned to the writer a few years since, as having just then occurred. Two ships were returning to London about the same time, after long voyages, one of them provided with chronometers, the other destitute of them. The weather was hazy, and the winds baffling; so that no ship, whose position was uncertain, could be safely carried up the British Channel. Confident of his position, however, the captain of the first ship stood boldly onwards, and arrived safely in the Thames; whilst the other ship was still beating about in uncertainty near the entrance to the Channel. The first ship discharged her cargo, took in another, set sail on a fresh voyage, and actually, in running down the Channel, encountered the second ship still toilsomely making her way to her port."

LESSONS IN ENGLISH.—No. XIV.

By JOHN R. BEARD, D.D.

DERIVATION: PREFIXES (*continued*).

Mille, of Latin origin (mille, *a thousand*), appears in *millennium* and its derivations. *Millennium* (annus, Lat. *a year*) properly signifies a period of a thousand years.

"When at your second coming you appear,
(For I foretell the *millenary* year)
The sharpen'd share shall vex the soil no more,
But Earth unbidden shall produce her store."
Dryden, "Palæmon and Arcite."

Mis, of Saxon origin, found in the verb to *miss*, and in the adverb *amiss*, denoting something wrong, forms a prefix to many words, as, *mis*allied, *mis*apply, *mis*become, *mis*conceive, *mis*judge, *mis*like, *mis*represent. *Mis*chief (achever, *Fr. to accomplish*) is a bad or wicked deed; the second syllable has nothing to do with our word *chief*,—that is, *head*. What we now call mischievous, was formerly pronounced according to the vulgar error mischiévous.

"And every one threw forth reproaches rife,
Of his *mischievous* deedes, and sayd that hee
Was the disturber of all civill life,
The enemy of peace, and authour of all strife."
Spenser, "Faerie Queene."

*Mis*give is used in the derivative sense of yielding, weakly yielding, and as yielding weakly, so improperly, the notion of impropriety lying in the *mis*.

"Great joy he promised to his thoughts, and new
Solace in her return, so long delayed;
Yet oft his heart, divine of something ill,
Misgave him." *Milton*, "Paradise Lost."

Mod, of Latin origin (modus, *manner, limit*), appears in *mod*ify; (facio, Lat. *I make*), to state with some restriction or qualification; to alter slightly; also in *mod*est, *mod*erate, com*mod*ious, com*mod*ity, &c.

Molli, of Latin origin (mollis, *soft*), appears in *molli*fy, to make soft; to appease, render gentle; *molli*fier, *molli*fication, *molli*fiable, &c.

"——— While the vocal flute,
Or number'd verse, by female voice endear'd
Crowns his delight and *mollifies* the scene." *Shenstone.*

Mono, mon, of Greek origin (monos, *alone*), gives rise to monachos, *a monk*, one who lives alone; *mon*achism, the society of monks; monas, a *mon*ad, a single object, a unit; *mon*arch (arché, Gr. *government*), one who rules alone; *mono*gamy (gamos, Gr. *marriage*); *mono*polise (poleo, Gr. *I sell*), to have the sole power of selling; *mono*theism (theos, Gr. *God*), the belief in one God; *mono*syllable, a word of one syllable.

"Conjunction, preposition, adverb join
To stamp new vigour on the nervous line;
In *monosyllables* his thunders roll,
[illegible]she, it, and we, ye, they, fright the soul."
Churchill, "Rosciad."

Mort, of Latin origin (mors, *death*, genitive mortis), forms the basis of *mort*al, and *immort*al; *mort*gage, is a dead gage or pledge,—that is to say, something so pledged, as what are called deeds or writings, so that it cannot be used for raising money.

Mortuum vadium, a dead pledge, mortgage, is when a man borrows of another a specific sum,—e. g., £200, and grants him an estate in fee, on condition that if he, the mortgager, shall repay the mortgagee the said sum of £200 on a certain day mentioned in the deed, then the mortgager may re-enter on the estate granted in pledge.—*Blackstone*, "Commentaries."

*Mort*main (mortuâ manu, Lat. *as a dead hand*), is explained thus:

"All purchases made by corporate bodies were said to be purchases in *mortmain*; for this reason, those purchases were usually made by ecclesiastical bodies, the members of which being professed (in orders), were reckoned *dead persons* in law; land, therefore, holden by them might, with great propriety, be said to be held in mortuâ manu.—*Blackstone*, "Commentaries."

Multi, of Latin origin (multus, *much*), appears in *multi*farious, of many sorts; *multi*form, of many shapes; *multi*ply (plica, Lat. *a fold*), to take many folds, &c.

"——— The beauteous lake
The pines wide-branching, falls of water clear,
The *multifarious* glow on Flora's lap
Lose all attraction." *Glover*, "Leonidas."

Neo, of Greek origin (neos, *new*), doubtless the same as our new, which thus appears to be Indo-Germanic. *Neo* forms the first syllable in *neo*logy, or new-science, new-doctrine—terms that might be used as fittingly as the Greek word *neo*logy. *Neo* is found also in *neo*phyte (phutos, Gr. *born*), a new-born person; a recent convert.

Non, of Latin origin, *not*, stands before words of historical importance, as, *non*-conformist, *non*-juror.

"By that act (the Five Mile Act), passed in the parliament held at Oxford, October 9, 1665, and entitled, 'An Act for restraining *Non-conformists* (to the Established Church) from inhabiting Corporations,' the non-conforming ministers were prohibited, upon a penalty, of forty pounds for every offence, to come, unless only in passing upon the road, within five miles of any city, corporation, &c."—*Locke.*

Non-juror is a term usually applied to those persons who refused to take the oaths of allegiance to William III. at the Revolution.

"The *nonjuring* prelates were Sancroft, Turner, Lake, Ken, White, Lloyd, Thomas, and Frampton."—*Smollett*, "History of England."

Ob, of Latin origin (as a preposition, *on account of*), has the general meaning of towards, and hence *at*, *near*, and varies with the word with which it is connected, the meaning of which it sometimes merely strengthens. In *ob*ject (jacio, Lat. *I throw*), to throw before or against, it conveys the idea of obstruction, an idea which it expresses more fully in *ob*struction (struo, Lat. *I build*) itself, which, according to its constituents, signifies a building or blocking up. In *ob*literate (litura, Lat. *an erasure*), to blot out, it has an augmentive force. Passing into the first letter of its principal, *ob* becomes *oc* as in occasion (cado, Lat. *I fall*), a suitable fall, a fall *before* you so as to suit your purpose, something seasonable and convenient, by which you may profit. *Ob* passes also into *of*, as in *of*fer (fero, Lat. *I bear*). This *of* must not be confounded with *of* or *off* signifying *from*, and found in *off*-scouring, and *off*-spring.

"Our prayer hath
No power to pass; and thou hast made us fall,
As refuse and *off-scouring* to them all." *Donne.*

"Whence it follows that these were nations not descending from us, but born with us; not our *off-spring*, but our brethren."—*South.*

Octo, also *octa*, of Latin origin (octo, *eight*), appears in *octa*gon, *eight-angled*; *octo*syllable, *of eight syllables*; *octo*teuch (teuché, Gr. *a fold* or *volume*), the first eight books of the Old Testament.

Olig, of Greek origin (oligos, *a few*), is the first part of *olig*archy (arché, Gr. *government*), government by a few; *olig*arch, one of a small number of rulers.

Omni, of Latin origin (omnis, *all*), is seen in *omni*scient (scio, Lat. *I know*), all knowing; *omni*potent (potens, Lat. *powerful*), all-powerful; *omni*present, existing everywhere; *omni*vorous, all-devouring.

Ortho, of Greek origin (orthos, *straight, right*), as in *ortho*doxy, right opinion; *ortho*gonal, right-angled; *ortho*pedic, right-footed, &c.

"Athanasius is commonly accounted the very rule of *orthodoxality* in this point."—*Cudworth*, "Intellectual System."

This prefix forms 'part also of *ortho*graphy (graphè, Gr. *writing*), right writing, that is, in the spelling of words; as *ortho*epy (epos, Gr. *a word*) is right pronunciation.

Over, of Saxon origin, as in *over*arch, *over*balance, *over*bear, *over*charge, *over*board, *over*-boil, *over*-bounteous, frequently denoting *too much*, as *over*-careful, that is, careful to excess. *Over*come has two significations, to conquer, and to come over or upon.

"He found the means to subdue both the one and the other, compelling as well the *overcomers* as the *overcome* to be his tributaries."—*Brende*, "Quinctus Curtius."

"*Mac.* Can such things be,
And *overcome* us like a summer's cloud,
Without our special wonder?" *Shakspeare.*

Over when employed for above as "*over* two hundred" is to be avoided as an Americanism. To *over*take is to come up with in walking or running.

"And had he not in his extremest need
Been helped through the swiftness of his steed,
He had him *overtaken* in his flight." *Spenser.*

In the passive the verb overtake seems to denote the being suddenly *surprised* into an action; *surprise* is from the Fr. surprendre (consisting of sur, *above* or *over*, and prendre, *to take*), whence *surprise* is the same as *overtake* in both derivation and meaning.

"Brethren if a man be *overtaken* in a fault."—Gal. vi. 1.

It is not difficult to see how to overtake may mean to get over, overcome, surprise, but how it means to come up with is less easy to conceive. The notion of *over*, or of superiority may, however, lie in the act by which you succeed in coming up to the person you wish to overtake; thus by walking more quickly than he, you overtake your friend, you *take* a step *over* his, and get beyond him.

Out, of Saxon origin, *beyond a certain limit*, is a very common prefix, as in *out*bid, *out*do, *out*face, *out*law, *out*live, *out*strip, &c. *Outrage* has nothing to do with *out*. *Outrage* comes from the mediæval Latin word ultragium, through the French oultraige, *outrage*. Ultragium, from ultra, *beyond*, denoted a surplusage paid to the lord by his subject on failure of paying his dues in proper time, whence *outrage* came to signify something in excess and to have an offensive meaning. Richardson shows himself ignorant of the origin of the word.

Pan, of Greek origin (pas, m. pasa, f. pan, n. *all*), is found in *pan*acea (akeomai, Gr. *I heal*), all-heal, a universal remedy; in *pan*creas (kreas, Gr. *flesh*), all-flesh,—that is, the sweetbread; and in *pan*dects (dekomai, Gr. *I receive*), receive-alls, a common title of the Greek miscellanies. The term is known in history in its application to a digest of the civil law published by the emperor Justinian. Again, *pan* occurs in *pan*theism (theos, Gr. *God*), all-godness,—that is, the system which regards God and the universe as the same. *Pan* forms the first part of pantomime (mimos, Gr. *a mimic;* and the word mimic is from mimos), all-mimicry, because the performance consisted solely of imitation.

"The *pantomimes* who maintained their reputation from the age of Augustus to the sixth century, expressed, without the use of words, the various fables of the gods and heroes of antiquity; and the perfection of their art, which sometimes disarmed the gravity of the philosopher, always excited the applause and wonder of the people."—*Gibbon*, "Roman Empire."

Para, of Greek origin, *by the side of*, as in parallels (i. e., parallel lines), has in English various acceptations. In *para*ble (ballo, Gr. *I throw*), something put by the side of another thing, a comparison, a similitude. In Scripture, the parables of the Old Testament are short, pithy, and weighty sayings: the parables of the New Testament are short tales, setting forth religious truth under similitudes: the former are apothegms; the latter allegories. *Para* appears in *para*clete (kalein, Gr. *to call*), the advocate or comforter (John xiv. 16).

Paradise is a Persian word, denoting a park, and has no connexion with the Greek *para;* in Hebrew, *pardes*, a garden.

Par, of Latin origin (pars, partis, *a part*), appears in *parti*cipate (capio, Lat. *I take*)—that is, to partake. This word *partake* is a hybrid, being formed of an English and a Latin word; it is therefore a cross in the breed between Latin and English.

Pent, or *penta*, of Greek origin, as in *penta*gon, a figure having five sides; *penta*teuch (*five-fold*), the name given to what are called "the five books of Moses,"—namely, Genesis, Exodus, Leviticus, Numbers, and Deuteronomy.

LESSONS IN BOTANY.—No. XIII.

CLASS XVI.—MONADELPHIA.

Plants bearing flowers, the filaments of whose Stamens are joined together in one set.

PENTANDRIA.

THE hemlock stork's-bill is a hairy and somewhat clammy plant, with a disagreeable smell. It grows in sandy places, especially near the sea. Its rose-coloured, but frequently white petals, are observable from June to September.

The musky stork's-bill is so called from the peculiar smell it exhales, and the plant is more hairy and clammy than the preceding. It grows in hilly pastures, and flowers in June and July, with rose-coloured petals.

The petals of the sea stork's-bill, appearing from May to September are minute, and of a pale red. This plant grows on the sandy coasts of the south of England, and in Ireland.

DECANDRIA.

In waste ground, in woods, by walls, among stones and fragments of rocks, a very beautiful little flower is observable from the beginning of May to the end of October; it is the herb Robert, or Poor Robin. It has a red stem, sending out numerous branches at the base; leaves tinged with red, and lance-shaped; petals twice the length of the calyx, oblong, bright rose-red, with three white veins. When the plant grows on exposed situations, the stems and leaves are of a rich crimson colour, and when autumn has come on, and they long survive the blossoms, they are scarcely less beautiful than the flowers themselves. Its stems are brittle; and the whole of the plant is very hairy.

A peculiar resinous substance is secreted by this plant, as well as by several others of the same species. Its odour is threfore disagreeable, particularly when the plant has been long gathered. So abundant is the resin in some foreign species, that if a light be applied to their stems, they will burn like torches, and yield a very agreeable perfume during their combustion.

How numerous these plants are in our own land may be seen at a rapid glance. The dusky crane's-bill grows in woods and thickets, and flowers in May and June; the wood crane's-bill flowers in June and July, and grows in woods and thickets by rivers; the spots in which to find the meadow crane's-bill, may be gathered from its name; it flowers in the two last-mentioned months. The dove's-foot crane's-bill appears early in April, and continues in bloom till August, and is observable on every bank or waste place, and in every pasture: it has long spreading stems, and broad roundish leaves, deeply cut into segments, of a pale gray-green, and downy as velvet; while the flowers are small, and of a purplish-red colour. And, besides these, there are six other species of crane's-bill.

Among these plants are found those universal favourites the geraniums. How often may one of them be observed in circumstances reminding us of Cowper's words when he says,—

"That man immured in cities, still retains
His inborn, inextinguishable thirst
Of rural scenes, compensating his loss
By supplemental shifts as best he may.
The most unfurnish'd with the means of life,
And they that never pass the brick-wall bounds,
To range the fields, and treat their lungs with air,
Yet feel the burning instinct; overhead
Suspend the crazy boxes, planted thick,
And watered duly. There the pitcher stands,
A fragment, and the spoutless teapot there:
Sad witnesses how close-pent man regrets
The country, with what ardour he contrives
A peep at nature, when he can no more."

Of the real geraniums some species or other may be found growing wild almost everywhere. Several flower-stalks very commonly diverge from one centre, forming what is called an *umbel*, but in most of the British plants of this tribe each principal stalk bears but two flowers. The petals are five in number, except in a few instances, in which one is undeveloped; their veins are unusually prominent, and they give to the petals a streaked or pencilled appearance. These veins consist

almost exclusively of air-vessels, and they serve as beautiful objects for microscopic inspection.

When the fruit is ripe it strikingly resembles the bill of certain birds; whence the British geraniums are known by the name of cranesbill. These plants are extensively diffused over the globe. What are commonly termed geraniums by horticulturists are not really such, but belong to the allied genus *pelargonium*. The chief residence of the pelargoniums is at the Cape of Good Hope, from whence these ornaments of our gardens and windows have been derived. These have been greatly improved by cultivation, and many more varieties have sprung up. Among the old favourites is the horseshoe pelargonium, known from the brown circle on the leaves in the form of a horseshoe, and the parent of many of the finest hybrid scarlet-flowered varieties introduced by crossing. The flowers of the original plant are small, and not now esteemed. The oak-leaved and the gooseberry-leaved are rapidly disappearing.

POLYANDRIA.

The leaves of the marsh-mallow are simple, and very soft and downy; and so are the stems, which are erect, and three feet high. The petals are of a pale rose-colour. The plant grows in salt marshes, and flowers from July to September.

The common mallow, though very rare in Scotland, is abundant in England. It has an erect stem, leaves with five or seven somewhat acute lobes; leaf-stalks and flower-stalks hairy. Its petals, which are numerous, of a purplish-red, and deeply-notched, appear about hedges and road-sides, from June to September. The recollections of some of our readers accord, very probably, with those of our rural poet Clare, when, looking back to past times, he describes himself and other children, as

> "Sitting down when school was o'er,
> Upon the threshold of the door,
> Picking from mallows, sport to please,
> The crumpled seed we call a cheese."

The name thus given to the circular fruit of the plant, leads to its being called "cheese-flower," in some country places. This play is not peculiar to the English child; it amuses also French children, who call the seeds of the mallow by the same name *les petits fromageons*.

The wild and cultivated mallows of our country are used in medicine for the mucilage they contain. Country people apply the leaves when boiled to wounds and bruises; and, in Paris, mallow-tea is considered a specific for many diseases. The mallows do not possess, however, any active properties.

The musk-mallow has an erect stem, about two feet high, little branched, and rough; its flowers, which grow on long, simple stalks, with large rose-cloured petals, appear in July and August. The plant grows in pastures, and by way-sides.

The dwarf-mallow has a prostrate stem; roundish heart-shaped leaves; stems numerous, lying flat on the ground; flowers pale-lilac, growing from June to September, and fruit-stalks bent downwards. It grows in waste ground, and by way-sides.

Besides these plants, there is the sea tree-mallow: the stem woody; the leaves downy, and plaited, with seven angles; the petals purplish rose-colour, and darker on the base; growing on rocks along the sea-shore, and flowering from July to October. It is, however, between the tropics, that the most remarkable species of mallow abound.

In a wild state, the corollas of the hollyhock are generally single, and of a red, white, or yellow colour; but by transference to a more favourable situation, and to more fertile soil, their flowers can be doubled to any extent, and, by care on the part of the cultivator, brought into almost every hue. "Oh, the hollyhock!" says a modern writer, "no garden should be without a hollyhock, whether it belong to a prince or a peasant. Stately and aspiring, and requiring space, it yet wisely accommodates itself to its circumstances, adorning alike the gay parterre and the cottage door. Whether puce, crimson, scarlet, yellow, or white, it is always elegant, and never forgets that it is a hollyhock."

Dr. Turner speaks of hollyhocks as familiar plants in 1564; and Gerard, in 1597, observes that they were then seen in gardens almost everywhere. There can be no doubt that they were very early cultivated, their majestic height and splendid flowers rendering them special objects of attention. The English name is derived from the Saxon *holyoak* or *holihoc*, the meaning of which is not very perceptible. Besides their floral beauty, hollyhocks are of great utility to bees, as they flower at a season when most other blossoms have faded. The fibrous bark of the flower-stalks furnishes no mean substitute for hemp; and a blue dye, little inferior to indigo, can be obtained from the whole plant.

LESSONS IN GEOGRAPHY.—No. VIII.

DISCOVERIES OF THE EIGHTEENTH AND NINETEENTH CENTURIES.

FRANCE, desirous of taking her share in the progress of maritime discovery, fitted out, in 1786, a new expedition under the command of La Perouse, an able and intrepid officer. The principal theatre of the explorations of this little French squadron was the north-west coast of America, and the shores of Tartary and Japan. Their vessels La Boussole and L'Astrolabe visited Easter Island, then the Sandwich Isles, and reached latitude 59° N. on the north-west coast of America. The expedition explored with great care a great part of this line of coast. During their hydrographical operations, a sad accident befell them, which cost twenty-one persons their lives, while making an attempt to land. These operations being finished, they traversed the Pacific, determined, on their way, the position of the Ladrone Islands, and arrived at Macao on the 2nd Jan. 1787. At the outset of his second expedition, La Perouse went along the coast of Corea, and discovered Cape Nota on the coast of Japan. The officers of the expedition applied themselves particularly to the determination of the latitudes and longitudes of the places which they visited. In latitude 45°, they discovered an harbour which they called the bay of Ternay. They next discovered the strait which separates the island of Jesso from Tchoka or Sagalien, and which is called the Straits of La Perouse. The expedition then sailed for Kamtschatka, where it was hospitably received. At this point M. Lesseps, who had accompanied La Perouse as interpreter of the Russian languages, was sent overland to France. This intrepid young man, to whom had been intrusted the journals and charts of the voyage, traversed the old continent through its whole extent from east to west, and happily arrived at Paris with the valuable observations which had been made during the expedition. La Perouse returned to Oceanica, to meet severe trials. At Maouna, one of the Navigators' Islands, his companion De Langle, captain of L'Astrolabe, and twenty of his attendants, were cruelly murdered by the natives. Lamanon, the naturalist of the expedition, perished in this attack. After a short stay at Botany Bay, New Holland (now Australia), La Perouse prepared for his third expedition. He purposed to explore the Tonga Isles, the south part of New Caledonia, the Louisiade Islands, New Guinea and other islands, the gulf of Carpentaria, and the coast of Australia from this gulf to Van Diemen's Land. He left the shores of New Holland full of hope and enterprise; but his task, so courageously self-imposed, was left unfinished; his career came to a close. From that moment he was never more heard of; for two years, expectation was kept on the stretch looking for news of the expedition. La Perouse and his companions were lost to their country. The cruel uncertainty which remained in France regarding the fate of the expedition, caused the national assembly to pass a decree in February 1791, by which it entreated the king, Louis XVI., to solicit the assistance of the other sovereigns of Europe in the search for the lost expedition. This decree also directed the organisation of an expedition, which had the double object of endeavouring to find some trace of the unfortunate navigator, and of completing the discoveries which had been left unachieved. This expedition took place under the command of Admiral D'Entrecasteaux, but without success. It was almost as unfortunate as that of La Perouse, although it was useful in making those coasts better known which had been carefully explored in search of him. The place of his shipwreck, in fact, was not discovered till 1827, by Captain Dillon, who ascertained that he and his unfortunate companions were lost on the rocks of one of the Feejee Islands, and found the

remains of the vessel and part of the articles that belonged to him. The singular voyage of Captain Bligh, who, owing to the mutiny of his crew, was obliged to traverse an immense extent of ocean in an open boat, led to the discovery, in 1789, of Waitoutaki, one of the Manaian group, or Harvey Islands. The surprising explorations, also, of Captain Flinders and Surgeon Bass, who attempted to effect the periplus of New Holland, in a sorry boat, ended in the discovery of the strait which separates that continent from Tasmania (Van Diemen's Land), and which still retains the name of Bass; and, at the same time, in the delineation of an immense line of coast on the same continent. Flinders, especially, has a right to the remembrance of geographers, for the steadiness with which he pursued during many years, his difficult and dangerous labours, almost always in an open boat or frail skiff which the smallest storm would have foundered in a moment. To him we owe the discovery of Kangaroo Island, the hydrography of Van Diemen's Land, the exploration of the southern and eastern coasts of New Holland, and the determination of numerous points in Torres' Straits and the Gulf of Carpentaria. The expedition to the same coasts under the French captain, Baudin, was productive of little utility in a geographical point of view, after the labours of Flinders.

The voyage of Vancouver preceded the French expedition above mentioned, and added to the knowledge of the Australian continent. He discovered the harbour of King George in the south-western extremity of New Holland, and completed the labours of Cook at New Zealand. To the east of the latter, Captain Broughton, commander of the tender, discovered Chatham Island, and the expedition proceeded to Tahiti to prepare for exploring the north-western coast of America. Vancouver, in company with a Spanish expedition which he met, under the command of Captain Quadra, discovered the island which now bears the name of both; he then explored the river Colombia as far as the expedition could ascend its streams. A rest at the Sandwich Islands, and new expeditions on the American coasts detained Vancouver till the winter of 1794, when he returned to the same archipelago. Having, in a new hydrographical expedition, explored another part of the coast of the new world, including Cook's inlet, Vancouver returned to England, laden with geographical information, and signalised by not a few discoveries. These regions were scarcely revisited until the voyage of Kotzebue, which took place in 1815-1818. This Russian navigator discovered to the north of Behring's Straits, between latitudes 67° and 68° N., and in longitude 163° 37' W., a great bay or sound to which he gave his name. His object was to find a passage to the Atlantic, and to ascertain first whether Icy Cape was an island; but illness prevented him from carrying his designs into execution. He discovered several unimportant islands in the Pacific, particularly the eastern part of the Caroline group.

As to the northern passage between the Atlantic and the Pacific, it seemed to elude all the skill and vigilance of navigators. Captain Phipps, in 1773, had reached latitude 80° 37' N. from the Atlantic side; Captain Cook, as we have seen, attempted it from the Pacific side; Pickersgill and Young succeeded no better by sailing through Baffin's Bay; and Lowenorn, Egede, and Rothe, in 1786-1787, attempted, but without success, to explore the eastern shores of Greenland, which is said to be unapproachable in consequence of the accumulation of ice since the beginning of the fifteenth century. At the beginning of the present century, northern expeditions were revived; and they have been pursued with more or less ardour till the present day. In 1818 two expeditions were fitted out for the north. The one was placed under the command of Captain Ross, who sailed from England towards the end of April of that year, accompanied by Lieutenant Parry, who commanded under his direction the ship Alexander. Between latitudes 76° and 77° 40' N. they discovered land which they called the Arctic Highlands. This country occupied a space of 120 miles in the north-east corner of Baffin's Bay. On the 30th of August they reached the entrance of Lancaster Sound, and as it was 50 miles broad from north to south, and as the soundings were 760 fathoms, they fancied they had discovered the north-west passage; but they soon perceived their mistake by observing land in their course at a distance of 30 miles from the entrance of the sound. Having reached latitude 70° N. the expedition returned and explored the coasts as far as Cape Walsingham, in Cumberland Island, whence it sailed for England. The other expedition to the north was undertaken by Captain Buchan and Lieutenant Franklin; but it was productive of no new discovery, as they were compelled to return when they had reached Spitzbergen, glad to escape the alarming dangers of sailing in the midst of floating icebergs. Captain Parry continued the exploration begun by Captain Ross. In a new expedition, he discovered the passage called Prince Regent's inlet, south of Lancaster Sound, Wellington's inlet farther north in the same sound, and the islands of Cornwallis, Griffith, Bathurst, Byam Martin, Melville, and others, all included, under the name of the North Georgian Islands. He also discovered Banks's Land, south of Melville Island, and North Somerset, which forms the north-west point of Prince Regent's inlet, and wintered in 1819-1820, in Melville Bay, where, during the long months, from the 4th of November till the 3rd of February following, they lived in continued darkness, and in an atmosphere, whose temperature was below the freezing point. In a second voyage executed in 1821-1822, Captain Parry discovered Melville Peninsula, north of Southampton Island, in the northern part of Hudson's Bay. He passed through the strait which he named after his two vessels, the Fury and Hecla, and which separates Melville Peninsula from Cockburn Island, on the north. Captain Scoresby, at the same period, explored a part of the east coast of Greenland. Parry made a third voyage in 1823, to the same regions he had formerly visited; but the Fury was shipwrecked, and the expedition failed. During the period from 1823 to 1826, Lieutenant Beechy sought for the passage between the two oceans by Behring's Straits, and reached latitude 71° 23' N., and longitude 154° 3' W. The indefatigable Parry attempted a fourth expedition to the north in search of the same passage, but it entirely failed, because he disregarded the experience of former navigators, as well as his own in preceding voyages.

LITERARY NOTICES.

THE SCIENCE OF BOTANY beautifully Illustrated by upwards of Three Hundred Engravings from Drawings from Nature.—In THE ILLUSTRATED EXHIBITOR AND MAGAZINE OF ART, for September 4th, a series of chapters has been commenced on the instructive science of Botany. Each chapter will be profusely illustrated with engravings, carefully executed. These chapters on Botany will not interfere with the general character of the work, which contains first-class engravings, including portraits and specimens of the works of the great masters, in painting, sculpture, and architecture; portraits of eminent characters; views of cities palaces, and public buildings; natural history; manufacturing processes; machinery and inventions; scientific, including the elements of design, perspective, hydraulics, the stereoscope, &c.; ornamental sculpture, needlework, &c.; with original literary articles, including biographies, descriptions of works of art, details of manufacturing processes and machinery, papers on natural history and other branches of science; and much interesting fragmentary matter. The ILLUSTRATED EXHIBITOR AND MAGAZINE OF ART is published in weekly Numbers, twopence each, or in monthly Parts, 9d. or 11d. each, according to the number of weeks in each month.

CASSELL'S SHILLING EDITION OF EUCLID.—THE ELEMENTS OF GEOMETRY, containing the First Six, and the Eleventh and Twelfth Books of Euclid, from the text of Robert Simson, M.D., Emeritus Professor of Mathematics in the University of Glasgow; with Corrections, Annotations, and Exercises, by Robert Wallace, A.M., of the same university, and Collegiate Tutor of the University of London, is now ready, price 1s. in stiff covers, or 1s. 6d. neat cloth.

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THE PATHWAY, a Monthly Religious Magazine, is published on the 1st of every month, price twopence—32 pages enclosed in a neat wrapper. No. 33, for September, is now ready, and Vols. I. and II., neatly bound in cloth and lettered, price 2s. 3d. each, may be obtained by order of any Bookseller.

RUSSIA AND THE RUSSIANS.—IN THE WORKING MAN'S FRIEND AND FAMILY INSTRUCTOR, published weekly, price one penny; monthly parts, 5d. or 6d., a most interesting series of papers appear weekly, descriptive of Russia and the Russians, richly embellished with engravings of the principal cities and public edifices of European Russia.

ANSWERS TO CORRESPONDENTS.

HENRY E. B. should give the preference to English, but he might try the French along with it, if he has time.—F. S. CRAIG (Sheffield): We are willing to do anything in reason for our correspondents; but to ask us to correspond in phonography is too much.—DOUGALL CHRISTIE (Glasgow): The first part of his paradoxical question has been put before, p. 256, and has not been answered.—An esteemed correspondent takes us politely to task for *apparently* misleading our readers, by allowing them to suppose that it is possible to find *the square* of £99 19s. 11¾d! Now, we *must* say that we made no remark whatever about *the square* of this quantity; for we entirely agree with him in saying that it is "utterly absurd;" yet we deny that it is absurd *to multiply this sum by itself!* And, in order to put the matter to the test, we propose a question, in which this multiplication will be necessary, and the answer will be quite free from absurdity. "If £1 in a certain number of years, becomes £99 19s. 11¾d.; what will £99 19s. 11¾d. become in the same period?" Here it will be necessary to multiply the sum in question by itself, and yet it will be *no square!* Some of our readers will, no doubt, favour us with the answer.—R. C. A. (Gourock) should try the "Cold Water Cure" for all his ailments.—A LONDON BOY may bind the POPULAR EDUCATOR in Russia leather, and if well done, it will look very handsome; besides it will preserve the book for a very long period; but it is rather expensive.—J. R. (Delph) wishes us to propose a question, originally proposed by Sir Isaac Newton: "If 12 oxen will eat 3½ acres of grass in 4 weeks, and 21 oxen will eat 10 acres in 9 weeks; how many oxen will eat 24 acres in 18 weeks; the grass being supposed to grow uniformly in all the cases?"—A Lover of the POPULAR EDUCATOR (Brecon) should write to the "Head Master of King's College School" at once for the information he requires. There can be no doubt that a prospectus will be sent on application.—STUDIOSUS (Newbury): The common phrase "were you" is quite correct, and "was you" quite wrong. Lessons in Composition are already given by Dr. Beard. The best rule for the acquisition of the pronunciation of geographical proper names is, to listen to the conversation of an enlightened traveller or merchant.—B. D. S. (Bradford): 26 numbers will make the first volume.—H. H. S———E (Lynn): The following are some subjects that might be discussed in a "Young Men's Society." 1. What is the nearest relation to any individual of the human race, who has reached the years of maturity, and has performed all the functions and duties required by nature and religion? 2. What are the causes of the disrespect so generally shown by children to their parents, and to aged persons in general, in modern times, and in civilised and Christian countries, as compared with what we read of in ancient times, particularly in the sacred Scriptures and in the authentic history of heathen nations; and, especially, looking at the example of the Saviour? (Luke ii. 51.)—W. S. H. (London): Thanks for his suggestion as to the geographical planisphere.—WILLIAM HOARE (Grosvenor-square): We intend to give lectures on Algebra, when the questions in the Arithmetic will be explained.

A SCHOOL ASSISTANT (Reigate): *Natural history* commonly denotes the science which gives us a history and description of animals, and traces their peculiar habits, qualities, and uses. *Physiology* is the science of the different functions of which life is the manifestation, as respiration, circulation, nutrition, &c. It is divided into *animal* and *vegetable* physiology; and, still further, into *human*, which relates to man; and *comparative*, which relates to inferior animals and to vegetables. On classification our correspondent is referred to the POPULAR EDUCATOR, p. 88. We are now treating the *order carnivora*; the other *orders* will follow in due course.

LATIN.—W. McP.: The Latin moods do not in all cases correspond with the English; the diversities will be made clear in due time. The translation is correct.—SANS-MAITRE: The imperfect tense denotes an action continued or repeated in past time. In the given sentence, absolutus est is in the perfect, because it denotes one simple act; while accusabatur is in the imperfect, because a continued state or condition is intended.—POOR DOCTOR'S BOY is informed that the first person plural is often used when one person only is meant; the great *we* of reviewers is merely *I* under a cloak of dignity; so the Queen says *we* when she means herself alone.—P. 275, 2nd col., lines 55 and 56 from the top, *for* perfect *read* future.

T. N. B. (Southgate): The best books on Botany are Loudon's "Encyclopædia of Plants," Lindley's "Elements of Botany," and his "Introduction," also Balfour's "Manual."—M. Y. F. (Bristol) should study Dr. Beard's Lessons both in Latin and English in preference to a variety of other lessons. On poetry we can give no advice; *poeta nascitur, non fit.*—R. M. STUDENS (Fife): Riddle's Dictionary (12s.) contains both the Latin-English and the English-Latin parts. You may get it through any respectable bookseller.—J SOWDEN: His demonstration of query 4, p. 111, is very good, and would have been inserted but for its length. The same proposition is demonstrated in Bland's "Geometrical Problems," Sect. 4, No. 40, in a shorter manner; but it depends like his upon the lemma, that "the three perpendiculars drawn from the three angles of a triangle to the opposite sides intersect each other in the [illegible] demonstrated in several well-known editions of Euclid: see Thomson's edition, Prop. H, Book VI., where it is made to rest on Prop. XXI., Book III. Perhaps our geometrical correspondents may yet accomplish its demonstration within the limits of the First Book of Euclid.—A SUBSCRIBER, W. G. (Birmingham): Mr. J. Guest, Bull-street, will supply you with the POPULAR EDUCATOR, fine or common edition, in parts or numbers.

SELF-TAUGHT (Duke-street) has made a good choice of studies, English, Arithmetic, and Geology: a most useful language, the most useful, pure, or exact science, and an interesting mixed science to relieve the former. Go on and prosper.—THEOPHILUS (Shrewsbury): See p. 161, line 44, and p. 162, No. 26.—GENTILHOMME: Très bien.—M. J. (Norwich): His case is very hard; but we admire his determination. All Nicholson's works are useful to carpenters. Consult John Weal's "Catalogue of Architectural Books."—J. P. K. (Polygon) wishes to know why a small portion of Kent is situated on the Essex side of the Thames, opposite to Woolwich?—X. X. X. (Liverpool): Punctuation will be included in the English Lessons. There is a treatise on "Grammatical Punctuation," by John Wilson, of Manchester.—GULIELMUM: Why not MUS? H. L. S.: Dr. Freund's Latin Dictionary, just published, is the most complete; and Zumpt's Latin Grammar is reckoned the best.—TWO FRIENDS shall have Penmanship soon; the POPULAR EDUCATOR will continue by the continued exertions of all its friends.—JAMES KER (Aughnacloy): His solutions and queries are good. Measure off from the lower corner of the square along the side to the right, a part equal to the hypotenuse of No. 2, and through its extremity draw a parallel to the side of the largest square, p. 239.—JOHN INGLIS (Aberdeen): The final *e* is always sounded in German, with some trifling exceptions, such as Sie, Die, &c.—B. P. (Islington): Smart's Walker's Pronouncing Dictionary is reckoned among the best. Some other languages must come before Dutch; but not till those in hand are brought to a close.—JAMES WILKINSON (Earby): We shall assist him in his question for the good of all, if he will send us the name of the book, and the page, from which it was taken.—JOHN BAXTER (Acomb) may trust us on the subject of Religion.—A Birmingham Subscriber, whose signature is illegible, is informed that the person-endings are the same for every verb of the same conjugation.—J. W., jun. (Gateshead): Any Latin dictionary will *do*.—J. H. and H. H., two subscribers at Chorley, are informed that the distance between the meridians on the globe diminishes from the *equator*, where it is *greatest*, to the *pole*, where it is *nothing*. A ship in passing from one meridian to another makes the same difference of longitude in whatever part of the globe she may be, but she has a much greater distance to sail near the equator than near the poles.—J. T. (York-street): You may say *cheese* when speaking of a large quantity; but you must say *cheeses* when speaking of number or variety.—A GRATEFUL SUBSCRIBER should study English Grammar before phonography, and learn it well before he meddles with that art. Our correspondence informs us that the students of phonography are the worst writers of English, whether it be as regards penmanship, spelling, grammar, or politeness, with one amiable exception at Newcastle-upon-Tyne. England comes from the Saxon Engla-land, which meant the country of the *Angles* in the south of England. These uniting with the *Saxons* conquered the south of Britain, and gave the name of the small part which they originally possessed to the whole of it. By a wise extension of the name in our day, England virtually includes Scotland, and English is now synonymous with British.—THOS. WATKINSON (Glemsford): The *a* in *answerin* is pronounced like the *a* in *mat*. You may get an old copy of Beza's Latin Testament for a shilling at a bookstall. Go on and prosper.—B. D. (Portsea): Capital; success to your endeavours, and those of your shopmates.

INDOCTUS (Sutton-in-Ashfield): An F.R.A.S., instead of emoluments, is required to pay money on admission to that honour; and as to requirements, he must, we suppose, have some claim to be considered an astronomer, either from his writings or his observations.—J. P. Y. (Devonport): We have not tried, and therefore don't know.—R. P. HAYES (Chorley): The patent laws are in a sort of transition state; but if he applies to a patent agent, he will get the newest information.—J. R. E. (Pudsey): For elocution read "Smart's Practice of English Elocution;" for etiquette, the treatise by Agogos; but fencing we cannot recommend, as we are on the peace side of the question. As to rules for a self-instruction society, we know nothing better than the Apostolic injunction: "We then that are strong, ought to bear the infirmities of the weak, and not to please ourselves."—W. SMITH (Coseley): Thanks for his communication on the construction of lenses.—DISCIPULUS (Hackney); G. E. BINFIELD: The order of Latin words can only be learned from deep acquaintance with the classics; follow Dr. Beard as closely as you can. *Homo* is used of a man considered as belonging to mankind in general; *vir*, of a man considered as a member of the state, and fulfilling all his duties to the same.—JOSEPH BLACKLOCK (Wigtown): Thanks for his useful information relating to Alexander Murray.—A. MENKOY (Bradford): Read Cassell's "New and Popular History of Ireland," 3 vols. in one, price 2s. 3d.—JOHN SMITH (Leeds): See page 161, col. 1, line 45.—A PUPIL TEACHER (Farnham): Both.

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LESSONS IN ARCHITECTURE.—No. VI.

The origin of the Tuscan order of architecture is involved in obscurity. During the era of the kings of Rome, it appears that this order was followed in the buildings of the Romans; but it originally belonged to the people of Etruria or Tuscany; and in that country remains of this order are found, which can be traced to a very remote antiquity. The characteristic qualities of the Tuscan style were solidity and grandeur, features in which it resembled the ancient Egyptian architecture, with less gigantic but more graceful forms. To whom the Etrurians were indebted for their style of architecture cannot now be determined, or whether it originated entirely with themselves; some indeed say that they brought it from the east; but we cannot agree with those who would deprive it of all originality, and assert that it was only the ancient Doric stripped of its finest features. The early Romans who used this style did not invent it, for they were mere warriors and not artists. They adopted from time to time the arts of the nations which they conquered. Hence, first came the Tuscan style, and then the Grecian orders, to be adopted by the Romans. For an example of the Tuscan column see fig. 19. The Temple of Jupiter Capitolinus, begun by Tarquinius Priscus and finished by Tarquinius Superbus, said to have been built by Etrurians, and the tomb of Porsenna, king of that people, were splendid early specimens of this order; but no remains of them are to be found. The column of Trajan, built about a century after the Christian era, and which remains to this day, is considered to be a remarkable specimen of the Tuscan column.

Fig. 16.

The Pantheon.

After the introduction of the Grecian orders of architecture into their edifices, the Romans chiefly employed Greek artists, and made no alteration upon these orders, except sometimes blending them together in the same building. In general, they employed the Corinthian order as the most elegant; and a modification of this order is attributed to them, as the only attempt which they made at originality in architecture; but some are inclined to believe that even this invention was due to some Greek architect. This new order was called the Composite, because it was in fact a compound order, made by the union of the Corinthian and the Ionian orders. The power, the wealth, and the vanity of the Romans, led them to increase the number, the magnitude, and the decorations of their edifices to a degree far beyond those of Greece. In the theatre of Marcellus, and in the Coliseum, the Doric and the Ionic styles were both introduced; but the Corinthian style, with its rich ornaments, was most adapted to the taste of the masters of the world; and as if not left by the inventors in shape sufficiently expressive of splendour and magnificence, they loaded every member of it with ornaments unknown to the Greeks. In the Composite, sometimes called the Roman order, there was especially a profusion of ornament; and there was scarcely a moulding which was not loaded with decorations. When the particular members could receive no more ornaments, they had recourse to varying the outlines of their edifices (particularly their temples) into every shape that could be produced by the union of circular and triangular figures. Specimens of the Roman style of architecture are to be seen in the arch of Titus and the baths of Diocletian; and two magnificent capitals are to be seen in the baptistry of Constantine, which belonged to some elder edifice whose history is now unknown. For a specimen of the column of the Composite order, see fig. 20.

Fig. 17.

The Magdalen.

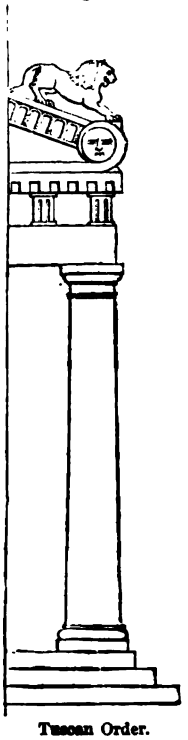
In the decline and fall of the Roman empire, Constantine the Great transferred the capital from Rome to Byzantium, and attempted to make the latter rival the former in monumental grandeur by erecting immense public edifices. Here, however, as in Italy, art and science took a retrograde course, and the elegant orders invented by the Greeks rapidly lost their original purity and simplicity. A new style was then grafted on Roman art; the capitals lost their graceful outlines, and assumed cubical forms; the columns were shortened, and the entablature no longer possessed its regular proportions. This style of architecture was called the Byzantine; its ornamentation was no more that of Rome; it again approached the older Greek style, but shorn of the grandeur and magnificence of the whole, and of the exquisite beauty of its details. The Byzantine style lasted during the period of the Eastern empire, and to this day it is employed by the Greeks in their buildings. From the combined influences of that empire, and the memorials

Fig. 18.

The Exchange at Paris.

which Rome still preserved in the first ages of the Christian era, of the finest periods of her architecture, a variety of styles arose, of which the oldest was called the Latin style, because it was adopted by the whole of the Latin church. Numerous examples of this style are to be found in Italy, and some in France; such as the churches of St. Laurence-without-the-walls, and St. Agnes, at Rome; the ancient baptistry of St. Jean, at Poitiers, &c. This style, in which may be found all the divisions of an order, was preserved entire until the age of Charlemagne, of which the cathedral of Aix-la-Chapelle, and the porch of the monastery of Lorsch are striking proofs. After the reign of this emperor, new innovations and a retrograde movement in the forms of the orders of architecture led to the Romanesque style, in which all regular proportion was completely abandoned, and in the most of the applications of this style the entablature was altogether omitted. From the Romanesque to the pointed style the transition was easy; in the latter the column departed still more from the rules established by antiquity; it was lengthened out of all proportion, and degenerated into a group of slender pillars. Towards the end of the middle ages, the fact of the numerous relations which subsisted between Italy and all parts of Europe, and of the continued existence in that country of the principles and specimens of ancient architecture led to a return to the established rules of the Greeks and the Romans. This return produced a change in the appearance of architectual monuments in Europe; this epoch, which was called the Renaissance period, brought back the different orders to reasonable and true proportions, and architecture has continued in this state, with more or less variation, to the present day.

Fig. 19.



Tuscan Order.

In our first page are represented some modern edifices built after the most ornamental of the Greek styles of architecture; namely, fig. 16, the Pantheon or Church of St. Genevieve; fig. 17, the Church of the Magdalen; fig. 18, the Bourse, or Exchange: all in Paris. The church of St. Paul's, London, which we pass every day, unites the Corinthian and Composite orders.

It is now time to give an explanation of the terms used in speaking of the different orders of architecture. Among the Greeks an order was composed of columns and an entablature; the Romans added pedestals under the columns of various orders to increase their height. The column is generally a round pillar constructed either to support or to adorn an edifice. Besides columns the Greeks employed human figures to support the entablature. Vitruvius informs us that when male figures were employed they were called Persians, to indicate the contempt in which that nation was held; and they represented these figures accordingly in the most suffering posture, and loading them as it were with the heaviest entablature, that of the Doric order; and when female figures were used, they were called Cariatides, to signify their contempt for the Carians, whose wives had been taken away captive in their wars with the Athenians. Some critics doubt the truth of these stories of Vitruvius, and endeavour to account for the origin of the figures and their names in a different manner. Whether the Greeks invented this mode of supporting entablatures, or copied it from the ancient Egyptian edifices or from the tombs and temples of India and Persia, it is needless to inquire. Fragments of male figures apparently employed for the same purposes, have been found among the ancient Roman monumental remains.

The pilaster is a square pillar used for the same purpose as the column; instead of standing isolated like the column, it is generally inserted in the wall of an edifice showing only a fourth or a fifth of its thickness. Pilasters have their bases, capitals, and entablatures with the same parts, heights and projections as columns have; and they are distinguished like them, by the names of the five orders of architecture, Doric, Ionic, Corinthian, Tuscan, and Composite. They are supposed to be of Roman origin, as they only appear in the later periods of Greek architecture; and they are much more numerous in the Roman monuments. Vitruvius calls them *parastatæ* because of their *standing close* to a building or forming part of it. The Greeks, though they did use pilasters in their designs, had a kind of square pillars at the end of their walls which they called *antæ*, and which sometimes projected a good way from the principal front; they were also at the entrances to a building.

Attics were a sort of low square pillars with their cornices, which originated in Athens, and were used in buildings to conceal the roof. These were ranged in a continued line, and raised above the rest of the structure, in front of the roof, so as to hide it entirely, presenting a new order as it were, above that of the building. The Greek attics are not now to be found among the ruins of Athens. Roman attics are seen in the remains of the triumphal arches, and in the piazza of Nerva. In the arch of Constantine, the columns are surmounted with pedestals, as high as the base of the attic, upon which are placed isolated statues. There are various other ancient ruins which exhibit these attics, but they appear to be of different proportions, some being nearly one-half of the height of the order. The moderns make the height of the attics equal to that of the entablature.

Fig. 20.

Composite Order.

A series of columns, separate or connected, used in the support of an entablature, is called a colonnade; it receives a specific name, from the number of columns employed; as, tetrastyle, when there are four; hexastyle, when there are six; octostyle, when eight; and decastyle, when ten. The space between the columns, is called the intercolumniation. There are five kinds of intercolumniation,—namely, the areostyle, or thinly set, where the columns are at the distance of four diameters of the column; the diastyle, when they are at the distance of three diameters; the eustyle, when at the distance of two and a quarter; the systyle, when at two; and the pycnostyle, or thickly set, when at one diameter and a half. Of these, the eustyle was most generally used by the ancient architects. Other names have been given to the intercolumniation of the Doric order, according to the number of the triglyphs placed over them; as, monotrigiyph, when there was one; ditriglyph, when there were two, &c. Coupled, grouped, or clustered columns, appear not to have been used by the ancients, with some apparent exceptions at Rome.

Every column, except the Doric, to which the Romans give no base, is composed of a base, a shaft, and a capital. The base is that part of the column, which is beneath the shaft and upon the pedestal, when a pedestal is used; it has a plinth, a member of a flat and square form like a brick, called in Greek plinthos, with mouldings that represent rings, with which the bottoms of pillars were bound, to prevent their cleaving. These rings, when large, are called tori, and when small, astragals. The tori have generally hollow spaces cut round between each torus, called rundels, scotia, or trochilus.

The shaft of the column is the round and even part extending from the base to the capital; this part of the column is narrower at the top than at the bottom. Some architects

would give the column a greater breadth at the third part of its height, than at the bottom of the shaft; there is no instance of this being practised among the ancients. Others make the shaft a cylinder from the bottom to the third part of its height, and thus lessen it from this to the top. And some consider that it should begin to lessen from the bottom. The capital is the upper part of the column immediately above the shaft.

The entablature is the part of the order above the columns, and is composed of three parts: 1. The architrave* or lower part; 2. The frieze or middle part; and 3. the cornice or upper part. The architrave represents a beam, and lies immediately above the capitals of the columns: the Greeks called it epistylion. The frieze is the space between the architrave and the cornice; it represents the ceiling of the building. The cornice is that which surmounts the whole order; it is composed of several mouldings, which, projecting over each other, are employed to shelter the order from the rain upon the roof.

The pedestal is the lowest part of an order. It is of a cubical or prismatic form, and consists of three parts: 1. the base or foot which stands on the area or pavement; 2. the die or middle part which rests upon the base; and 3. the cornice or wave, upon which the column is placed. The use of pedestals appears to have been introduced into architecture subsequent to the loss of political independence in Greece. In the original examples of Greek architecture the columns are generally formed standing on the uppermost of three steps; the temple of Theseus has but two steps. When the Romans elevated the floors of their temples and other edifices, they were obliged to discontinue the erection of front stairs, on account of their inconvenience in occupying so much ground around the building, and to adopt the pedestal or podium raised to a level with the top of the stairs, and projecting to the front of the steps which profiled it on all sides. Vitruvius makes no mention of pedestals, in treating of the Doric, Tuscan, and Corinthian orders; and in treating of the Ionic, speaks of the pedestal as a part of the construction, but not of the order.

* Architrave is a mongrel term, derived from arche, Gr. *beginning* or *foundation*, and trabs, Lat. *a beam*.

LESSONS IN LATIN.—No. XXII.

By John R. Beard, D.D.

REGULAR VERBS.

The Second Conjugation.

PASSIVE VOICE.

Example.—Moneor 2, *I am reminded.*

Chief Parts; moneor, monĭtus sum, monēri.

Characteristic letter, E long.

		Indicative.	*Subjunctive.*	*Imperative.*	*Infinitive.*	*Participle.*
Present.	*Sing.*	mŏneor	mŏnear	[dior monēri		
		monēris	monearis	monēre or mon-		
		monētur	moneātur	monĭtor		
	Plural.	monēmur	moneāmur			
		monēmini	moneāmini	monēmini		
		monĕntur	moneantur	monĕntor		
Imperfect.	*Sing.*	monēbar	monĕrer			
		monebāris(e)	monerēris			
		monebātur	monerētur			
	Plural.	monebāmur	monerēmur			
		monebāmini	monerēmini			
		monebantur	monerentur			
I. Future.	*Sing.*	monĕbor			monĭtum	monendus
		monēbĕris(e)			[iri	
		monēbĭtur				
	Plural.	monēbĭmur				
		monebĭmini				
		monebuntur				
Perfect.	*Sing.*	monĭtus sum	monĭtus sim		monĭtum	monĭtus
		monĭtus es	monĭtus sis		[esse	
		monĭtus est	monĭtus sit			
	Plural.	monĭti sumus	monĭti simus			
		monĭti estis	monĭti sitis			
		monĭti sunt	monĭti sint			
Pluperfect.	*Sing.*	monĭtus eram	monĭtus essem			
		monĭtus eras	monĭtus esses			
		monĭtus erat	monĭtus esset			
	Plural.	monĭti eramus	monĭti essemus			
		monĭti eratis	monĭti essetis			
		monĭti erant	monĭti essent			
II. Future.	*Sing.*	monĭtus ero				
		monĭtus eris				
		monĭtus erit				
	Plural.	monĭti erĭmus				
		monĭti eritis				
		monĭti erunt				

Exercises.—According to this model, form habeor, *I am possessed*; terreor, *I am frightened*; exerceor, *I am exercised.*

Vocabulary.

Despēro 1, *despair*; augeo, augere auxi, auctum, *I increase* (E. E. *augment*); deterreo 2, *I frighten from, deter*; oppleo, opplēre opplevi, oppletum 2, *I fill up*; jungo, jungere, junxi, junctum 3, *I join*; vivo, vivere, vixi, victum 3, *I live*; cingo, cingere, cinxi, cinctum 3, *I surround*; propositum, i, n. *a proposition, design*; fossa, ae, f. *a ditch, moat*; difficultas, atis, f. *difficulty*; obsidio, ōnis, f. *blockade*; cognitio, ōnis, f. *knowledge*; subitus, a, um, *sudden*; naturālis, e, *natural*; castra, orum, *a camp*; extemplo, ad. *forthwith*; strenuè, *earnestly, strenuously*; postquam, *afterwards.*

Exercises.—Latin-English

Exerceor; exerceris; exercetur; exercebar; exercebaris; exercebatur; exercebor; exercēbere; exercebitur; pater curat ut ego, bene exercear; oppletur fossa; curo ut bene exercearis; curo ut puer bene exerceatur; pater curabat ut filius bene exerceretur; curabam ut bene exercereris; curabam ut filia tua bene exerceretur; quis nescit quam praeclaris fructĭbus animi nostri in literarum studiis augeantur; timemus ne exercitus noster ab hostibus vincatur; omnes cives metuebant ne urbs ab hostibus obsidione cingeretur; quum in literis exercemur, animi nostri multarum rerum utilium cognitione augentur; quum subito periculo terremur, non debemus extemplo de salute desperare; virtutis honos nullā oblivione delebitur; pueri in literarum studiis strenue exercĭti sunt; metuebamus ne urbs ab hostibus obsidione cincta esset; metuo ne milites subito periculo territi sint; strenue exercetor puer; ne rerum difficultatibus a proposito deterretor; boni discipuli student exerceri in literarum studiis; puer bene educatus omnibus placet; hostes territi in castris manent; pueri strenue exercendi sunt.

English-Latin.

The boys are earnestly exercised; let boys be earnestly exercised; the boys must be strenuously exercised; the boys will be strenuously exercised; the boys are strenuously exercised; the boys were being strenuously exercised; the boys have been strenuously exercised; the boys will have been strenuously exercised; I take care that the boys are (may be, in Latin) strenuously exercised; I took care the boys were (might be) strenuously exercised; my sisters have been strenuously exercised; the girl will have been strenuously exercised; I fear the city will be surrounded with blockade (blockaded).

The Third Conjugation.

ACTIVE VOICE.

Example.—Lego 3, *I read.*

Chief Parts; lego, legi, lectum, legĕre.

Characteristic letter, E short.

		Indicative.	*Subjunctive.*	*Imperative.*	*Infinitive.*	*Participle.*
Present.	*Sing.*	lego	legam		legĕre	legens
		legis	legas	lege or légito		
		legit	legat	légito		
	Plural.	légimus	legāmus	[litte		
		légitis	legātis	légite or leg-		
		legunt	legant	legunto		
Imperfect.	*Sing.*	legēbam	legerem			
		legēbas	legeres			
		legebat	legeret			
	Plural.	legebāmus	legerēmus			
		legebātis	legerētis			
		legebant	legerent			

		Indicative.	*Subjunctive.*	*Infinitive.*	*Participle.*
I. Future.	*Sing.*	legam leges leget		lectūrum [esse	lecturus
	Plural.	legēmus legētis legent			
Perfect.	*Sing.*	legi legisti legit	legerim legeris legerit	legisse	
	Plural.	lēgimus lēgistis legērunt (ēre)	legērimus legēritis legērint		
Pluperfect.	*Sing.*	lēgeram lēgeras lēgerat	legissem legisses legisset		
	Plural.	legerāmus legerātis legerant	legissēmus legissētis legissent		
II. Future.	*Sing.*	lēgero lēgeris lēgerit			
	Plural.	legerĭmus legerĭtis legerint			

Gerunds.	Gen.	legendi	Supines.	1.	lectum
	Dat.	legendo			
	Acc.	legendum		2.	lectu
	Abl.	legendo			

Instances.—After this model write out fundo, fundĕre, fudi, fusum, *I pour*; tribuo, tribuere, tribui, tribūtum, *I bestow*; and scribo, scribere, scripsi, scriptum, *I write*.

Vocabulary.

Duco, ducere, duxi, ductum 3, *I lead*; pingo, pingere, pinxi, pinctum 3, *I paint* (E.R. *picture*); instruo, instruere, instruxi instructum 3, *I draw up, form* (E.R. *instruct*); acies, ei, f. *a line of battle*; vivo, vivere, vixi, victum 3, *I live*; quoad, *as long as*; gero, gerere, gessi, gestum 3, *I carry on*; simulatque, *as soon as*; excŏlo, excolere, excolui, excultum 3, *I cultivate*; corrigo, corrigere, correxi, correctum 3, *I correct*; comburo, comburere, combussi, combustum 3, *I burn*; disco, discere, dĭdici, *I learn*; libenter, *willingly*; defendo, defendere, defendi, defensum 3, *I defend*; coerceo, coercere, coercui, coercitum 2, *I restrain*, dico, dicere, dixi, dictum 3, *I say*.

Exercises.—Latin-English.

Duximus; duxisti; ducis; ducebam; ducet; ducat; dum ego pingebam, tu scribebas, et frater legebat; hostes aciem instruebant; quoad vives bene vives; si virtutem coletis, boni te diligent; hostes aciem instruxerunt; hostes aciem instruent; multas literas hodie scripsimus; bellum atrocissimum gesserunt hostes; Caesar aciem instruxerat; simulatque literas scripserimus ambulabimus; curo ut puerorum animos excolam; curabam ut filii mei preceptor animum exco eret; nemo dubitat quin ego puerum semper diligenter correxerim; metuimus ne hostes urbem combusserint; nemo dubitat quin hostes urbem obsidione cincturi sint; narrate nobis quid parentes scripserint; scribito; disce, puer; boni pueri libenter discunt; miles se fortiter contra hostes defendens, laudatur; cupiditates coerceere debemus.

English-Latin.

I defended the city; the soldiers defended the city; they will defend the city; they have defended the city; they were writing; he has written a letter; no one doubts that you will write a good letter; take care to write a letter; the teacher takes care that his scholars write good letters; I have written a letter to-day; the enemies will draw up (their) line of battle; the soldiers have burnt the city, I have read the letter which thou wrotest; I fear that the enemies will blockade the city; correct that boy; the master will take care to correct his scholars; tell (*narro*) me what thou saidst to thy [illegible]s restrain thy desires; we ought to restrain our desires; a boy restraining his desires is loved; strenuously cultivate thy mind, my son!

LESSONS IN MUSIC.—No. IX.

By John Curwen.

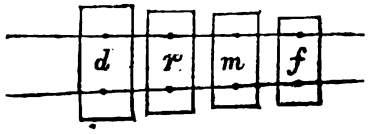
While our pupils are advancing in their own practical study of the three principal notes of the scale, in connexion with the tunes given in this and the following lesson, we shall usefully occupy our time in reviewing and making the more sure some of the steps already taken. One of the chief anxieties of the art of teaching is that of ascertaining where lie the real difficulties of our pupils. This we are enabled to do by means of the correspondence with which we have been favoured. Most of the mistakes of our pupils have arisen from careless reading or from a forgetfulness of the pledge to which at first we sought to bind them. This was the pledge: "We have only two things to ask of you;—the first, that you will *be content to learn one thing at a time*, instead of being impatient for knowledge not for the moment helpful, perhaps just then only confusing to you; the second, that when something is set before you to be done, *you will really do it*, instead of supposing it to be done and going on; for only by doing we truly understand." But without judging our friends too nicely we will try to meet their difficulties. Those difficulties relate to the "modulator," the "pattern," and "the moveable DOH."

2. "*What I want*," says one of our correspondents, "*is to be able to measure to the eye the exact interval the voice is taking.*" It is just for this purpose that the modulator is provided. The ordinary staff of five lines and four spaces does not measure *to the eye* the exact interval the voice is taking, because it fails to show pictorially the places of the "semitones" (tonules) of the scale, and, indeed, makes, pictorially, no difference between tone and "semitone." This is, however, a point of vital importance to the learner, and *one which should be kept constantly before his eyes*. Hence the necessity of some such scale as the modulator offers. The modulator also possesses the advantage of showing not only lines or marks *for* the notes, but the names of the notes themselves. Our pupils have to use only the middle column at present. In order thus to measure to the eye the interval the voice is taking, our pupil must not be constantly looking from the book to the modulator and from the modulator to the book. He must first learn a few notes on his tune "by heart" and then sing them from the modulator alone, and so on till he can point the whole tune from memory, and without the book. Thus, if he is learning exercise five, let him just read and repeat to himself "DOH, SOH, ME, DOH" several times over. Then let him, laying aside his book, turn to the modulator and sing those notes while he points to them. Next let him learn to "point and sing," without book, the phrase "ME, ME, DOH" in the same manner, and after that the whole exercise. Very extensive experience in teaching has made us feel increasingly the importance of requiring the pupils thus to "see," and themselves point out, the intervals they sing on a perfect scale like the modulator. It is only by this painstaking that a real knowledge of interval is gained. If the pupil will *begin at the beginning* and *faithfully pursue this plan*, we can promise him that long before he has reached this ninth lesson he will have attained such a facility in "pointing from memory on the modulator" as will make the exercise quite a delightful one to him. "Oh," said a little girl to her mamma, as they were travelling in a railway-train, and a stranger opened a number of the Popular Educator, "Oh, mamma, there's a modulator!" "What do you know of the modulator?" said the stranger. "Oh! I know something," was the answer, and the happy child soon convinced the stranger that she "knew something" by singing and "pointing" as she sang several of the tunes she had learnt at school. Upwards of a hundred and fifty adult pupils from various classes in London last season took "certificates of proficiency," implying the ability to sing plain music at first sight, and every one of them was required to bring proofs to the examiners of his ability to sing and point on this scale from memory a large number of tunes. Let not our pupils of the Popular Educator be behind the others in this vital exercise of self-discipline.

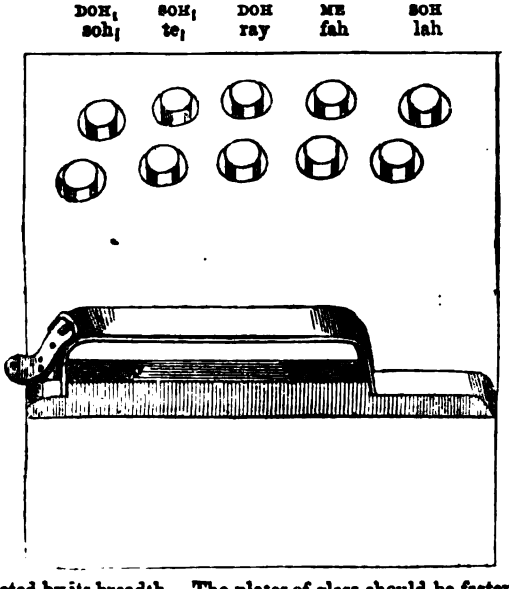
3. Many of our correspondents want to know "whether they can learn the Music Lessons without the aid of a friend to set the pattern." A large number of our pupils are, no doubt, like one of them who says, "I have naturally a good ear for music, and am able to sing almost any song after hearing it two or three times." To such persons, very little patterning

will be needed. Let them only learn, from a friend, how to strike the chord (DOH, ME, SOH) to any sound that may be given, and the rest will easily follow. We ourselves were exactly in their position, and *did* thus "make out" tunes, and teach ourselves to sing plain tunes at sight,—*constantly using the modulator, and pointing as we sang*, and often having to run up or down from one note to another in order to know how to strike an interval. We had nothing but a c¹ tuning-fork, by means of which we found out the key-note. Everything depends on the faithfulness with which you master the exercises of the first three lessons. But to many persons, doubtless, who have no friend to set the pattern, some simple instrument will be necessary. If you are already acquainted with an instrument, *whatever it is*, use that. Only let us warn you not to sing *with* your instrument,—that is, to use it as a "pattern," not as a "leader,"—to make yourself independent of the pattern as soon as possible, often endeavouring to do without it, and to trust more and more to your own perception of the mental effect of notes, as developed in our lessons; for instruments may be out of tune, and some of them—the piano and organ for instance—are systematically (to however small an extent) *imperfect* in tune. The flatness of the fifths on the piano, for instance, are very obvious. The fifth note of the scale (SOH) should be brilliant and trumpet-like in its effect. The pupil's knowledge may thus correct the slight inaccuracies of his instrument. We have been at some pains to make inquiries with a view of recommending some cheap instrument to our pupils with which they may set the pattern. We shall, in this article, describe two of the most accessible,—"the Glass-harmonicon," and "the German concertina."

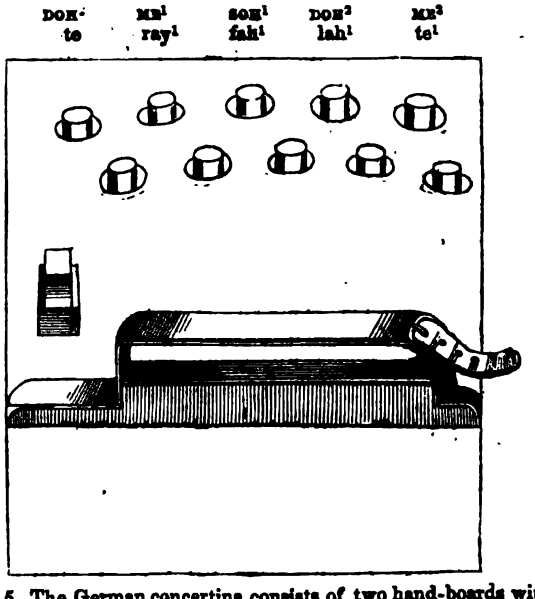
4. The glass-harmonicon is a well-known and cheap instrument, in which the sounds are produced by striking with a light hammer on small plates of glass. These are of different lengths, and are placed in a row, fastened to two slightly-converging tapes, thus:



The acuteness or gravity (highness or lowness) of the sound in each glass, depends on the fineness of the substance of the glass, the thickness of the plate, and its length; but is not



affected by its breadth. The plates of glass should be fastened to the tape by strong cement (bored and tied would be better), at the distance of one quarter of their length from each end. This we mention for the sake of any artisans who may wish to make one. The cheapest of these instruments—which may be bought for nine pence or a shilling—contains eight glasses, which are tuned to the single octave in the key of C. These glasses are marked C D E F G A B C¹. Our pupils should paste little letters on them with the initials of the solfa syllables, DOH, RAY, ME, FAH, SOH, LAH, TE, DOH¹. Then, he will only have to strike with his hammer the glasses that are marked with the syllables named in his exercise, and he would hear his wished-for "pattern." With this instrument, he can play all the exercises which do not run beyond the range of a single octave. Of course he can only play them in the key of C, however preferable some other key-note may be. But this is not of so great consequence as he may suppose, for when once the ear and voice are tuned to a single key, the other keys (which are all of the same structure, only higher or lower in pitch) are easily mastered. Let the pupil who has learned to sing the chord DOH, ME, SOH, by such an instrument, and can sing it perfectly without the instrument, exercise himself in striking the sound G, and raising a chord (DOH, ME, SOH) upon that, without a pattern. Next, let him raise a chord on the sound D, next on the sound A, next on E, and next on B, in the same manner as before. After this let him try to sing, not only the chord, but the whole scales of G, D, A, and E. Many will be able to do this; and they, when they have learnt their tune by pattern in the key of C, will easily manage to pitch the proper key-note, raise the chord upon it, and afterwards sing the tune itself in the key for which it was written. We should, however recommend our pupils to purchase the glass-harmonicon with two octaves (fifteen notes), which they can get for one shilling and ninepence. Let them mark it with the syllables, and use it in the same way as that with one octave. For a slight additional expense, any maker of these instruments would construct one for you tuned in the key of G, or in any other key you may desire. In that case, you must paste your DOH upon the glass marked G, RAY upon that marked A, and so on. With these two instruments you would be able to play most of the tunes very fairly. You would still lack the so-called "accidentals," not yet explained in our lessons. If these are added to your two octaves of glasses, the instrument would cost you from five to seven shillings. The prices we have named are those of Mr. T. Bull, 34, Windmill-street, Finsbury-square, who sells these instruments more cheaply than any one we have yet discovered. Mr. Hack, of Fleet-street, makes very good ones of plate glass, but, of course, at much higher prices.



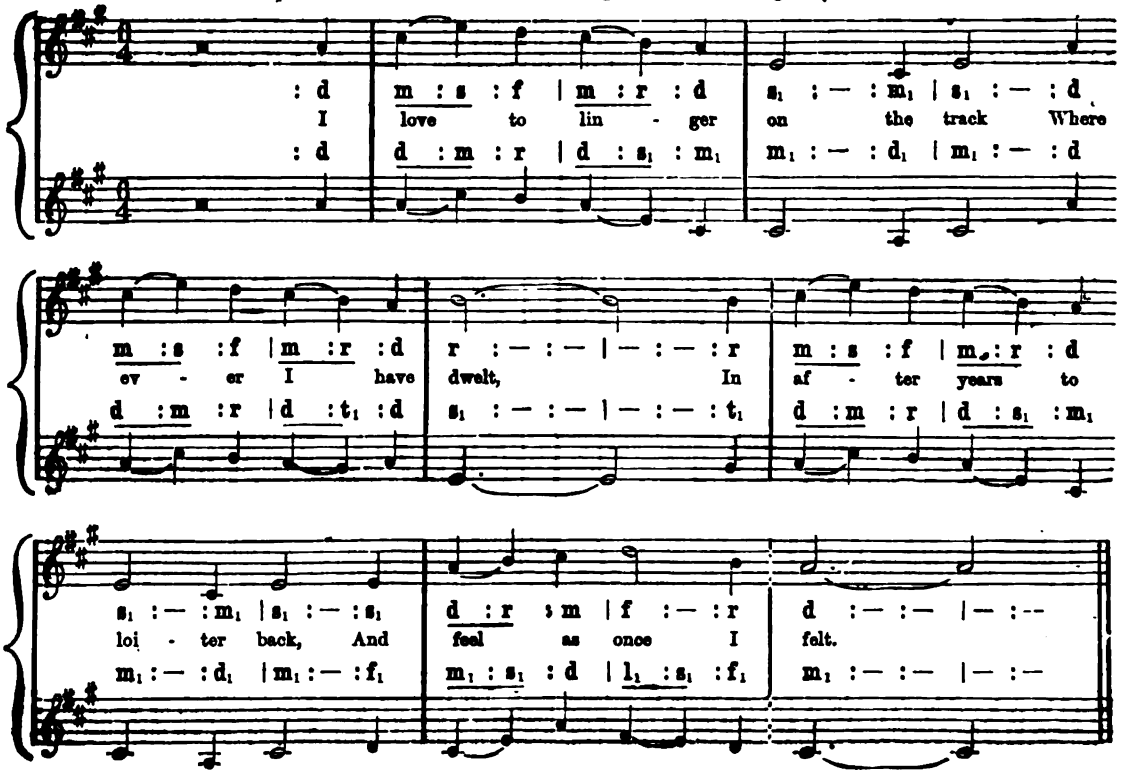
5. The German concertina consists of two hand-boards with bellows between. The metallic tongues by which the sound is produced and the machinery by which the little pegs, when

pressed by the hand, direct the current of air upon them are all concealed. We have drawn the hand-boards as though they were made to face us. The right hand is passed through the strap so that its thumb can command the valve at the side, and its fingers the pegs by which the notes are produced. In a similar manner the left hand is passed through the other strap, so that its fingers can press the pegs of the other board. You can thus open or close the bellows with the hands while the fingers are at liberty to play. Be very careful not to draw or press the bellows without either opening the valve or pressing one of the pegs. If you use such careless violence the metallic tongues will soon be put out of tune. The use of the valve is this: If you have drawn out the bellows to the full extent and wish, for the production of some note, to draw them again, hold down the valve and press the bellows. The air will thus escape without a sound, and you are liberty to *draw* the bellows again just as you please. If you have pressed down the bellows to the full extent and should wish to press them yet again, you can, in a similar way, *draw* with the valve held down, and then *press* as you please. Holding down any one of the pegs with your finger you can produce two notes, one while the bellows is *pressed* together, and the other while it is *drawn* out. We have placed above the pegs in the diagram the solfa names of the notes which they produce. Those printed in capitals are produced by *pressing* the bellows, those in small letters are produced by *drawing* out the bellows. These solfa names of the notes apply to both rows of pegs alike; the higher row of pegs playing in the key of c, and the lower row in the key of *d*.

The learner will notice that all the *press*-notes are those of the tonic chord DOH, ME, SOH. So that if you were to hold down all the pegs at once, and *press* the bellows, you would produce good harmony. This is a great help to the memory. Let the pupil who possesses such an instrument begin by holding down the middle peg of the left-hand board, and *pressing* the bellows. This will give him DOH. Next let him *draw* the bellows, holding down the same peg. This will give him RAY. Next, holding down the fourth peg, let him press and draw. This will give him ME and FAH. In the same manner the fifth peg will give him SOH and LAH. But now, in order to continue ascending the scale on the right-hand board, he must no longer press and draw, but *draw* and *press*. A similar alteration in the recurrence of the pressing and drawing occurs in the higher part of the right-hand board, where the two *draw*-notes, LAH and TE, are required to follow each other. Our diagram will explain this. The first and second pegs of the left-hand board give notes which are very useful as accompanying harmony, but of harmony we must not begin to speak at present. With this instrument our pupils can play most of our exercises. They can play them in two parts if they please. Two of the "accidentals," those most frequently occurring, can be obtained on the instruments with two rows of pegs. Thus, if you are playing in the key of c, that is, on the higher row of pegs, you can get the "accidental," which we call TU (commonly called the sharp fourth, but really the seventh of a new key, of which we shall have more to say in future lessons), by *drawing*, on the first peg of the lower row on the right-hand board, or on the second peg of the left-hand board. TU is, in fact, the TE of another key. Again, if you are playing in the key of c, that is, on the lower row of pegs, you can get the "accidental" FI (commonly called the flat seventh, but really the fourth of a new key), by *drawing*, on either the fourth peg of the left-hand board or the third peg of the right-hand board. FI is, in fact, the FAH of another key. These instruments are now commonly sold, if with one row of pegs on each board (playing only in the key of c), for about eight or ten shillings; if with two rows of pegs (playing in the keys of c and *d*), for about fifteen or eighteen shillings. The cheapest we have seen were at the musical-instrument makers above named. More expensive instruments are made with three rows of pegs, and with two additional pegs. They need not be here described.

Of the other difficulty of our correspondents, the "moveable DOH, or key-note," we must speak in the next lesson. Meantime let our pupils practise carefully the following exercise. It is intended to exhibit the contrasted effects of ME and SOH (the third and fifth of the scale) in a somewhat quick movement.

EXERCISE 19. **I LOVE TO LINGER.** KEY A. M. 160.

(Words from MARTIN TUPPER, Esq. Tune, Old English.)

: d | m : s : f | m : r : d | s1 : — : m1 | s1 : — : d
I love to lin - ger on the track Where
: d | d : m : r | d : s1 : m1 | m1 : — : d1 | m1 : — : d
m : s : f | m : r : d | r : — : — | — : — : r | m : s : f | m : r : d
ev - er I have dwelt, In af - ter years to
d : m : r | d : t1 : d | s1 : — : — | — : — : t1 | d : m : r | d : s1 : m1
s1 : — : m1 | s1 : — : s1 | d : r : m | f : — : r | d : — : — | — : —
loi - ter back, And feel as once I felt.
m1 : — : d1 | m1 : — : f1 | m1 : s1 : d | l1 : s1 : f1 | m1 : — : — | — : —

My foot falls lightly on the sward
Yet leaves a deathless dint,
With tenderness I still regard
Its unforgotten print.

Old places have a charm for me
The new can ne'er attain,
Old faces! how I long to see
Their kindly looks again!

LESSONS IN FRENCH.—No. XXIII.

By Professor Louis Fasquelle, LL.D.

Section XLVIII.

1. The verb *seoir* [3 ir. Sect. 46, R. 3], is also used unipersonally:—

Il ne vous sied pas de parler ainsi. *It does not become you to speak thus.*

2. The verb convenir [2 ir. *see* § 62], *to suit*, is at times used unipersonally. It then signifies *to be suitable, advisable*, &c.:—

Il convient de lui écrire. *It is advisable to write to him.*

3. The irregular verb valoir [*see* table, § 62] corresponds in signification to the English expression, *to be worth*:—

Cette maison vaut cinq mille francs. *That house is worth five thousand francs.*

4. Ne rien valoir means *to be good for nothing*; ne pas valoir grand'chose, *to be worth little, not to be good for much.*

Ce drap ne vaut rien. *That cloth is good for nothing.*
Notre maison ne vaut pas grand'chose. *Our house is not good for much.*

5. Être riche de . . . means *to be worth, to possess*; when a person is the nominative of the verb, valoir is never used in this sense.

Cette personne est riche de cinq mille piastres. *That person is worth five thousand dollars.*

6. Valoir mieux, conjugated unipersonally, means *to be better*; valoir la peine, *to be worth the while*:—

Il vaut mieux travailler que d'être oisif. *It is better to labour than to be idle.*

Il ne vaut pas la peine de parler quand on n'a rien à dire. *It is not worth the while to speak when one has nothing to say.*

Résumé of Examples.

Il ne vous sied pas de nous faire des reproches.	*It does not become you to reproach us.*
Il ne vous convient pas de parler de la sorte.	*It is not suitable for you to speak so.*
Il ne nous convient pas d'y aller.	*It does not suit us to go there.*
Combien votre jardin vaut il?	*How much is your garden worth?*
Il vaut beaucoup plus que le vôtre.	*It is much more valuable than yours.*
Il ne vaut pas autant que le mien.	*It is not worth so much as mine.*
Notre maison ne vaut rien.	*Our house is good for nothing.*
Votre habit ne vaut pas grand'chose.	*Your coat is not good for much.*
Cela ne vaut pas la peine.	*That is not worth the while.*
Ce château peut valoir cent mille francs.	*That villa may be worth one hundred thousand francs.*
De combien votre oncle est il riche?	*How much is your uncle worth?*
Il est riche de deux cent mille francs.	*He is worth two hundred thousand francs.*
Ne vaut il pas mieux lire que jouer?	*Is it not better to read than to play?*

Exercise 95.

Assur-er, 1. *to assure*;	Couteau, m. *knife*;	Pouvoir, 3 ir. *to be able*;
Au juste, *precisely*;	Marché, m. *market*;	Reproch-er, 1. *to reproach*;
Autre chose, *something else*;	Mérit-er, 1. *to deserve, merit*;	Tout au plus, *at most*;
Cass-er, 1. *to break*;	Montre, f. *watch*;	Va *from* aller, *to go*;
Centaine, f. *about a hundred*;	Négligence, f. *neglect*;	Vingtaine, f. *about twenty.*
Chaîne, f. *chain*;	Négociant, *merchant*;	

1. Vous sied-il de nous reprocher notre négligence? 2. Il ne sied de vous faire des reproches quand vous le mériterez. 3. Vous convient il d'aller trouver mon frère? 4. Il ne me convient pas d'aller le trouver, j'ai autre chose à faire. 5. Combien ce champ peut il valoir? 6. Il peut valoir une vingtaine [§ 27 (2)] de mille francs. 7. Valez vous mieux que votre frère. 8. Mon frère vaut beaucoup mieux que moi. 9. Ce couteau ne vaut il pas plus que le vôtre? 10. Le mien est meilleur, il vaut davantage. 11. Combien votre montre vaut elle? 12. Elle ne vaut pas grand'chose, elle ne va pas bien. 13. De combien le négociant, est il riche? 14. Je ne puis vous le dire au juste, il est riche d'une centaine de mille francs. 15. Ne vaut il pas mieux rester ici que d'aller au marché? 16. Il vaut mieux aller au marché. 17. Votre chaine d'or vaut elle plus que la mienne? 18. Elle vaut tout autant. 19. Elle ne vaut pas grand'chose, elle est cassée. 20. Cela vaut il cinquante francs? 21. Cela vaut tout au plus deux francs? 22. Avez vous demandé au marchand ce que cela vaut? 23. Je ne le lui ai pas demandé. 24. Il m'assure que cela vaut une centaine de francs.

Exercise 96.

1. How much is my house worth? 2. It is worth about twenty thousand francs. 3. Is that horse worth as much as this one? 4. This horse is worth two hundred dollars, and that one three hundred. 5. Is it worth the while to write to your brother? 6. It is not worth the while. 7. Is it worth the while to go out when one does not wish to walk? 8 It is not (*n'en*) worth the while. 9. Does it suit you to write to my brother to-morrow? 10. It does not suit me to write to him. 11. Does it become you to reproach me with my neglect? 12. It becomes me to blame (*blâmer*) you when you deserve it. 13. What is that man worth? 14. I cannot tell you exactly, about fifty thousand francs. 15. Is that cloth good? 16. No, Sir, it is good for nothing. 17. Is your gun worth as much as mine? 18. Yes, Sir, it is worth more. 19. Will you go to my father's? 20. No, Sir, I have something else to do. 21. Is it better to go to market early than late? 22. It is better to go early. 23. How much may your horse be worth? 24. It is not worth much, it is very old. 25. Is your watch better than mine? 26. It is not worth much, it does not go. 27. Is that book worth two francs? 28. It is worth one, at most. 29. Have you asked your sister what that book is worth? 30. I have not. [Sect. 24, R. 12. Sect. 46, R. 4.] 31. What must I do? 32. You must speak to your father. 33. Must he have money? 34. He must have some. 35. Has he not sold his horse? 36. He has sold it, but it was not worth much.

Section XLIX.

1. When the verbs prendre [4 ir. *see* § 62], *to take*; voler, *to rob, to steal*; acheter, *to buy*; demander, *to ask for*; payer, *to pay*, are followed by one regimen only, or by several regimens in the same relation; these regimens, if nouns, must not be separated from the verb by a preposition; if pronouns, they take the form of the direct regimen, *le, la, les*:—

Avez vous pris le livre?	*Have you taken the book?*
Avez vous payé le libraire?	*Have you paid the bookseller?*
Avez vous demandé votre argent?	*Have you asked for your money?*
L'avez vous demandé?	*Have you asked for him?*

2. When the verbs above mentioned are accompanied by several regimens holding different relations, the regimen representing the thing or object will be direct, and come under the above rule, and that representing the person, will, if a noun be preceded by the preposition *à*, and, if a pronoun, assume the form of the indirect regimen: lui, *to him, to her*; leur, *to them*:—

J'ai pris le livre à mon frère.	*I have taken the book from my brother.*
J'ai payé le livre au libraire.	*I have paid the bookseller for the book.*
Je le lui ai payé, &c.	*I have paid him for it.*

3 Demander is used also in the sense of *to inquire for, to ask for*:—

J'ai demandé ce monsieur. *I asked for that gentleman.*

Résumé of Examples.

Vous a-t-on volé vos livres?	*Has any one stolen your books from you?*
On me les a volés [Sect. 34. 1, 2].	*They have been stolen from me.*
A-t-on payé les souliers au cordonnier?	*Has the shoemaker been paid for the shoes?*
On ne les lui a pas encore payés.	*He has not been paid for them.*
Qu'a-t-on pris à votre père?	*What has been taken from your father?*
On lui a pris son argent.	*His money has been taken from him.*
Ne vous a-t-on rien payé?	*Has nothing been paid you?*
On m'a payé presque tout.	*I have been paid almost all.*
J'ai acheté des livres au libraire.	*I bought books from the bookseller.*
Qui avez vous demandé?	*Whom have you asked for?*
J'ai demandé mon frère aîné.	*I inquired for my eldest brother.*
Avez vous demandé de l'argent à votre ami?	*Have you asked your friend for money?*
Je ne lui en ai pas demandé.	*I have not asked him for any.*

Exercise 97.

Chapelier, m. *hatter;*	Loyer, m. *rent;*	Renseignements, m. p. *information;*
Crayon, m. *pencil;*	Pantoufle, f. *slipper;*	Revenu, m. *income;*
Demeur-er, 1. *to dwell;*	Paysan, m. *peasant;*	Tout, e, *all;*
Fenêtre, f. *window;*	Propriétaire, m. *landlord;*	Voyageur, m. *traveller.*
Frapp-er, 1. *to knock;*	Rend-re, 4. *to return;*	
Légume, m. *vegetable;*		

1. Que vous a-t-on pris? 2. On m'a pris mes livres, mes crayons et mon canif. 3. Savez vous qui vous les a pris? 4. Je ne connais pas celui qui me les a pris, mais je sais qu'il demeure ici. 5. Avez vous demandé vos livres? 6. Je les ai demandés à mon cousin. 7. Vous les a-t-il rendus? 8. Il me les a payés. 9. Vous a-t-on volé beaucoup de fruit cette année? 10. On m'a volé des légumes, mais on ne m'a point volé de fruit. 11. Avez vous payé votre chapeau au paysan? 12. Je ne le lui ai pas payé, je l'ai payé au chapelier. 13. A qui avez vous demandé des renseignements? 14. J'en ai demandé au voyageur. 15. Savez vous qui vient de frapper à la porte? 16. C'est M. L., qui vous demande. 17. Qui avez vous demandé? 18. J'ai demandé votre frère. 19. Votre frère a-t-il payé toutes ses dettes? 20. Il ne les a pas encore payées, parce qu'il n'a pas reçu ses revenus. 21. Lui avez vous payé ce que vous lui avez acheté? 22. Je le lui ai payé. 23. Ne leur avez vous pas payé votre loyer? 24. Je le leur ai payé. 25. Ils nous ont payé notre maison.

Exercise 98.

1. Have you paid your landlord? 2. I have paid him my rent. 3. Have you paid him for the windows which you have broken? 4. I have paid him for them. 5. Has the hatter paid for all his hats? 6. He has not paid for them, he has bought them on credit (*à crédit*). 7. Do you pay what you owe, every day? 8. I pay my butcher every week. 9. Have you paid him for his meat? 10. I have paid him for it. 11. For whom did you inquire this morning? 12. I inquired for your brother. 13. Why did you not inquire for my father? 14. I know that your father is in England. 15. Has the hatter been paid for his hats? 16. He has been paid for them. 17. Has your money been taken from you? 18. My hat has been stolen from me. 19. Have you asked your brother for your money? 20. I have asked him for it, but he cannot return it to me. 21. Has he no money? 22. He has just paid all his debts, and he has no money left (*de reste*). 23. Have you asked your father for money? 24. I have not asked him for any, I know that he has none. 25. From what bookseller have you bought your books? 26. I bought them from your bookseller. 27. Are you wrong to pay your debts? 28. I am right to pay them. 29. Who is inquiring for me? 30. The physician is inquiring for you. 31. Who knocks? 32. Your shoemaker knocks.

LESSONS IN GEOLOGY.—No. XII.

By Thomas W. Jenkyn, D.D., F.G.S., &c.

CHAPTER I.

ON THE ACTION OF VOLCANOES ON THE EARTH'S CRUST

SECTION VIII.

ON THE ELEVATION AND SUBSIDENCE OF LAND.

In reading geological works you find that geologists describe certain strata, which rest upon one another, as being some marine beds, and others fresh-water beds. They are called so, because in the marine beds they find the shells and other remains of fish, which only live in the salt water of the ocean; and in the fresh-water beds they find fossils of animals which live in rivers, lakes, estuaries, and marshes. Try your own reason upon these strata. At the bottom there is a stratum full of marine shells. A few feet higher up is a stratum full of fresh-water remains. Some feet yet higher, another marine bed, and higher still, another fresh-water stratum. How can you account for this? At one time the lower marine bed must have been the bottom of the sea. It then rose a little beyond the reach of the sea, and became perhaps a marsh, perhaps the estuary of a river. Both beds sank again and became the bottom of the sea. In the course of ages the three beds now rose, and the surface became again the bottom of an estuary, or perhaps a lake. It is this rising and sinking of the surface that is called by geologists the elevation and subsidence of the land. Instances of these processes are found abundantly in England, especially in Sussex, Hampshire, and the Isle of Wight.

These elevations and subsidences are the results, in some instances, of the vertical action of earthquakes; and in others, they are the consequences of the intense heating and of the subsequent cooling of rocks deeply seated in the interior of the earth.

§ i. Elevation and subsidence by earthquakes.

It is well known that during the paroxysms of earthquakes some districts of the land are elevated above their former level, while other districts are depressed and sink below it. The instances in which towns, cities, and regions on the coast, have been either completely or partially submerged under the sea, are almost innumerable. I will mention a few of the most remarkable.

Jamaica was agitated by a violent earthquake in 1692. At Port Royal, then the capital of the island, several large storehouses in the harbour subsided, some 24 feet, some 36, and some 48 feet, under water. The buildings remained whole and standing, and the tops of their chimneys were seen erect above the waves. A large tract of land around the town, about 1,000 acres in extent, sank down in less than a minute, and became the bottom of the sea. In the harbour, was the Swan frigate repairing near the wharf. This ship was raised, and driven over the tops of many buildings, and was, at last, thrown upon one of the roofs, which it crushed.

In Peru, in 1746, a tremendous earthquake destroyed Lima, and the whole coast near Callao was converted into a bay of the sea. The main-land near Lima shows that it had been subject to such changes before, even within the human epoch. At a place inland, a rock is found 80 feet above the sea. On this elevation there is a stratum full of sea-weeds and shells. What proves that this bed was the bottom of the sea since man was created, is that the stratum contains cotton-thread and plaited rushes, which must have been of human manufacturing.

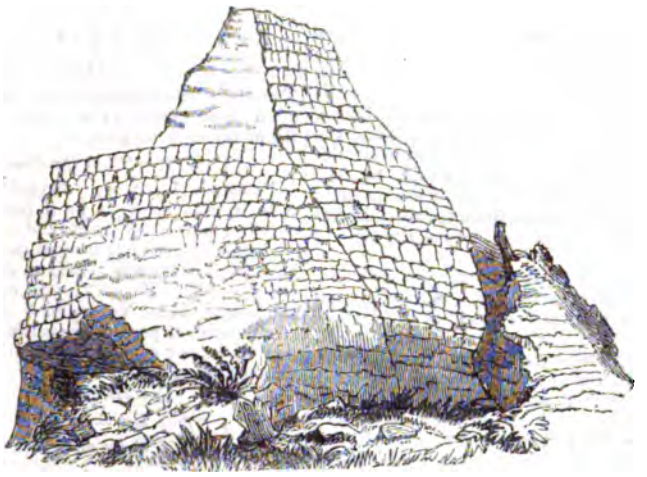
Just before the earthquake of Lisbon, in 1755, a new quay had been built in the harbour, consisting of massive and solid marble. To escape the dangers from tottering houses during the convulsions, a vast concourse of people collected for safety on this large quay. Suddenly the whole quay sank down with all the people on it, and not one of the bodies ever floated to the surface again. At a little distance off the quay, boats and vessels lay at anchor, and full of people. Suddenly the body of water beneath them sank, the boats and ships went down as into a whirlpool, and not a single fragment of the wrecks ever came to the surface. When, a short time afterwards, the spot occupied by these boats was sounded, it was found unfathomable, and subsequently it was ascertained to be two hundred yards deep.

During the earthquake at Messina, in 1783, of which you have had an illustration in fig. 24 of Lesson X., similar phenomena were observed. The ground along the port of Messina was perfectly level before the earthquake, but afterwards it sloped much towards the sea, and the sea itself became deeper and deeper according to its distance from the shore. This shews that the sloping of the coast continued far under the sea, and that, consequently, the bottom of the sea, as well as the shore, had sunk. Even the quay itself had sunk about fourteen inches. If the shore sank seaward it is natural to infer that the coast had also sloped inland. This inference was established by facts. In the interior of the island, Sicily, it was found that several new ravines had been formed by the fissures of the earthquake. The fresh faces of the rocks on each side of these ravines proved that there had been considerable shiftings of the strata that were continuous before they were fissured. Some of them had risen, and others had sunk, six or ten feet above or below each other respectively.

This elevation and subsidence, or the shifting of strata, is well explained by a disturbance of regular masonry in the walls of the Round Tower at Terra Nova, in Calabria. In many streets of the town, some houses had been raised above their usual level, and others had sunk down in the ground. Adjoining the town was a massive circular tower of solid masonry. One part of this tower remained undestroyed by the earthquake, but it was divided by a vertical rent. One side of it was raised much above the other, and the foundation

of the upraised portion was brought up to view. It is remarkable, that along the whole line of shift, the divided walls were found to adhere as firmly to each other, and to fit as closely as if they had been thus constructed and cemented from the very first. The only signs of their having been divided were, that the top of one part was much higher than the other, and the courses of the stone on each side of the rent did not correspond. This is represented in fig. 27.

Fig. 27.

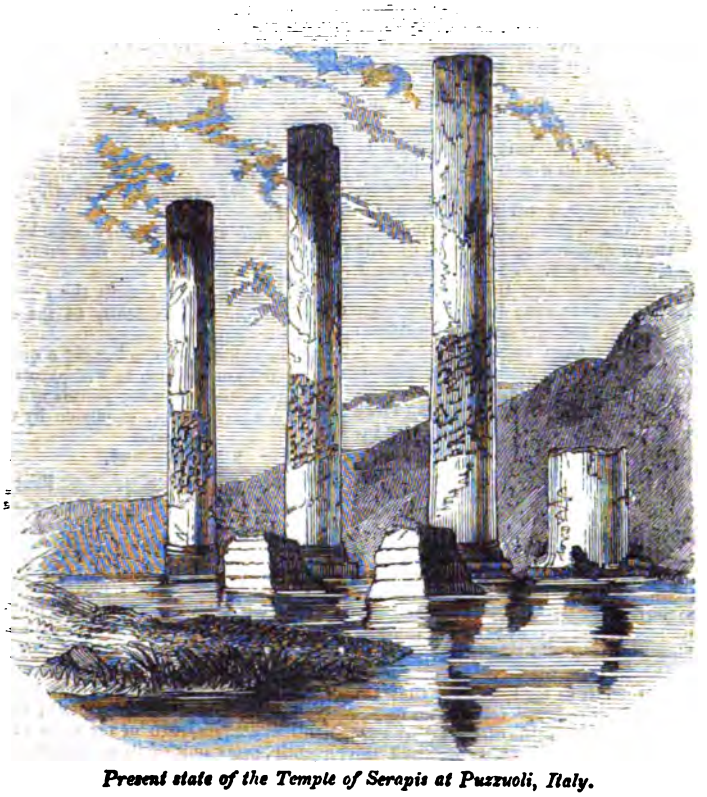


The shift in the Round Tower of Terra Nova in Calabria, occasioned by the Earthquake of 1783.

In North America, just above the falls of the Columbia River, there is a district twenty miles in length, and one mile in breadth, where a remarkable subsidence took place towards the close of the last century. In 1807, American travellers found here a forest of pines standing erect, under water, in the body of the river, some twenty feet deep. Another traveller, in 1835, found the trees still standing in their natural position, but the tops of the trees, between high and low water-mark, had decayed away. The roots were seen through the clear water, spreading as they had grown in their native forest. This phenomenon occurs in a region of extinct volcanoes; for the river passes amid and through hills of basaltic rocks.

The most extensive elevation of land by earthquake is that which took place on the coast of CHILI, South America, in 1822. The shock was felt along the coast for 2,000 miles. For more than one hundred miles the whole coast was elevated three or four feet high, and an area of about 100,000 square miles, nearly half the size of all France, was thus raised above the level of the sea. Some geologists suppose that the whole country, from the foot of the Andes to a great distance under the sea, was thus elevated; for the greatest rise was at the distance of two miles inland from the shore. On the coast, the rise was two or four feet; but a mile inland, it was six or seven feet. This elevation has been disputed by several naturalists, especially by Mr. Cuming, the celebrated conchologist, who was at Valparaiso at the time; but it has been verified by the German travellers, Dr. Meyen M. Freyer, and by our own Darwin.

Fig. 28.



Present state of the Temple of Serapis at Puzzuoli, Italy.

In 1819 a great subsidence of land took place in Hindostan, at the mouth of the river Indus, where the bed of the river sank eighteen feet, and the fort of Sindree became submerged. To the south-east of the eastern branch of the Indus, is an island district called Cutch. From the delta of the Indus to Cutch was an inlet of the sea, about a foot deep when the tide was out, and never more than six feet at flood-tide. After an earthquake in 1819, this inlet was deepened to more than eighteen feet at low water. In consequence of this sinking of the district, many parts of the inland navigation that had been closed for centuries became again practicable. The fort of Sindree, on the eastern branch of the Indus, was completely submerged; and yet the masonry of the houses was not disturbed, either by the violence of the earthquake, or by the rush of the sea.

When this region was examined in 1826-1827, it was found that, after the earthquake, the sea rushed into the mouth of the Indus, and then, in a few hours, converted a tract of land, about 2,000 square miles in area, into an inland sea. After the subsidence, one of the towers of Fort Sindree continued to stand above the water, and the inhabitants betook themselves in boats to this elevation for safety. While they were on this tower, they could see at the distance of full five miles to the north-west of them, an elevated land, where, before the earthquake, all had been level plains. This new-raised district turned out to be more than fifty miles in length from east to west. Its breadth from north to south was about sixteen miles. Its uniform rise above the level of the delta was ten feet. Its direction ran parallel to the district that had sunk, so that as one region subsided, the

other rose. To this raised region was given the name of Ullah Bund, "The Mount of God." Through this Ullah Bund the Indus had to force a cutting. The cutting revealed the fact that the whole bed of the soil consisted of clay with marine shells, proving that at a previous period the region had been a bed of the sea.

The most remarkable instance of the repeated processes of elevation and subsidence in the same district, is found in the Bay of Baiæ, to the north of Naples. In that bay is situated the town of Puzzuoli, formerly called Puteoli. It is the place where Paul landed after his voyage on his visit to Rome. "And after one day the south-wind blew, and we came the next day to Puteoli, where we found brethren, and were desired to tarry with them seven days." (Acts xxviii. 13, 14.) Were he to land there now, he would not know the district; for, in the north of the bay, an entire mountain, called Monte Novo, has been raised up, which was not there at the time of his visit.

At Puzzuoli, close by the sea-shore, are the remains of a magnificent building—whether of a bath or a temple has not been decided, but it is known all over the world as the Temple of Serápis. The building was quadrangular, 70 feet in diameter. The roof was supported by 46 pillars, 24 of granite, and 22 of marble, each consisting of a single block. Of these 22 marble columns, three remain standing, the tallest of them being 42 feet high. The surface of these columns is smooth and uninjured up to about twelve feet from the pedestal. Then begins a series of perforations and holes in the marble. These holes and perforations continue upward in a regular band round the column to the height of nine feet, and then cease; and the surface continues smooth all the way to the summit. The upper edge of the perforated band is now 23 feet above the level of the sea.

How came these perforations into the columns? All the holes are deep, and in the shape of a pear,—i. e., very narrow at the entrance, but become larger as it enters the marble. It is evidently the work of a species of mussels called *modiola lithophaga*—marine shell-fish which eat into stones. A large number of these holes contain to this day the shells of the fish which perforated them, though many have been emptied by travellers.

How did the mussels come to attack these columns? and how did they come to limit their operations just to a band nine feet in width? There can be no doubt that the temple to which they belonged, and the ground on which they are placed, were submerged under the water of the sea. When they were in this sunken state, the basement was protected from the boring mussels by masses of rubbish, tufa, and silt which the sea-water washed around them, and the upper part of the columns was beyond the reach of the sea. The perforations in this column prove—1, that this coast has, since the temple was built, sunk beneath the level of the sea; 2, that the same coast has been again elevated; 3, that the movement downward and again upward was more than twenty feet; and 4, that the elevation and subsidence was so gradual as to permit these columns to maintain their erect position.

Now, all these changes of this temple have transpired since the time that Paul landed at Puteoli. Among the ruins, inscriptions have been discovered, which record that certain embellishments of marble were conferred on the building by Septimius Severus and Marcus Aurelius. The Emperor Severus died A. D. 211. This proves that this temple was in its original position at the commencement of the third century of our era. In A. D. 1198, in consequence of an eruption of Solfatara, in that neighbourhood, a subsidence of the coast took place, and the temple sank with it, and the columns came within the reach of the boring mussels. They continued for some time to sink lower and lower, and as they sank the mussels carried on their perforations higher and higher. They must have continued in this submerged state till near the middle of the sixteenth century, for in 1530 it is well known that the whole of that coast was covered by the sea. In 1538 an earthquake, connected with Vesuvius, agitated this district, threw up in one night on this shore a mountain 450 feet high, raised the coast on which the temple is built to the height of 20 feet, and formed a new tract of coast six hundred feet in breadth. It was then that these columns were raised beyond the reach of the mussels of the sea. These columns have been latterly much studied by scientific geologists, and it is now ascertained that, for the last thirty or forty years, a gradual sinking of the coast is again going on, and that the floor of the temple becomes frequently covered again by water from the sea.

LESSONS IN ARITHMETIC.—No. XVI.

CONTRACTIONS IN DIVISION.

THE operations in division, as well as those in multiplication, may often be shortened by a careful attention to the application of the preceding principles.

CASE I.—*When the divisor is a composite number.*

EXAMPLE 1.—A man divided 837 crowns equally among 27 persons, who belonged to 3 families, each family containing 9 persons: how many crowns did each person receive?

Analysis.—Since 27 persons received 837 crowns, each one must have received as many crowns as the number of times that 27 is contained in 837. But as 27 (the number of persons), is a composite number whose factors are 3 (the number of families), and 9 (the number of persons in each family), it is obvious we may first find how many crowns each family received, and then how many each person received.

	Operation.	*Explanation.*
Divisor 27	3)837 Dividend. 9)279 Share of each family. *Ans.* 31 Share of each person.	If 3 families received 837 crowns, 1 family must have received as many crowns as 3 is contained times in 837; but 3 is in 837, 279 times. That is, each family received 279 crowns. Again, if 9 persons (the number in each family) received 279 crowns, 1 person must have received as many crowns as 9 is contained times in 279; and 9 is in 279, 31 times. Therefore 31 crowns is the share of each person.

To divide by a *composite* number. Rule:

Divide the dividend by one of the factors of the divisor, then divide the quotient thus obtained by another factor; and so on till all the factors are employed. The last quotient will be the answer required.

To find the full remainder. Rule:

If the divisor is resolved into but two factors, multiply the last remainder by the first divisor, and to the product add the first remainder, if any; the sum will be the compound remainder.

When more than two factors are employed, multiply each remainder by all the preceding divisors, and to the sum of their products add the first remainder; the sum will be the full remainder.

The *full* remainder may also be found by multiplying the quotient by the divisor, and subtracting the product from the dividend.

This contraction is exactly the *reverse* of that in multiplication. The quotient will evidently be the same, in whatever order the factors are taken.

EXAMPLE 1.—A man bought a quantity of clover seed amounting to 507 pints, which he wished to divide into parcels containing 64 pints each: how many parcels can he make?

Since 64=2×8×4, we divide by the factors respectively.

Operation.

Divisor 64	2)507 Dividend.		
	8)253—1 rem.	First remainder =	1 pt.
	4)31—5 rem.	5×2	= 10 pts.
Quotient	7—3 rem.	and 3×8×2	= 48 pts.
		Full remainder	59 pts.

Quotient. 7 parcels, and 59 pints over.

Dividing 507, the number of pints, by 2, gives 253 for the quotient, or distributes the seed into 253 equal parcels, leaving 1 pint over. Now the units of this quotient are evidently of a *different value* from those of the given dividend; for since there are but *half* as many parcels as at first, it is plain that each parcel must contain 2 pints, or 1 quart; that is, every unit of the first quotient contains two of the units of the given dividend; consequently, every unit of it, as 5, that remains will contain the same; therefore this remainder must be multiplied by 2, in order to find the units of the given dividend which it contains. Dividing the quotient 253 parcels, by 8, will distribute them into 31 other equal parcels, each of which will evidently contain 8 times the

quantity of the preceding, viz: 8 times 1 quart=8 quarts, or 1 peck; that is, every unit of the second quotient contains 8 of the units in the first quotient, or 8 times 2 of the units in the given dividend; therefore what remains of it, as 3, must be multiplied by 8×2, or 16, to find the units of the given dividend which it contains. In like manner, it may be shown, generally, that the division by *each successive factor* reduces each quotient to a class of units of a higher value than the preceding; that every unit which remains of any quotient, is of the same value as that quotient, and must therefore be multiplied by all the preceding divisors, in order to find the units of the given dividend which it contains. Finally, the several remainders being reduced to the same units as those of the given dividend according to the rule, their sum must evidently be the compound remainder.

EXERCISES.

1. How many acres of land, at 35 crowns an acre, can you buy for 4650 crowns?
2. Divide 16128 by 24.
3. Divide 17220 by 84.
4. Divide 25760 by 56.
5. Divide 91080 by 72.
6. Divide 142857 by 112.
7. Divide 123456 by 168.

CASE II.—*When the divisor is* 1 *with ciphers annexed to it.*

It has been shown that *annexing* a cipher to a number *increases* its value *ten times*, or *multiplies* it by 10. Reversing this process—that is, *removing* a cipher from the right hand of a number—will evidently *diminish* its value *ten times*, or *divide* it by 10; for, each figure in the number is thus restored to its original place, and consequently to its original value. Thus, annexing a cipher to 15, it becomes 150, which is the same as 15×10. On the other hand, removing the cipher from 150, it becomes 15, which is the same as $150\div10$.

In the same manner it may be shown, that removing *two* ciphers from the right of a number, divides it by 100; removing *three*, divides it by 1000; removing *four*, divides it by 10000, &c. Hence,

To divide by the numbers 10, 100, 1000, &c. Rule:

Cut off as many figures from the right hand of the dividend as there are ciphers in the divisor. The remaining figures of the dividend will be the quotient, and those cut off will be the remainder.

EXERCISES.

1. In one pound there are 10 florins; how many pounds are there in 200 florins? In 340 florins? In 560 florins?
2. In one metre there are 100 centimetres; how many metres are there in 65000 centimetres? In 765000 centimetres? In 4320000 centimetres?
3. Divide 26750000 by 100000.
4. Divide 144360791 by 1000000.
5. Divide 382367180309 by 100000000.

CASE III.—*When the divisor has ciphers on the right hand.*

EXAMPLE.—How many hogsheads of molasses, at 30 crowns apiece, can you buy for 9643 crowns?

The divisor 30 is a composite number, the factors of which are 3 and 10. We may, therefore, divide first by one factor and the quotient thence arising by the other. Now cutting off the right-hand figure of the dividend divides it by ten, consequently dividing the remaining figures of the dividend by 3, the other factor of the divisor, will give the quotient.

Operation.

Divisor 3|0)964|3 Dividend
Quotient 321 $\frac{13}{30}$

Explanation.

We first cut off the cipher on the right of the divisor, and also cut off the right-hand figure of the dividend; then dividing 964 by 3, we have 1 remainder. Now, as the 3 cut off is part of the remainder, we therefore annex it to the 1. Ans. 321$\frac{13}{30}$ hogsheads.

When there are ciphers on the right hand of the divisor. Rule:

Cut off the ciphers, also cut off as many figures from the right of the dividend. Then divide the other figures of the dividend by the remaining figures of the divisor, and annex the figures cut off from the dividend to the remainder.

EXERCISES.

1. How many vehicles at 70 pounds apiece, can you buy for 7350 pounds?
2. How many barrels will it take to pack 36800 pounds of pork, allowing 200 pounds to a barrel?
3. Divide 3360000 by 17000.
4. Divide 123456789 by 290000.

Operations in long division may be shortened by subtracting the product of the respective figures in the divisor into each quotient figure as we proceed in the operation, setting down the remainders only. This is called the *Italian Method.*

How many times is 21 contained in 4998?

Operation.

21)4998(238
79
168

1. Divide 1188 by 33.
2. Divide 3128 by 86.
4. Divide 2516 by 37.
3. Divide 7125 by 95.

CASE IV.—*When the divisor is the number* 5.

A merchant laid out 873 pounds in flour, at 5 pounds a barrel; how many barrels did he get?

Operation.

873
2
1|0)174|6
174$\frac{3}{5}$ Ans.

Explanation.

We first double the dividend, and then divide the product by 10, which is done by cutting off the right-hand figure. But since we multiplied the dividend by 2, it is plain that the 6 cut off is 2 times too large for the remainder; we therefore divide it by 2, and we have 3 for the true remainder.

When the divisor is the number 5. Rule:

Multiply the dividend by 2, *and divide the product by* 10.

When the figure cut off is a significant figure, it must be divided by 2 for the *true* remainder. This contraction depends upon the principle that any given divisor is contained in any given dividend, just as many times as *twice* that divisor is contained in *twice* that dividend, *three times* that divisor in *three times* that dividend, &c.

1. Divide 6035 by 5.
2. Divide 32561 by 5.
3. Divide 8450 by 5.
4. Divide 43270 by 5.

CASE V.—*When the divisor terminates in* 5.

To divide by 15, 35, 45, 55, &c. Rule:

Double the dividend, and divide the product by 30, 70, 90, 110, *&c., as the case may be.*

This method is simply doubling both the divisor and dividend. We must therefore divide the remainder, if any, by 2, for the *true* remainder.

1. Divide 1256 by 15.
2. Divide 3507 by 45.
3. Divide 2673 by 35.
4. Divide 7853 by 55.

CASE VI.—*When the divisor terminates in* 25 *or* 75.

To divide by the number 25. Rule:

Multiply the dividend by 4, *and divide the product by* 100.

This process is obviously the same as multiplying both the dividend and divisor by 4. Hence, we must divide the remainder, if any thus found, by 4, for the *true* remainder.

1. Divide 2350 by 25.
2. Divide 42340 by 25.
3. Divide 4860 by 25.
4. Divide 94880 by 25.

To divide by the number 125. Rule:

Multiply the dividend by 8, *and divide the product by* 1000.

This contraction is multiplying both the dividend and divisor by 8. For the *true* remainder, therefore, we must divide the remainder, if any, by 8.

1. Divide 8375 by 125.
2. Divide 25426 by 125.

To divide by 75, 175, 225, or 275. Rule:

Multiply the dividend by 4, *and divide the product by* 300, 700, 900, *or* 1100, *as the case may be.*

This contraction is multiplying both divisor and dividend by 4. For the *true* remainder, divide the remainder, if any thus found, by 4.

1. Divide 1125 by 75.
2. Divide 3825 by 225.
3. Divide 2876 by 175.
4. Divide 8250 by 275.

The preceding are among the most frequent and useful modes of contracting operations in division. Various other methods might be added, but they will naturally suggest themselves to the inventive student, as opportunities occur for their application.

EXERCISES.

1. How long would it take a vessel sailing 100 miles per day to circumnavigate the earth, whose circumference is 25000 miles?
2. The distance of the Earth from the Sun is 95,000,000 of miles: how long would it take a balloon, going at the rate of 100,000 miles a year to reach the sun?
3. Divide 467000000000 by 25000000000.

4. 568240 ÷ 42.
5. 785372 ÷ 63.
6. 896736 ÷ 72.
7. 67234568 ÷ 5.
8. 34256726 ÷ 15.
9. 42367581 ÷ 45.
10. 16753672 ÷ 35.
11. 3256385 ÷ 55.
12. 45672400 ÷ 25.
13. 6245634 ÷ 45.
14. 8245623 ÷ 125
15. 462156 ÷ 75.
16. 3562189 ÷ 225.
17. 685726 ÷ 32000.
18. 723564 ÷ 175.
19. 892565 ÷ 225.
20. 456212 ÷ 275.
21. 925673 ÷ 125.
22. 763421 ÷ 175.
23. 876240 ÷ 275.
24. 7825600 ÷ 80000.
25. 92004578 ÷ 100000.

GENERAL PRINCIPLES IN DIVISION.

From the nature of division, it is evident, that the *value* of the *quotient* depends both on the *divisor* and the *dividend*.

I. If a given divisor is contained in a given dividend a certain number of times, the same divisor will obviously be contained, in *double* that dividend, *twice* as many times; in *three times* that dividend, *tre* as many times, &c. Hence,

If the divisor remains the same, to multiply the dividend by any number, is in effect multiplying the quotient by that number.

Thus, 6 is contained in 12, 2 times; in 2 times 12 or 24, 6 is contained 4 times (i. e. twice 2 times); in 3 times 12 or 36, 6 is contained 6 times (i. e. thrice 2 times); &c.

II. Again, if a given divisor is contained in a given dividend a certain number of times, the same divisor is contained in *half* that dividend, *half* as many times; in a *third* of that dividend, a *third* as many times, &c. Hence,

If the divisor remains the same, dividing the dividend by any number, is in effect dividing the quotient by that number.

Thus, 8 is contained in 48, 6 times; in 48÷2 or 24 (half of 48), 8 is contained 3 times (i. e. half of 6 times); in 48÷3 or 16 (a third of 48), 8 is contained 2 times (i. e. a third of 6 times); &c.

III. If a given divisor is contained in a given dividend a certain number of times, then, in the same dividend, *twice* that divisor is contained only *half* as many times; *three times* that divisor, a *third* as many times, &c. Hence,

If the dividend remains the same, multiplying the divisor by any number, is in effect dividing the quotient by that number.

Thus, 4 is contained in 24, 6 times; 2 times 4 or 8 is contained in 24, 3 times (i. e. half of 6 times); 3 times 4 or 12 is contained in 24, 2 times (i. e. a third of 6 times); &c.

IV. If a given divisor is contained in a given dividend a certain number of times, then, in the same dividend, *half* that divisor is contained *twice* as many times; a *third* of that divisor, *three times* as many times, &c. Hence,

If the dividend remains the same, dividing the divisor by any number, is in effect multiplying the quotient by that number.

Thus, 6 is contained in 36, 6 times; 6÷2 or 3 (half of 6), is contained in 36, 12 times (i. e. twice 6 times); 6÷3 or 2 (a third of 6), is contained in 36, 18 times (i. e. thrice 6 times); &c.

V. From the preceding articles, it is evident that any given divisor is contained in any given dividend, just as many times as *twice* that divisor is contained in *twice* that dividend; *three times* that divisor in *three times* that dividend, &c.

Conversely, any given divisor is contained in any given dividend just as many times, as *half* that divisor is contained in *half* that dividend; a *third* of that divisor, in a *third* of that dividend, &c. Hence,

If the divisor and dividend are both multiplied, or both divided by the same number, the quotient will not be altered.

Thus, 6 is contained in 12, 2 times; 2 times 6 is contained in 2 times 12, 2 times; 3 times 6 is contained in 3 times 12, 2 times, &c.

Again, 12 is contained in 48, 4 times; 12÷2 is contained in 48 ÷2, 4 times; 12÷3 is contained in 48÷3, times, &c.

VI. If the *sum* of two or more numbers is divided by any number the *quotient* will be equal to the *sum* of the quotients which will arise from dividing the given numbers separately.

Thus, the sum of 12+18=30; and 30÷6=5.
Now, 12÷6=2; and 18÷6=3; but the sum of 2+3=5.

Again, the sum of 32+24+40=96; and 96÷8=12.
Now, 32÷8=4; 24÷8=3; and 40÷8=5; but 4+3+5=12.

CANCELLING FACTORS.

DEFINITION.—*The method of contracting arithmetical operations, by rejecting equal factors, is called* CANCELLING FACTORS.

We have seen that division is finding a quotient, which, multiplied into the divisor, will produce the dividend. If, therefore, the dividend is resolved into two such factors that one of them is the divisor, the other factor will, of course, be the quotient. Suppose, for example, 42 is to be divided by 6. Now the factors of 42 are 6 and 7, the first of which being the divisor, the other must be the quotient. Therefore, *cancelling a factor of any number divides the number by that factor.*

CASE 1.—When the dividend is the product of two factors, one of which is the same as the divisor. Rule:

Cancel the factor common to the dividend and divisor; the other factor of the dividend will be the answer.

NOTE.—The term *cancel* signifies to *erase* or *reject*.

EXAMPLE.—1. Divide 952 or 34×28 by 34.

Common Method.

Dividend.
Divisor 34)952(28 Quotient
68
272
272

By Case I.

$\frac{34\times28}{34}=28$ Quotient

Cancelling the factor 34, which common both to the divisor and dividend, we have 28 for the quotient, as by the common method.

This process may be applied with *great advantage* to that class of examples and problems, which involve both multiplication and division,—that is, which require the *product* of two or more numbers to be divided by *another number*, or by the *product* of two or more numbers.

1. Divide 3420 or 76×45 by 76.
2. Divide 5330 or 65×82 by 82.
3. Divide 5103 or 63×81 by 81.
4. Divide 6395 or 95×73 by 95.

EXAMPLE 2.—Divide the product of 3780 or 45 times 84 by 9.

Analysis.—The factor 45=5×9; hence the dividend 3780 is composed of the factors 84×5×9. We may therefore cancel 9, which is common both to the divisor and dividend, and 84×5, the other factors of the dividend, will be the answer required.

Operation. $\frac{84\times5\times9}{9}=84\times5=420.$

Proof. $\frac{3780}{9}=420.$

7. Divide 810 or the product of 45×18 by 90 or 18×5.

Operation. $\frac{45\times18}{18\times5}=\frac{45}{5}=9.$

Proof. $\frac{810}{90}=9.$

We cancel the factors 18 in the dividend and 18 in the divisor for cancelling the same or equal factors in the divisor and dividend, is dividing them both by the same number, and therefore does not affect the quotient.

CASE II.—When the divisor and dividend have common factors. Rule:

Cancel the factors common to both; then divide the product of those remaining in the dividend by the product of those remaining in the divisor.

8. Divide 15×7×12 by 5×3×7×2.
9. Divide 27×3×4×7 by 9×12×6.
10. Divide 75×15×24 by 25×3×6×4×5.

The four preceding rules,—viz., *Addition*, *Subtraction*, *Multiplication*, and *Division* are usually called the FOUR FUNDAMENTAL RULES of Arithmetic, because they are the *foundation* or *basis* of all arithmetical calculations.

LESSONS IN NATURAL HISTORY.—No. IX.

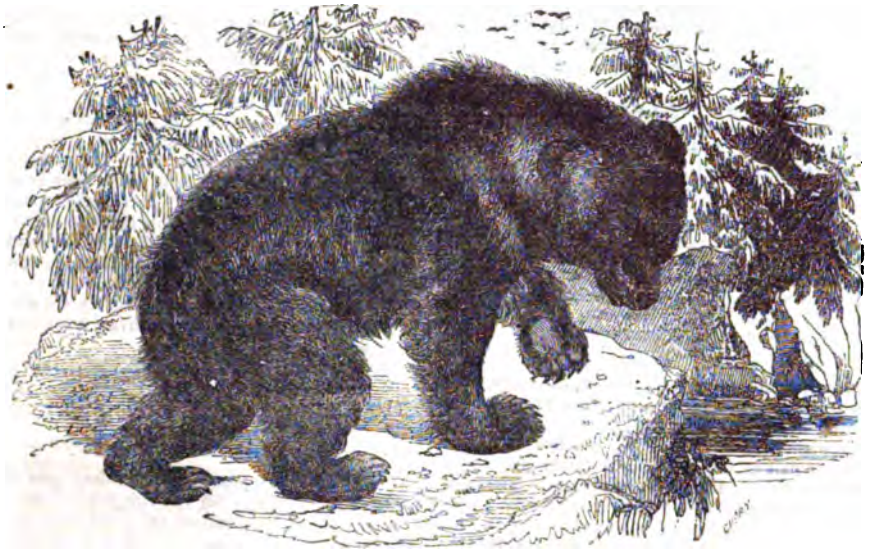
THE BEAR.

[*Order* CARNIVORA, *genus* URSUS.]

THE bear belongs to a section of the animal kingdom to which has been given the name of *Plantigrades*, from their applying the entire sole of the foot to the ground, so as to have the free power of raising themselves on their hinder limbs, and maintaining with ease an upright position; their motions are slow and heavy; their habits are generally nocturnal; and in the northern regions, they usually pass the winter in a lethargic state, concealed in holes in the ground. Some of the species are able to use their fore-feet in conveying food to their mouths, or in seizing hold of objects. Their claws are strong, blunt, and well adapted to digging and climbing. In consequence of their adaptation to the latter purpose, bears are able to ascend trees in search of prey, and also to escape the pursuit of their enemies.

Dancing bears used to be a common sight in the streets of Lon-

don; and then they shared the popularity of Punch with gaping crowds, as will be still remembered by the elders of the present generation. The signs of the "Black Bear," in Piccadilly, "Taylor's Bear," in Whitechapel, the "White Bear," and the "Bear and Ragged Staff," are relics of that time. Stories, also, were afloat of bears being made to stand upon hot iron, and to undergo other kinds of severe discipline, in order that they might be taught "to dance." The public has at last discovered that the proper place for these animals is our Zoological Gardens, where they not only excite but gratify an intelligent curiosity.



THE BROWN BEAR.

The brown bear, well known over the continent of Europe, and formerly the species to which our street visitors belonged, is now confined to his accustomed regions, where he finds a dwelling amidst rocks, glens, and forests, in Sweden, Russia, Poland, and Norway. In Norway the bear retires to his den, which is generally some sheltered hole in the rocks of the Fjelds, in November, and remains in a dormant state almost without food until April. The female brings forth her young, and rears them during this period. It is said that there is nothing found in the stomach or bowels of the bear when he is tracked to his winter lair and killed; that he eats nothing for some days before retiring, and that then he is quite fat; but when he reappears in spring, he is very meagre and exhausted.

Bears sometimes reside for years in the neighbourhood of cattle without doing them any injury; but, at other times, they will visit herds solely from the desire of prey. They have been known to climb the roofs of houses, and tear them off in order to reach the animals within; and after killing them, to carry them off through the aperture. Their strength is remarkably great; for a bear has been seen walking on his hinder feet upon a tree stretched across a river, bearing a dead horse in his fore-paws. The ability of the bear to climb is well known to the visitors of the gardens of the Zoological Society; it being an amusement there to see him mounting a pole to reach some proffered dainty. In descending a tree or

THE WHITE BEAR.

a precipice, the bear always moves backwards; thus resembling a human being in his cautious descent. He is a good and rapid swimmer, and is fond of bathing during the heat of summer.

A Savoyard, who obtained his living by exhibiting a monkey and a bear, gained so much applause from his tricks with the monkey, that he was encouraged to practise some on the bear; but being dreadfully lacerated in the attempt, and rescued with great difficulty from the grasp of Bruin, he exclaimed, "What a fool was I, not to distinguish between a monkey and a bear! A bear, my friends, is a very grave kind of personage, and, as you plainly see, does not understand a joke!"

The white or Polar bear is a much larger animal than any of the species found on land. One measured by Captain Lyon, in his northern expedition, was found to be eight feet seven inches and a half in length, and it weighed, no less than sixteen hundred pounds.

Describing this animal in the frozen regions of the North, Thomson says,—

> "There through the piny forest half-absorpt,
> Rough tenant of these shades, the shapeless bear,
> With dangling ice all horrid, stalks forlorn;
> Slow-paced, and sourer as the storms increase,
> He makes his bed beneath th' inclement drift,
> And, with stern patience, scorning weak complaint,
> Hardens his heart against assailing want."

This creature seems especially fitted to spend its existence in a liquid element. It is much larger in the body than other bears, and its legs are shorter and thicker. It also differs much in the shape of the head; when viewed in profile, the line is nearly straight, and the upper part of the cranium is rather depressed. The muzzle is broader and thicker than in other species. The neck is nearly equal in thickness to the head. The fur is very long and thick, of a bright white beneath, and of a yellowish tinge on its upper surface. The sides of the feet are thickly covered with hair, which gives the animal a firm footing on the ice; and the claws are short, black, and nearly straight.

On Beraud Island, situated between Spitzbergen and the North Cape, white bears are numerous. Vessels go from Norway to this island almost every year, for the purpose of killing these animals during the winter. "Two men, with lances," says Mr. Laing, "can always despatch the animal without difficulty, one taking him in front, and the other on the side. They sometimes use small dogs, as in attacking the common bear in Norway. Among the whole of the ursine tribe the most tender parts are those behind, exposed when they walk, and vulnerable even by the smaller animals. When the dogs bark and attack the bear behind, he sits down instinctively to cover his hinder parts, and to defend himself with his fore-paws."

That the maternal feeling of the bear is strong is evident from the following instance. When the Carcase frigate was locked some years ago in the northern ice, a she-bear and her two cubs, nearly as large as herself, came towards the vessel. The crew threw to them great lumps of sea-horse blubber. The old bear fetched these away singly, and divided them between her young ones, reserving only a small piece for herself. The sailors shot the cubs as she was carrying the last portion, and wounded herself. She could just crawl with it to them, tear it in pieces, and lay it before them. When she saw they did not eat, she laid her paws first on one, and then on the other, and tried to raise them up, moaning piteously all the while. She then moved from them, looked back, and moaned, as if for them to follow her. Finding they did not, she returned, smelt them, and licked their wounds; again she left them, and again returned, and then went round them pawing and moaning, with signs of inexpressible fondness. At last, she raised her head towards the ship, and uttered a growl of despair, when a volley of musket-balls terminated her life.

The bears of Kamtschatka live chiefly on fish, which they procure for themselves from the rivers. A few years ago, the fish became very scarce. Emboldened by famine and hunger, the bears, instead of retiring to their dens, wandered about, and sometimes entered the villages. On a certain occasion one of them found the outer door of a house open, and entered it, the gate accidentally closing after him. The woman of the house had just placed a kettle of boiling water in the court. Bruin smelt it, but burnt his nose. Provoked at the pain, he vented all his fury on the tea-kettle. He folded his arms round it, pressed it with his whole strength against his breast in order to crush it, but this, of course, only burnt him the more. The horrible growling which the rage and pain forced on the poor animal now brought the neighbours to the spot, and Bruin, by a few shots, was put out of his misery. To this day, however, when anyone injures himself by his own violence, the people of the village call him "*the bear and the tea-kettle.*"

In addition to the species we have described there are others in different countries. America has three species of bear: the black, the cinnamon, and the grizzly. The black bear is smaller than the European species, and his glossy fur is much prized as an article of commerce. The grizzly bear is the most formidable and ferocious of the tribe; he is a native of the state of Missouri and the Rocky Mountains. The cinnamon is considered by some naturalists a variety of the black bear.

India has several species of bear, as the Malay, Tibet, &c. They agree with the rest of the tribe in their general habits, but are of less size, and have short close fur. Their claws are remarkably long and curved, and as the form of the body is light, they are able to climb with great facility. In the mountains of that country there is also the sloth bear. This creature has the singular power of protruding or contracting the lips, which have great mobility, and are employed to reach or collect its food, consisting, it is said, of white ants, honey, and vegetables. Having claws which are long and powerful, it can not only readily dig up some of its means of subsistence, but it can also excavate holes and dens as places of its retirement.

LESSONS IN GERMAN.—No. XIII.

Section XXV.

Dürfen *expresses a possibility dependent upon the will of another, or upon a law.* *Ex.:* Ich darf diese Blumen nicht pflücken; I cannot (I am not allowed, permitted to) pluck these flowers. Der Bauer darf nicht fischen; the peasant is not allowed (by law) to fish. Ich darf diese Früchte essen, aber ich kann sie nicht erreichen; I can (have the right to) eat these fruits, but I cannot obtain (get at) them. (§ 83. 1. 2.)

CONJUGATION OF THE PRESENT AND IMPERFECT OF dürfen.

Present.

Singular.	*Plural.*
Ich darf, I am permitted;	wir dürfen, we are permitted;
Du darfst, thou art permitted;	ihr dürfet, you are permitted;
Er darf, he is permitted;	sie dürfen, they are permitted.

Imperfect.

Singular.	*Plural.*
Ich durfte, I was permitted;	wir durften, we were permitted;
Du durftest, thou wast permitted;	ihr durftet, you were permitted;
Er durfte, he was permitted;	sie durften, they were permitted

I. Können *corresponds in the present and imperfect to the English* "can." *Ex.:* Der Fisch kann schwimmen; the fish can swim. Er konnte nicht lesen; he could not read.

Können *also sometimes answers to* "may." *Ex.:* Das kann sein; that may be. Er kann schon da sein; he may be already there. Es kann regnen; it may rain. (§ 83. 1. 3.)

CONJUGATION OF THE PRESENT AND IMPERFECT OF können.

Present.

Singular.	*Plural.*
Ich kann, I can;	wir können, we can;
Du kannst, thou canst;	ihr könnt, you can;
Er kann, he can;	sie können, they can.

Imperfect.

Singular.	*Plural.*
Ich konnte, I could;	wir konnten, we could;
Du konntest, thou couldst;	ihr konntet, you could;
Er konnte, he could;	sie konnten, they could.

II. Mögen *expresses a possibility dependent on the will of the subject or the speaker.* *Ex.:* Er mag gehen; he can (may, is at liberty to) go. Sie mögen gehen; you may (have permission to) go. Ich mag ihn nicht sehen; I do not wish to see him. Das mag ich nicht glauben; I do not like to believe that. (§ 83. 4.)

III. Mögen, *like* "may," *denotes a concession on the part of the speaker.* *Ex.:* Er mag ein treuer Freund sein; he may be a true friend. Sie mögen es gethan haben; they may have done it (§ 83. 4.)

CONJUGATION OF THE PRESENT AND IMPERFECT OF mögen.

Present.

Singular.	*Plural.*
Ich mag, I may or am allowed;	wir mögen, we may or are allowed;
Du magſt, thou mayst or art allowed;	ihr möget, you may or are allowed;
Er mag, he may or is allowed;	ſie mögen, they may or are allowed.

Imperfect.

Ich mochte, I was allowed;	wir mochten, we were allowed;
Du mochteſt, thou wast allowed;	ihr mochtet, you were allowed;
Er mochte, he was allowed;	ſie mochten, they were allowed.

IV. Müſſen *in those tenses in which its English equivalent "must" is defective, is to be rendered by "to be obliged, forced, compelled," &c. Ex.:* Er mußte es thun; he was obliged to do it. See complete conjugation, § 88. 5.

CONJUGATION OF THE PRESENT AND IMPERFECT OF müſſen.

Present.

Singular.	*Plural.*
Ich muß, I must;	wir müſſen, we must;
Du mußt, thou must;	ihr müßt, you must;
Er muß, he must;	ſie müſſen, they must.

Imperfect.

Ich mußte, I was obliged;	wir mußten, we were obliged;
Du mußteſt, thou wast obliged;	ihr mußtet, you were obliged;
Er mußte, he was obliged;	ſie mußten, they were obliged.

V. Sollen *indicates necessity, dependent upon the will of another person; thus corresponding in signification with the second and third persons of our word "shall." Ex.:* Du ſollſt ſterben; thou shalt die. Er ſoll es thun; he shall do it. Sie ſollten hier bleiben; you should (ought to) remain here. Wenn er kommen ſollte; if he should come. (§ 88. 6.)

CONJUGATION OF THE PRESENT AND IMPERFECT OF ſollen.

Present.

Singular.	*Plural.*
Ich ſoll, I shall;	wir ſollen, we shall;
Du ſollſt, thou shalt;	ihr ſollet, you shall;
Er ſoll, he shall;	ſie ſollen, they shall.

Imperfect.[1]

Ich ſollte, I should;	wir ſollten, we should;
Du ſollteſt, thou shouldst;	ihr ſolltet, you should;
Er ſollte, he should;	ſie ſollten, they should.

VI. Wollen *expresses a desire, but not a positive intention, and is rendered by "to wish." Ex.:* Was will er? What does he wish? Was will er thun? What does he wish to do?

The imperfect often answers to our "was going," when expressive of purpose. Ex.: Ich wollte ſagen; I was going to say. (§ 83. 8.)

CONJUGATION OF THE PRESENT AND IMPERFECT OF wollen WITH AN ACTIVE VERB.

Present.

Singular.	*Plural.*
Ich will gehen, I wish to go;	wir wollen gehen, we wish to go;
Du willſt gehen, thou wishest to go;	ihr wollet gehen, you wish to go;
Er will gehen, he wishes to go;	ſie wollen gehen, they wish to go.

Imperfect.

Ich wollte gehen, I wished to go;	wir wollten gehen, we wished to go;
Du wollteſt gehen, thou wishedst to go;	ihr wolltet gehen, you wished to go;
Er wollte gehen, he wished to go;	ſie wollten gehen, they wished to go.

VII. The perfect and pluperfect tenses of these verbs, as, also, of laſſen, *to permit, to cause, is formed by means of the infinitive, instead of the participle* (§ 74. III.). *Ex.:*

Er hat nicht gehen können.	He has not been able to go.
Wir haben nie ſchießen dürfen.	We have never been allowed to shoot.
Ich habe es nicht thun mögen.	I have not wished to do it.
Sie haben ſchreiben müſſen.	They have been obliged to write.
Sie hätte leſen ſollen.	She ought to have read.
Sie haben nicht arbeiten wollen.	You have not been willing to work.
Ihr habt ihn nicht gehen laſſen.	You have not caused him to go (have not sent him).

VIII. In the future, therefore, these verbs (except in the *tense* auxiliaries) are, in *form*, like the perfect. Compare the following:

Ich werde reden dürfen.	I shall be allowed to speak.
Ich habe reden dürfen.	I have been allowed to speak.
Du wirſt ihn ſehen können.	You will be able to see him.
Du haſt ihn ſehen können.	Thou hast been able to see him.
Er wird bleiben mögen.	He will wish to remain.
Er hat bleiben mögen.	He has wished to remain.

IX. The phrase, Wie viel Uhr iſt es? like the corresponding one in English, is abbreviated; the full form being Wie viel auf der Uhr iſt es? What o'clock (literally, *how much upon* the clock) is it?

When a part or the whole of the last quarter of an hour is named, it is designated, as in English, by its distance from the hour *following*. Ex.:

Es fehlen fünf, acht oder zehn Minuten bis (or an) zwölf.	It lacks five, eight, or ten minutes to twelve.
Es fehlt ein Viertel bis zwölf.	It lacks a quarter to twelve.

When a half-hour is named, it is not measured, as in English, from the preceding hour, but from the one that follows. This is, likewise, commonly the case with any part or the whole of the first quarter, although it may, as in English, be referred to the hour preceding. Ex.;

Es iſt halb* zwölf.	It is ½ (towards 12) past 11.
Es iſt zehn Minuten auf zwölf.	It is 10 minutes (towards 12) past 11.
Es iſt ein Viertel auf zwölf.	It is ¼ (towards 12) past 11.
Es iſt zehn Minuten nach eins.	It is ten minutes past one.
Es iſt ein viertel nach eins.	It is a quarter past one.

X. The prepositions bei, nach, mit, von, zu, &c. (§ 111.) govern no case but the dative, while an, auf, in, unter, &c. (§ 115.) govern the dative only when used with a verb of *rest*, or of motion *within specified limits*. Ex.:

Der Mann arbeitet an dem (am § 4. 2.) Tiſche.	The man is working at the table.
Das Kind tanzt auf dem Brette.	The child is dancing on the board.
Der Knabe ſpielt in dem Garten.	The boy is playing in the garden.
Der Hund iſt unter dem Baume.	The dog is under the tree.

But when motion towards a given point is signified, the accusative is used. Ex.:

Der Mann geht an den Tiſch.	The man is going to the table.
Das Kind ſpringt auf das (aufs § 4. 2.) Brett.	The child springs upon the board.
Der Knabe eilt in den Garten.	The boy hurries into the garden
Der Hund läuft unter den Baum.	The dog runs under the tree.

Dative and accusative.

Der Fiſch ſchwimmt in dem Waſſer.	The fish swims in the water.
Der Stein fällt in das Waſſer.	The stone falls *into* the water.
Er ſteht an der Thüre.	He is standing *at* the door.
Er geht an die Thüre.	He is going *to* the door.

EXERCISE 25.

Auf'merkſam, attentive;	Hausfrau, *f.* housewife;	Neidiſch, envious;
Daß, that;	Kirſche, *f.* cherry;	Regnen, to rain;
Deutſch, German;	Können, can, to be able;	Sagen, to say;
Druckſchrift, *f.* print;	Kunſt, *f.* art, skill;	Schwer, heavy, hard, difficult;
Finden, to find;	Lernen, to learn;	Thun, to do;
Geduld', *f.* patience;	Leſen, to read;	Ver'kau'fen, to sell
Genug', enough;	Mannheim, *n.* Mannheim;	Warten, to wait;
Güte, *f.* goodness, kindness;	Morgen, to-morrow;	Woche, *f.* week;
Handſchrift, *f.* handwriting, manuscript;	Müſſen, must;	Wollen, to will;
	Nächſt, next;	Zeit, *f.* time.

* In case of halb, the preposition auf is commonly omitted.

Mit der Ruhe eines Sto'kers ertrug' er den heftigſten Schmerz.	With the (quiet) calmness of a stoic he endured the most violent pain.
Bei dem Gedan'ken an die Schmach ſeines Va'terlandes konnte er die Thränen nicht länger zurück'halten.	At the thought of the disgrace of his native country he could not (longer) repress (the) his tears.
Wir müſſen uns beſtre'ben, wenn wir anders gute Bürger ſein wollen, mit unſern Kräften und nach unſerm Vermö'gen dem Staate zu nützen.	We must exert ourselves, if we (otherwise) wish to be good citizens, with all our strength and according to our ability to serve the state.
Wir dürfen Andern nicht thun, was wir nicht wünſchen von ihnen gethan zu haben.	We must not do to others what we do not wish to have done by them.
Er hat Briefe ſchreiben wollen	He has wished to write letters.
Wird ſie gehen müſſen?	Will she be obliged to go?
Sie wird nicht gehen können.	She will not be able to go.
Wir haben es nicht thun mögen.	We have not wished to do it.
Sie werden gehen dürfen.	You will be allowed to go.
Ich mußte den ganzen Abend leſen.	I was obliged to read the whole evening.
Sie hätten es nicht thun ſollen.	They ought not to have done it.

1. Wollen Sie mit mir nach Mannheim gehen? 2. Ich kann nicht, ich habe keine Zeit. 3. Wann können Sie gehen? 4. Ich werde die nächſte Woche gehen, wenn Sie ſo lange warten können. 5. Will Ihr Lehrer mit Ihnen auf das Feld oder nach der Stadt gehen? 6. Er will nicht auf's Feld, und kann nicht nach der Stadt gehen. 7. Was wollen dieſe Kinder? 8. Sie wollen Aepfel und Kirſchen, aber ſie können keine kaufen, denn ſie haben kein Geld. 9. Was wollen Sie, mein Herr? mein Fräulein? meine Dame? 10. Wollen Sie die Güte haben, mir ein Glas (Sect. 62) Waſſer (Sect. 26) zu geben? 11. Können Sie mir ſagen, wie viel Uhr es iſt? 12. Ich kann es (Sect. 36. VI) Ihnen nicht ſagen, ich habe keine Uhr bei mir. 13. Was wollte der Kaufmann Ihnen verkaufen? 14. Ich konnte nichts bei ihm finden, was ich kaufen wollte. 15. Wir werden morgen ſchlechtes Wetter haben. 16. Es kann ſein, daß es noch heute regnen wird. 17. Können Sie die deutſche Handſchrift leſen? 18. Nein, ich habe genug mit der Druckſchrift zu thun. 19. Der Neidiſche (Sect. 17) will ſeinen Freund nicht loben. 20. Eine Gelehrte iſt nicht immer eine gute Hausfrau. 21. Geduld iſt eine ſchwere Kunſt; Manche (§ 53. 1.) können ſie lehren, aber nicht lernen. 22. Ein guter Lehrer muß Geduld haben. 23. Jeder gute Schüler wird aufmerkſam ſein.

1. You can go into the garden, but you cannot remain long there. 2. These attentive scholars were allowed to go with their teacher to Mannheim. 3. We can employ[1] our time better. 4. Can you speak German? 5. We could not learn our lessons this week. 6. You must learn this week's lessons[2] attentively. 7. You may go to-morrow to your parents. 8. He may be a good man. 9. The housewife must (is obliged to) go to market to-morrow. 10. Have you written to your parents? 11. Yes, I was obliged to write. 12. It is two o'clock. 13. I shall arrive at your house at a quarter past three o'clock. 14. Will you come twenty minutes before eight o'clock? 15. I may come to your house this evening, but do not wait for me. 16. As long as[3] it rains, I cannot go out. 17. Fish can only[4] live in water, and birds in the air. 18. You should not have done that, it will not be any recommendation[5] to you. 19. I wish to go to the theatre this evening. 20. We may not have the opportunity[6] another time.

[1]anwenden. [2]die Aufgaben dieſer Woche. [3]So lange als. [4]nur. [5]keine Empfehlung. [6]Gelegenheit.

ANSWERS TO CORRESPONDENTS.

A MINER may study geometry with very little knowledge of arithmetic, and relieve his mind with geology and English. A true geometer needs scarcely any instruments.—A PUPIL (Newport): Study both, and do all the Latin exercises if you wish to excel.—D. MINTY (Cardiff): Hints in composition will be given. Dr. Beard is right, if we consider that all prefixes were once words.—JOHN HOLLAND (New Basford): We advise him to apply to the clergyman of the parish in which he resides.—W. B. U. (Cashel): Thanks for his communication. In Geology, *eocene* comes from *eos*, the dawn, and *kainos*, recent; *miocene*, from *meion*, smaller or less, and the same word; and *pliocene*, from *pleion*, more, and the same word. The meaning is, that certain formations are called *recent*; and of this recentness, there are degrees: first, the *newest* or *more recent*, called *pliocene*; second, the *less recent*, called *miocene*; and third, the *least recent*, or the commencement of recentness, called the *eocene*.—A WOULD-BE-APPRENTICE, must not be afraid of any difficulties that may arise, if he were bound to a master; the law would protect him from ill-usage. A knowledge of Geometry would be a "feather in his cap," in an engineering shop.—D. H. (Liverpool): We cannot give a reference to the rules in French Grammar, which will remove his difficulties, because we have not come to these rules in our course; and to anticipate them for every one, would be endless.—AN ENQUIRER IN THE WEST: No, certainly not; he can only learn by experience, or by consulting a dictionary.—E. M. COLLINS (Bath): Thanks for her communication.—G. BROWN (Sheffield): We mean pp. 676, 677, and 686 of the *Three Guinea* Catalogue, which is, no doubt, in the hands of some of the Sheffield manufacturers whose goods figured in class 22, of the Great Exhibition.—C. A. MOLLYSON: Right.—J. E. WOOD (Tookworth): We are preparing the book on Arithmetic he wants.—X. Y. Z. (Bayswater): We must give the first part before the second part: patience, friend.—B. H. N. (Dukinfield): Right.—J. G. (Heywood): His remarks on the necessity of a French key, are just; we shall try to meet them.

ONE ANXIOUS, &c. (Kirton-in-Lindsay): Go on, all right; all your questions have been already answered; read the notices to correspondents from the beginning.—H. D. (Slaidburn) shall receive due attention.—Q. K. X.: Yes.—E. S. PARKER (Plaistow): Go on as you are doing. Latin will help the French if you have time.—R. W. (Whitby): Yes.—E. M.: The references are to future lessons not to past.—W. MARCHBANK (Cowling): Thanks for his communication; his solution is quite correct; but arithmetic is preferable to algebra, for the mass, in such questions.—C. THOMAS (St. Austell): His solution is quite correct, but too laborious.—GEORGE PEPPER (Belfast), A. HALL (Bristol), recommends Odell's system of shorthand, as it can be learned in half the time of Pitman's system.—JAMES L. ARDEN (Malton): The books selected for the class are very good; but after you have purchased them it would not be wise to attempt to criticise on your choice. You seem to have enough in hand for the present.—J. W. Y.: Words which from their nature admit of no comparison should not be treated like those which do. It is neither proper to say *more proper*, nor correct to say *more correct*.—LILLY (Gloucestershire) should request her mother or some friend to listen to her reading a column of Smart's "Walker's Pronouncing Dictionary" every day, and to ask her to spell the words in it after she has read it.—WILLIAM SMITHSON (Newcastle): If a mutual class be formed for the study of Euclid, a certain portion should be given out to be committed to *judgment* and not to *memory* only; and one member should be selected in turn to hear the rest. A black board or slate will be necessary to draw the diagrams upon, with chalk, so that all may see. Let each then, in turn, with his book shut, give the best account he can of a proposition and its demonstration to the chairman or teacher for the evening; the latter if he be not well acquainted with the proposition, holding his own book open by way of check upon any great inaccuracy of statement. (I. 2) means *first proposition, second book*. Q.E.F. means *quod erat faciendum*, i.e., which was to be done. The longitude on maps is to be counted from the *first meridian*, viz., that of Greenwich; and it is so counted and marked at the top and bottom of square maps. On round maps, like those of the world, it is marked along the equator, the meridian passing through Greenwich being marked O.—VERITAS: We are anxious to begin mechanics. CIↃIↃCC means 1700, and the French Testament of this date, published in Amsterdam, is very likely to be both correct and good. Our thanks to his French teacher. His plan regarding exercises is good, but there are great difficulties in the way. The statement about the letters in the alphabet in the I. E. must be misprinted; but write to its editor.

ORATOR (Greenock): Thomson's Algebra as a companion to his Euclid, is better than Bridge's. The French pronunciation is taught on the very plan he wishes, in the "French Lessons" published here, and which may be had by post, for seven penny stamps.—J. S. (Edgeware-road): The shilling edition of Euclid will be sent through the post, upon the transmission of 18 penny postage stamps to our office.

LITERARY NOTICES.

CASSELL'S ELEMENTS OF ARITHMETIC, will be issued early in October, price 1s. in stiff covers, or 1s. 6d. cloth, uniform with Cassell's Edition of Euclid, edited by Professor Wallace, A.M., of the University of Glasgow, Editor of Cassell's "Euclid," the POPULAR EDUCATOR, &c.

THE POPULAR EDUCATOR ALMANACK, price 2d., containing a large amount of Educational Statistics, compiled from the most authentic sources, with brief notices of the various arts, sciences, languages, &c., will be ready for delivery November 1st.

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LESSONS IN GEOGRAPHY.—No. IX.

DISCOVERIES OF THE NINETEENTH CENTURY.

Sir John Ross, who sailed in the Victory, in 1829, on an expedition to the north, again explored Baffin's Bay, Lancaster Sound, and Prince Regent's Inlet, discovered land which he called Boothia Felix, from the name of his patron, and explored the coasts of this new country, until he was so hemmed in by the ice, that he could neither advance nor return. The expedition accordingly remained in this condition during the space of four years, the longest period on record, of the detention of navigators in the northern regions. While thus detained the members employed their time in making excursions which enlarged our geographical and meteorological knowledge, and added to philosophy the fine discovery of the north magnetic pole. Besides the isthmus and peninsula of Boothia Felix, the expedition discovered King William's Land, and the western sea called after the same sovereign. As to the north-west passage, he found that this did not exist in Prince Regent's Inlet, nor to the south of latitude 70° N.; but Sir John Ross failed in discovering a free passage in the frozen seas of America, by which he could find his way to Behring's Straits; in fact, the peninsula which separates Prince Regent's Inlet from this northern sea, at the place where the expedition made its principal researches, is not only very narrow, but is chiefly covered with lakes which reduce the isthmus between the two seas to a breadth of three miles.

Other expeditions, no less dangerous, and equally difficult, if not more so, had been undertaken by land, with a view of exploring the northern regions of America, and the coasts of the Polar Sea, in order to assist in the discovery of the passage so ardently sought for, during so many ages. Samuel Hearn, employed by the Hudson's Bay Company, in 1771, commenced his expedition at Prince of Wales' Fort, and discovered the Coppermine River, which he traced to its embouchure, in the Polar Sea. Franklin, in 1820-21, made an expedition by land along the same coast between the Coppermine River and Cape

CROSSING THE ANDES OR CORDILLERAS.

Turnagain. This adventurous expedition accomplished amidst a thousand dangers, among which famine was not the least formidable, was highly useful in a geographical point of view. Two years afterwards the same officer undertook another expedition to the north, and explored the country between the Mackenzie River and Cape Back; at the same time Dr. Richardson, one of the party, explored that part between the Mackenzie River and the Coppermine River. The part of the coast left unexplored between the limits of Captain Beechey and Captain Franklin's discoveries, extending to 160 miles, was nearly completed in this respect by Captain Back, and after him by Messrs. Dease and Simpson, so that the northern shores of North America are now geographically known almost throughout their whole extent.

Our geographical knowledge of the desert regions of North America was greatly increased by some other important expeditions. Lewis and Clarke travelled to the sources of the Missouri among the Rocky Mountains, and reached the Pacific Ocean by descending along the course of the Colombia River. Pike, in exploring the sources of the Mississippi, discovered those of the Arkansas and the Red River. Major Long, James Peak, Messrs. Cass and Schoolcraft, travelled over this vast region, so remarkably studded with lakes and rivers, and belonging partly to Britain and partly to the United States. Mackenzie, in 1789, went from Montreal, and travelling to the north-west, descended along the course of the river which bears his name, and found that its source was in the Slave Lake, and its termination in the Arctic Ocean; he then crossed the chain of the Rocky Mountains, and reached the Pacific. In South America, M. de Humboldt began his explorations, and accompanied by M. Aimé Bonpland, the celebrated botanist, visited Colombia, studying during his travels all the phenomena of nature, tracing the geography of the country, measuring the heights of the Andes, examining the craters of volcanoes, delineating on maps the courses of rivers, and, in short, exploring the whole external appearance of this magnificent country. On the river Amazon, he made observations equally curious and important. He proceeded from Peru to Mexico, and made similar observations in the latter country; and he has described his scientific discoveries in these regions in a style both effective and interesting; so that in no portion of the globe have greater advances been made in the knowledge of physics and geography, and of all the sciences connected with them. Botanical geography may, in fact, be said to have originated with M. de Humboldt. If to this we add, that the author of the "Tableaux de la Nature" studied the countries in which he travelled both in an economical and political point of view, his merit as a scientific traveller stands unrivalled.

The travels of La Condamine in Peru and on the river Amazon; of Smith and Maw, on the same river; of Messrs. Spix, Martius, and Auguste St. Hilaire, in Brazil; of Don Felix Azara, in Paraguay; of Captains Parker-King, and Fitzroy, in Patagonia, and Terra-del-Fuego; of M. Stephenson, in Chili and Peru; of M. Gay, in Chili; and of M. Schomberg, in Guiana,—have all contributed to the perfection of our knowledge of the geography, the productions, the geology, and the population of South America. Among these later travellers, must be mentioned M. A. d'Orbigny, a learned French geologist, who, in 1826, after a sojourn of seven months at Buenos Ayres, ascended the Parana as far as 1,000 miles from its mouth, travelled over the provinces of Corrientes and of Missions, penetrated into the hordes of savages which people Grand-Chaco, and returned to a civilised territory, passing through the provinces of Entre-Rios and Santa-Fe. He then travelled into Patagonia, ascended the Rio Negro, and sojourned eight months in that country, amongst the giants, whose Herculean forms and size had been described with so much exaggeration, by Pigafetta, Drake, Sarmiento, Lemaire, Byron, Bougainville, and many other navigators. This intrepid naturalist then proceeded to Chili, having doubled Cape Horn and reached Bolivia (Upper Peru), of which he explored the western region, rendered so remarkable by the labours of the ancient Quichuas. He ascended the summits of the Andes, and on his reaching the opposite sides of these amazing heights, beheld a magnificent panorama of snowy peaks, and of immense chains of mountains. He at last reached the vast tableland on which is situated the great Lake of Titicaca, 160 miles long, rendered so famous by the Temple of the Sun, built by the Incas, in an island in its centre. At the village of Tiahuanacu, near the banks of this lake, are also to be seen the remains of the stupendous palace erected by the ancient Peruvians. The interior courts, 360 feet square, are built of enormous blocks of stone, some of which weigh 80 tons. The great gates are each composed of one single mass; and there are colossal images rudely sculptured, showing that at a very early period there must have been some communication between the old world and the new. The traveller, above mentioned, then visited in succession the cities of Cochabamba and of Santa Cruz de la Sierra; courageously penetrated into the province of the Chiquitos, which he surveyed in every direction to the river Paraguay and the Brasilian city of Matto-Grosso; noted the manners of the Guarayos, a tribe still entirely savage; traversed the province of the Moxos, to the north-east of Upper Peru; passed some time in the forests inhabited by the Yuracares Indians; discovered the points of discharge of the Rio-Beni and Rio-Mamoré, tributaries to the Amazon; returned to Santa Cruz; visited Potosi, the city of inexhaustible mines; and finally sailed for France from the coast of Peru. This remarkable expedition lasted for the space of eight years; and produced valuable results for the geographer, the natural historian, and the geologist.

From the extremity of South America, let us pass on to the regions which surround the antarctic pole. There we see navigators of all nations, braving the storms and the icebergs of those seas which are covered with everlasting mists, in order to enrich geography with important observations and discoveries. After the immortal name of Cook, came those of William Smith (1818), of Lieutenant Barnsfield, of the Russian officers Bellinghausen and Lazareff (1819), of Botwell (1820), of Weddell and Palmer (1822), of Biscoe (1830), and of Balleny (1839). It is to these navigators, some commissioned by the government of the nations to which they belong, and others who were simply whalers or seal-catchers, that we owe the successive discoveries of New South Shetland, the New Orkneys, Palmer and Trinity lands, the islands of Peter and Alexander, Enderby land, Adelaide island, Graham's land, and the islands of Biscoe and Balleny. Three voyages in the southern circumpolar seas, those of Dumont-d'Urville, of Captain James Clarke Ross, and of the American Lieutenant Wilkes, deserve particular notice. The French expedition under the command of Captain Dumont-d'Urville, after a careful exploration of the straits of Magellan, proceeded in 1838 towards the icy regions, and was stopped by an iceberg in latitude 64° S. The two vessels endeavoured to overcome the obstacles which opposed their progress, but they were blockaded by the ice during five successive days, and only secured their safety by a sudden change of the wind to the south, and the immediate efforts of the crews, who cleared their way through the immense blocks of ice with which they were surrounded. Sailing in a different direction, they discovered Louis Philippe's land; and returning northward, Captain d'Urville visited agreeably to his instructions the islands of Juan Fernandez, Marquesas, Tahiti, Samoa, Vavaoo, Hapaee, and Feejee. He then touched at the islands of Sir J. Banks, Vanikoro, Solomon, Carolines, and others, and arrived at the hospitable port of Guam. He then sailed through the great Asiatic Archipelago, and explored the banks of New Guinea, Australia, and the isles of Sunda; he made the tour of Borneo and made a short stay at Hobart Town in Tasmania. In January, 1840, the vessels of the same expedition, L'Astrolabe and La Zelee sailed again towards the icy regions of the south, and swept over the immense space from 120° to 170° E., which had not hitherto been fully explored by navigators. Having discovered some land and coasts which they supposed to belong to the yet undiscovered antarctic continent, they returned to New Zealand, and explored its coasts, and those of the islands of Louisiade, New Guinea, including the dangerous reefs of Torres Straits.

The object of the expedition, under Captain Ross, was to investigate the problem of the antarctic continent of which d'Urville was considered to have seen the shores. He sailed for this purpose, with the Erebus and Terror under his command, and early in 1840, he discovered land in latitude 70° 47 S., and longitude 174° 56′ E., consisting of a collection of peaked mountains varying from 9,000 to 12,000 feet in height

covered with snow, and surrounded with immense masses of ice which jutted into the ocean like huge promontories. An island discovered in the vicinity of this land, was called Victoria. In latitude 76° 8′ S., and longitude 170° 32′ E., they discovered another island; and next day they beheld a mountain 12,400 feet high, belching forth, at an immense elevation, flames and smoke; to this volcano, they gave the name of Mount Erebus. Having reached latitude 78° 4′ S., the farthest south point yet reached in the antarctic ocean, the expedition proceeded on its way in a retrograde direction, coasting as it were the land first discovered, it being impossible to get on shore on account of the ice in which it was enveloped. It was thus ascertained that this land extended in latitude from 70° S. to 79° S.; and it was named Victoria's Land. A second voyage of Captain Ross was fruitless; and a third ended in the discovery of a small volcanic island in latitude 64° 12′ S., and in longitude 54° 29′ W. The expedition of Wilkes, the American navigator above mentioned was practically useless; as it was proved that his claim to the discovery of the antarctic continent, could not be supported even by the testimony of his own officers. Recent attempts to penetrate into the land around the south pole have proved unsuccessful.

LESSONS IN LATIN.—No. XXIII.

By John R. Beard, D.D.

REGULAR VERBS.

The Third Conjugation.

PASSIVE VOICE.

Example.—Legor 3, *I am read.*

Chief Parts; legor, lectus sum, legi.

Characteristic letter, E short.

		Indicative.	*Subjunctive.*	*Imperative.*	*Infinitive.*	*Participle.*
Present.	Sing.	légor légeris légitur	legar legáris legátur	[légitor légere or légitor	legi	
	Plural.	légimur legíminí leguntur	legámur legámini legántur	[leginínor leginíni or legúntor		
Imperfect.	Sing.	legébar legebáris (e) legebátur	legérer legerére legerétur			
	Plural.	legebámur legebáminí legebántur	legerémur legerémini legerántur			
I. Future.	Sing.	legár legéris (e) legétur			lectum iri	legendus
	Plural.	legémur legéminí legentur				
Perfect.	Sing.	lectus sum lectus es lectus est	lectus sim lectus sis lectus sit		lectum [esse	lectum
	Plural.	lecti sumus lecti estis lecti sunt	lecti simus lecti sitis lecti sint			
Pluperfect.	Sing.	lectus eram lectus eras lectus erat	lectus essem lectus esses lectus esset			
	Plural.	lecti eramus lecti eratis lecti erant	lecti essemus lecti essetis lecti essent			
II. Future.	Sing.	lectus ero lectus eris lectus erit				
	Plural.	lecti erimus lecti eritis lecti erunt				

Instances.—In this way conjugate in full, agor, agi, actum esse, *I am driven;* regor, regi, rectum esse, *I am ruled;* and dividor, dividi, divisum esse, *I am divided.*

Vocabulary.

Curae mihi est, *it is an object of care to me,* or *I take pains that*; detĕgo, detegere, detexi, detectum 3, *I uncover, detect, lay open*; que, *and*, it comes after the word, as voluptasque; conspicio, conspicere, conspexi, conspectum 3, *I behold*; educo 3, *I lead out*; quidam, quaedam, quoddam, *certain*; societas, ātis, f. *relationship* (E. R. *society*); vix, *scarcely*; pie, *piously, religiously*; contemno, contemnere, contempsi, contemptum 3, *I despise, contemn*; probe, *honestly, excellently*; dives, divitis, *rich, a rich man*; divitiae, arum, pl. f. *riches*; honos, ōris, m. *honour*; schola, ae, f. *a school*; scriptor, ōris, m. *a writer* (E. R. *scripture*); quoad, adv. *as long as.*

Exercises.—Latin-English.

Pater curat ut ego strenue excŏlar; curo ut puer bene excolatur; pater curabat ut puer bene excoleretur; curae mihi est ut a te diligar; conjuratio Catilinae a Cicerone detecta est; tria bella atrocissima gesta sunt inter Romanos et Carthaginienses; labor voluptasque naturali quadam societate inter se juncta sunt; multae urbes ab hostibus combustae sunt; vix hostes conspecti erant quum milites a duce e castris in aciem educti sunt; metuebamus ne urbs ab hostibus obsidione cincta esset; Deus pie colitor; leges divinae ne contemnuntor; sapientes semper ratione regi student; pueri probe excolendi sunt; ne vincitor cupiditatibus; non eris dives nisi divitiae a te contemptae erunt! contemnens voluptates, diligĕris; quoad literis honos erit, Graeci et Latini Scriptores in scholis legentur.

English-Latin.

My mind will be cultivated; my brother's mind has been cultivated; if thy mind is well cultivated, thou wilt be loved; riches are despised by the wise; riches will be despised by me; riches will have been despised by my father; let riches be despised by thee, my son; he strives (*studet*) to be governed by reason; the boy must be well cultivated; let the boy be well cultivated; I have taken care that pleasures should be despised by my children; the Latin writers are read in my school; if thou livest well, thou wilt be loved by good men; I fear riches will (may) not be despised by thee; many wars have been carried on by the English; the city was burnt by the army.

The Fourth Conjugation.

ACTIVE VOICE.

Example.—Audio 4, *I hear.*

Chief Parts; audio, audivi, auditum, audire.

Characteristic letter, I long.

		Indicative.	*Subjunctive.*	*Imperative.*	*Infinitive.*	*Participle*
Present.	Sing.	audio audis audit	audiam audias audiat	[audíto audí or audíto	audíre	audiens
	Plural.	audímus audítis audiunt	audiámus audiátis audiant	[audítote audíte or audiunto		
Imperfect.	Sing.	audiébam audiébas audiébat	audírem audíres audíret			
	Plural.	audiebámus audiebátis audiebánt	audirémus audirétis audirent			
I. Future.	Sing.	audiam audies audiet			audíturum [esse	audíturus
	Plural.	audiémus audiétis audient				
Perfect.	Sing.	audívi audí(v)isti audivit	audí(v)erim audí(v)eris audí(v)erit		audí(v)isse	
	Plural.	audívimus audí(v)istis audí(v)erunt	audí(v)érimus audí(v)éritis audí(v)erint			
Pluperfect.	Sing.	audí(v)eram audí(v)eras audí(v)erat	audí(v)issem audí(v)isses audí(v)isset			
	Plural.	audí(v)erámus audí(v)erátis audí(v)erant	audí(v)issímus audí(v)issétis audí(v)issent			

		Indicative.
II. Future.	*Sing.*	audí(v)ro audí(v)ris audí(v)rit
	Plural.	audí(v)rimus audí(v)ritis audí(v)rint

GERUNDS. Gen. audiendi; Dat. audiendo; Acc. audiendum; Abl. audiendo.

SUPINES. 1. auditum; 2. auditu

INSTANCES.—According to the example, form finio 4, *I finish*; haurio, hausi, haustum, haurire 4, *I draw up, I drink.*

VOCABULARY.

Sitio 4, *I thirst* (sitierunt is a syncopated form for sitiverunt); esurio 4, *I am hungry*; tenuis e, *thin*; membrānum, i, n. *a leaf*, or *covering*; vestio 4, *I clothe* (E. R. *vest*); paries, ĕtis, m. *a wall*; corōna, ae, f. *a crown, chaplet*; placĕo 2, *I please*; navigo 1, *I sail* (E. R. *navigate*; munio 4, *I fortify*; dormio 4, *I sleep*; simulac, *as soon as*; antequam, *before that*; expedio, with the reflective pronoun, *I prepare*; garrio 4, *I chatter*; Lacedaemonii, orum, m. *the Spartans*; specto *I regard* (id spectant, *have this object*); custodio 4, *I keep, guard*; lenio 4, *I soften, soothe*; punio 4, *I punish*; obedio 4, *I obey*, governs the dative (obedieratis, syncopated for obediveratis); prodest, *he benefits.*

EXERCISES.—LATIN-ENGLISH.

Milites per totum diem sitierunt et esurierunt; natura oculos tenuissimis membranis vestivit; cur domūs vestrae parietes coronis ornavistis et vestivistis? praeceptoribus vestris placueratis, quia semper praeceptis eorum obedieratis; vix milites nostri castra muniverant, quum Caesar aciem instruxit; non prius dormiemus quam negotia nostra finierimus; quum milites castra muniverint, ad pugnam se expedient; cavete, pueri, ne garriatis; Lacedaemoniorum leges id spectant ut laboribus erudiant juventutem; nemo dubitabat quin pueros semper custodivisses; narrate mihi quā consolatione aegrum amici animum leniveritis; nescio cur puerum puniveritis; non dubitabam quin praecepta mea memoriā custodivissetis; ne garritóte, filiae; venio te rogatum ut mecum ambules; milites urbem custodire debent; sapientia est ars videndi; obediendum est praeceptis virtutis; ars navigandi utilissima est.

ENGLISH-LATIN.

They thirsted; I shall be hungry; thou wilt not obey my precepts; the boys chatter; they have not obeyed their father; I know not why they have not obeyed their father; no one doubts that good boys obey their father; he kept my words in memory; I shall take care that thou keepest (mayest keep) my words in memory; they come to fortify the city; the art of writing is useful; they adorn the walls of their house with chaplets; I shall not sleep until (before that) I have (shall have) finished my business; hast thou finished thy business? he was punishing the boy when I entered the school.

THE FOURTH CONJUGATION.

PASSIVE VOICE.

EXAMPLE.—Audior 4, *I am heard.*

Chief Parts; audior, auditus sum, audiri.

Characteristic letter, I long.

		Indicative.	*Subjunctive.*	*Imperative.*	*Infinitive.*	*Participle.*
Present.	*Sing.*	audíor audíris audítur	audiar audiáris audiátur	[audítor audíre audítor	audíri	
	Plural.	audímur audímini audiuntur	audiámur audiámini audiántur	[audíminor audímini or audiuntor		
Imperfect.	*Sing.*	audiébar audiébāris (e) audiébātur	audírer audirēris audirētur			
	Plural.	audiébāmur audiébāmini audiébantur	audirémur audirémini audirentur			
					auditum	audiendus

		Indicative.	*Subjunctive.*	*Infinitive.*	*Participle.*
Perfect.	*Sing.*	auditus sum auditus es auditus est	auditus sim auditus sis auditus sit	auditum esse	auditus
	Plural.	auditi sumus auditi estis auditi sunt	auditi simus auditi sitis auditi sint		
Pluperfect.	*Sing.*	auditus eram auditus eras auditus erat	auditus essem auditus esses auditus esset		
	Plural.	auditi eramus auditi eratis auditi erant	auditi essemus auditi essetis auditi essent		
II. Future.	*Sing.*	auditus ero auditus eris auditus erit			
	Plural.	auditi erimus auditi eritis auditi erunt			

EXERCISES.—LATIN-ENGLISH.

Pater curat at filius bene erudiatur; pater curabat at filius bene erudiretur; cives metuant ne castra ab hostibus ante urbem muniantur; oculi tenuissimis membranis vestiti sunt; quum rex urbem intrabat, omnium civium domus coronis et floribus vestitae et ornatae sunt; non prius dormiemus quam negotia vestra finita erunt; simulac castra munita erunt, milites se ad pugnam expedient; metuebamus ne urbs ab hostibus obsidione cincta esset; improbi puniuntor; bonus discipulus literarum cognitione erudiri studet; urbs, obsidione cinctā, multis malis punitur; vir eruditus non solum sibi sed etiam aliis prodest; pueri diligenter erudiendi sunt.

ENGLISH-LATIN.

They are guarded; the city is guarded; the city will be guarded; the city has been guarded; I take care that the city is (may be) guarded; no one doubts that the city is well guarded; the citizens ought to guard the city; why do not the citizens guard the city? I know not why the citizens do not guard the city; I fear the citizens may not guard the city; they have prepared for the fight; the walls of the house have been clothed with flowers.

LESSONS IN PHYSIOLOGY.—No. X.

MAN.

THE structure of our bodies may be perfect—they may be possessed of all the properties which are required for their activity, but this activity would never be put forth without the stimulation of heat. This is essential to every action of life. Why are persons sometimes frozen to death, but because, under the extreme cold to which they are exposed, they are not able to keep up the temperature of the body? In man, the standard heat is from ninety-eight to one hundred degrees; and it is well known that whatever may be the state of the air by which we are surrounded,—whether we be in the polar regions, or in the torrid zone,—under any variety of circumstance, the body retains nearly the same temperature. This is a property peculiar to life; and "without this power of adaptation, it is obvious that man must have been chained for life to the climate which gave him birth, and even then have suffered constantly from the change of seasons; whereas, by possessing it, he can retain life in a temperature sufficiently cold to freeze mercury, and is able for a time to sustain, unharmed, a heat more than sufficient to boil water, or even to bake meat." This uniform temperature is effected by the production of heat sufficient to compensate for that which is constantly lost in radiation, or in the evaporation which takes place from the exposed surfaces of the body. In proportion as the external temperature is low, it is needful that more heat should be generated and evolved to keep up the temperature of the body to its proper standard. If the surface is exposed to a high degree of external heat, then the temperature of the body is kept down by the increased amount of fluid which is set free from the perspiratory glands; this fluid is carried off by perspiration in a state of vapour, and withdraws a certain quantity of caloric or a certain degree of heat from the surface. As a rational and intelligent being, man has the power to adapt himself to the extremes of heat and cold, and to every possible variety of climate. His intelligence will be seen in the choice of

his food, his clothing, his occupation, and even his amusements. He may live in either zone, or within the zones, and enjoy the fulness of health.

But what is the source of this animal heat? If it be so essential to vital action how is it produced? It was long before this question came to be satisfactorily answered. But now the general opinion is, that it is owing to certain chemical processes going on in the system, and that these chemical changes are carried on in parts whose functions are, to a certain extent, under the influence of the nervous system. In warm-blooded animals,* the blood receives from the digestive canal and the lungs, more carbon, hydrogen, and oxygen, than are consumed in the repair of the tissues, and from the combination of these elements is always parting with a certain quantity of carbonic acid and water. Now in the process of this combination, heat is continually produced in the animal body; and the illustrious Liebig believes that the union of the oxygen absorbed into the blood from the air which we breathe, by being united with the carbon and hydrogen which are taken into the system as food, is sufficient to account for the whole of the heat which is formed in the body.

It is laid down as a general rule, that, in the various classes of animals, "the quantity of heat generated in the body is in direct proportion to the activity of the respiratory process. The highest animal temperature is found in birds, in whom the function of respiration is most actively performed. In mammalia, the process of respiration is less active, and the average temperature of the body less than in birds. In reptiles, both the respiration and the heat are at a much lower standard; whilst in animals below them, in which the function of respiration is at the lowest point, a power of producing heat, is, in ordinary circumstances, hardly discernible." Other equally interesting facts come in to confirm this theory. It appears that in the vegetable kingdom the degree of heat which is evolved by plants, is in proportion to the amount of oxygen which they absorb and convert into carbonic acid. In the germination of seeds there is a considerable elevation of temperature. A thermometer introduced into a flower during the time of flowering has been known to rise to 112°, while the temperature of the surrounding air was not much more than one half of that. If you take a living and dead plant, and expose them to the same atmosphere, you will find that the warmth of the living plant is somewhat greater than that of the dead one. More than this:—you will find that in the leaves and young stems, as the parts in which the most active vital changes are taking place, the elevation of temperature is greatest. But to return to the animal economy. It cannot be denied that the variations of heat in man are dependent in part upon the temperature of the external air—on the general condition of the body, as to repose or activity—the period of the day—the time that has elapsed since the taking of a meal, and even on the quantity and quality of the food consumed in different seasons and in different climates. A larger amount of heat is generated during the day than in the night—the body is warmer at noon than at midnight. The temperature is raised during the process of digestion. The quantity of food consumed in colder seasons and in northern regions is different and greater than what is consumed in warmer suns and southern climes. It is this last fact which explains the preservation and continued activity of life within the frigid zones. The food adapted to the inhabitants of these cold regions—such as the several fatty and oily substances—abounds in carbon and hydrogen, and combining with the large quantities of oxygen derived from the lungs by breathing a cold dense air, a proportionate degree of heat is generated in the body.

But has not the period of life to do with the maintaining of the heat of the body, and so with the continuation of life? Most certainly. Some young animals come into the world in such an advanced condition, as to be almost independent of parental assistance, and therefore capable of maintaining their own temperature; but when they are born in such a state as to require to be for some time supplied with food by the parent, they are then more or less dependent upon the warmth imparted to them from the parental body. This is especially the case with children, who are more dependent on the parent than the young of any other animal. However healthy and vigorous an infant may be at its birth, it has not the power to keep up the standard heat of the body without assistance; and exposure to a cold atmosphere would be followed by the most serious or fatal consequences. It is a well-known fact, that during the first month of infant life, the mortality in winter is nearly double that of summer. In adult life, on the contrary, when there is the power of maintaining a high independent temperature, the deaths in winter are scarcely one-sixth more than in summer. In old age, the power of generating heat again diminishes, and the relative mortality is nearly the same as in the first month of infancy. At the age of ninety, the average of deaths in winter are more than twice those of summer. Great attention, then, should be paid to the temperature of the body by every one who wishes to enjoy health. Care should be taken to select a dry atmosphere, and avoid all damp and marshy situations. If the air be saturated with vapour, it will interfere with the healthy functions of the skin, and so derange the whole system.

An interesting question comes in here:—How do we know that the production of heat is modified by the influence of the nervous system? If animal heat is to be resolved into a chemical process, what can the nerves have to do with it? We can only appeal to facts. If the supply of nervous influence to any part of the body be cut off, the temperature of that part falls below its proper standard. For example:—it has been found that the temperature of the hand of a paralysed arm has been as low as seventy degrees, while that of the sound side had a temperature of ninety-two degrees. On electrifying the paralysed part, the temperature rose to seventy-seven degrees. In the finger of a paralysed hand, the temperature has been six degrees less than in that of a hand not paralysed. So we all know, that if we are very much depressed in our minds, how the temperature of our bodies falls, and we feel chilly and cold. On the contrary, if we become powerfully excited by passion, the heat of the body may increase even to perspiration. Yet we must not conclude that animal heat is generated by mere nervous action. All that we can say is, that nervous action in some way or other affects those chemical changes which are going on in the system, and to which, in an especial sense, we ascribe the generation of heat.

Nearly all chemical changes are attended with some alteration in the electric state of the bodies concerned, and hence we find that some living animals exhibit the most marvellous manifestations of free electricity. The best examples are furnished in the TORPEDO, or ELECTRIC RAY, and the GYMNOTUS, or ELECTRIC EEL, both of which possess a set of organs in which electricity may be generated and laid up in large quantities, and from which it may be discharged at will. The delicate experiments made on both these species, prove that the shocks communicated by them are due to electric currents so generated in these electric organs; and that these organs owe their most immediate and powerful stimulus to the action of the nerves. Their nerves, which arise from the top of the spinal cord, are of very great size—larger than others in the same animals—and larger than any nerves in other animals of the same bulk. As a consequence, their shock is very powerful. The shock of a large gymnotus is sufficient to kill small animals, and even to paralyse men and horses! "In both species of fishes, the electricity generated by the action of their peculiarly organised batteries—besides its benumbing and stunning effects on living animals—renders the needle magnetic, decomposes chemical compounds, emits the spark, and, in short, exercises all the other known powers of the ordinary electricity developed in inorganic matter, or by the artificial apparatus of the laboratory." Animal and common electricity are one and the same. In the FROG, during its whole life, there is a continual current of electricity, passing from its extremities towards its head, termed *le courant propre*, or peculiar current of the frog, as it has been discovered in no other animal.

But are there any manifestations of electricity in man? There are some persons who have it in a remarkable degree, and of equal power. A lady, called THE ELECTRICAL LADY, "was for many months in an electric state so different from that of surrounding bodies, that, whenever she was but slightly insulated by a carpet or other feebly-conducting medium, sparks passed between her person and any object which she approached. When she was most favourably circumstanced, four sparks per minute would pass between her finger and the brass ball of a stove, at a distance of one inch and a half."

It is a not less curious fact that some of the lower animals—especially the fish tribe—have the power of evolving light. You are

* Cold-blooded animals, among which are the Invertebræ, have little or no power of sustaining an independent temperature. They depend for their vital action upon the warmth they receive from the air or the water which they inhabit. They have no power of resisting the depressing influence of cold, and when the temperature sinks below a certain point, they pass into a state of complete inaction or torpidity. Their vitality falls with the diminution of their heat.

familiar with that beautiful phenomenon called the phosphorescence of the sea. This is due to the presence in multiplied numbers of the smaller class of jelly-fish, while the light given off by the larger species of this same tribe appears in brilliant stars, ribands, and globes of fire. Still more striking examples are to be found in the class of insects, in which the brilliant emission takes place from one or two isolated spots of the body. In this country, the beautiful spontaneous light of THE GLOW-WORM, as well as that of the common HUNDRED-LEGGED WORM, is well known. In warmer climates THE LANTERN-FLY, and THE FIRE-FLY, exhibit this luminous appearance in a yet more remarkable degree. How are we to account for this luminosity? Some think that it is owing to the formation of a peculiar secretion, which, on coming into contact with the oxygen of the air, kindles into light:—that it is a slow process of combustion, like that which takes place when phosphorus is exposed to the air, and that these insects are endowed with a special provision for conveying a large supply of air through the peculiar substance which is deposited beneath the luminous spots, so that they can suddenly extinguish their light or as suddenly renew it. To do this they have simply but to exclude or to admit the external air. Others conceive that the substance which these insects secrete is phosphorus, and that the light which they give off is owing to the combustion of this body. A third party are of opinion that the luminosity is rather of an electrical character.

Several vegetable and animal substances are thus phosphorescent when deprived of vitality. By the spontaneous decay or decomposition of vegetable productions in stagnant water, there is formed a gas composed of carbon and hydrogen, which, when it is kindled, is probably the cause of the light that so frequently is seen during the evenings of summer and autumn, flickering and dancing over the surface of some marsh or boggy soil, and which is known by every schoolboy as JACK-O'-LANTERN, or WILL O'-THE WISP. A spontaneous pale light is known to be emitted from the decayed wood of old forest trees. And there are certain flowers, such as the tuberose, nasturtium and marigold, which occasionally present flashes of light towards the close of a warm summer's evening. In the animal economy, the flesh of the carp, tench, herring, sole, crab, and lobster, affords the most remarkable instance of this phenomenon of luminosity, but it is seldom presented by the dead flesh of quadrupeds, and never by that of birds, under any circumstances of putrefaction. Although it is very rare in any of the higher vertebræ, and especially in man, yet instances have been recorded. It is fair to state, however, that the individuals exhibiting this luminosity, have suffered from some wasting disease, such as consumption, and were near the close of life, so that the light emitted is to be accounted for by the decomposition of the tissues. Here, however, is a striking case:—A large cancerous sore of the breast emitted so much light, as to enable the hands on a watch-dial to be distinctly seen when it was held within a few inches of the ulcer. There can be no doubt that, in this instance, the phosphorescence was owing to the decomposing and decaying surface of the wound being exposed to the oxygen of the air, as in the case of a dead body.

What a world of mystery is man in himself! Whether we look at the structure and functions of his body, or go into the grander domain of his soul, we are perplexed and baffled. We can never hope to explain the phenomena of either matter or mind. And it will be among the lofty employments of a higher world to study the manifold works of God.

QUESTIONS FOR EXAMINATION.

What is the standard heat of the human body?
How is the uniform temperature of our system produced?
How is the temperature kept down in very hot climates?
What is the source of animal heat?
In what species of animals do we find the highest temperature?
In what proportion is heat evolved by plants?
On what conditions is the temperature of the human body dependent?
Can very young animals maintain an independent temperature?
When is mortality greatest among infants?
What influence has the nervous system on the production of heat?
Have we in the animal economy any manifestations of free electricity?
What is the difference between animal and common electricity?
Give some examples of free electricity in the human subject.
Which tribe has the special power of evolving light?
Can you explain the cause of the phosphorescence of the sea?
What is it that gives existence to the Will-o'-the-wisp?
In what state or condition is light evolved from our body?
Give an example of this fact

LESSONS IN FRENCH.—No. XXIV.

By Professor LOUIS FASQUELLE, LL.D.

SECTION L.

THE PAST DEFINITE. (§ 120.)

1. THE past definite may be called the narrative or historical tense of the French. It is used to express an action entirely past, definite and complete in itself. The time must be specified, and every portion of it must be elapsed. One night at least should have occurred since the action took place.

Mon frère partit hier pour Paris. *My brother left yesterday for Paris*

2. The student will bear in mind that the past indefinite [Sect. 40] may be used for the past definite. The past definite, however, may never be used for the indefinite. In conversation the indefinite is often preferred to the definite, as the latter would at times appear too formal [§ 121 (3)]:—

3. The past definite may generally be rendered in English by the simple form of the imperfect, or by the same tense conjugated with *did*. The past definite can never be rendered in English, by the participle present of the verb preceded by *was*.

J'allai à l'église hier matin. *I went or did go to church yesterday morning.*

4. TERMINATIONS OF THE PAST DEFINITE OF THE FOUR CONJUGATIONS. See Sect. 22, and § 60.

Je	chant	-ai	fin	-is	reç	-us	rend	-is
	sang		*finished*		*received*		*rendered*	
Tu	parl	-as	chér	-is	aperç	-us	vend	-is
	spokest		*cherishedst*		*perceivedst*		*soldest*	
Il	donn	-a	fourn	-it	perç	-ut	tend	-it
	gave		*furnished*		*gathered*		*tended*	
Nous	cherch	-âmes	pun	-îmes	conç	-ûmes	entend	-îmes
	sought		*punished*		*conceived*		*heard*	
Vous	port	-âtes	sais	-îtes	d	-ûtes	perd	-îtes
	carried		*seized*		*owed*		*lost*	
Ils	aim	-èrent	un	-irent	déç	-urent	mord	-irent
	loved, liked		*united*		*deceived*		*bit*	

5. It will be seen that the terminations of the second and fourth conjugations are alike.

RÉSUMÉ OF EXAMPLES.

On nous parla de vous hier.	*They spoke to us of you yesterday.*
Le banquier nous donna de l'argent l'année dernière.	*The banker gave us money last year.*
Le banquier nous a donné de l'argent.	*The banker has given us money.*
Le professeur nous parla de vous l'année dernière.	*The professor spoke to us about you last year.*
Il nous a parlé de ses amis et des nôtres.	*He spoke to us of his friends and of ours.*
Pendant notre voyage, il nous raconta ses aventures.	*During our journey he related to us his adventures.*
Il nous a raconté l'histoire de sa vie.	*He related to us the history of his life.*

EXERCISE 99.

Aîné, e, *elder, eldest.*	Se lev-er, 1, ref. *to rise*	Propriété, f. p. *property.*
Avec, *with.*	Lorsque, *when.*	Remerci-er, 1. *to thank.*
Se couch-er, 1. ref. *to go to bed.*	Neuf, ve, *new.*	Séjour, m. *stay.*
Dernier, e, *last.*	Ordinairement, *generally.*	Semaine, f. *week.*
S'échapp-er, 1. ref. *to escape.*	Pendant, *during.*	Soldat, m. *soldier.*
Habillement, m. *dress.*	Pri-er, 1, *to beg.*	Tard, *late.*
		Trop tôt, *too soon.*

1. Le banquier reçut il beaucoup d'argent la semaine dernière? 2. Il en reçut beaucoup. 3. Aussitôt que vous aperçûtes votre frère, ne lui parlâtes vous pas? 4. Dès que je l'aperçus, je lui parlai. 5. Avez vous déjà porté vos habillements neufs? 6. Je ne les ai pas encore portés. 7. Quand il vous donna de l'argent, hier, le remerciâtes vous? 8. Je le remerciai et je le priai de vous remercier. 9. Avez vous trouvé vos livres? 10. Je ne les ai pas encore trouvés. 11. Lorsque vous vîntes nous voir ne finîtes vous pas vos affaires avec mon père? 12. Je les finis alors et je le payai. 13. N'avez vous pas vu votre sœur aînée pendant votre séjour à Lyon? 14. Je ne l'ai pas vue. 15. Ne vous couchâtes vous pas trop tôt hier

au soir? 16. Je me couchai tard. 17. A quelle heure vous êtes vous levé ce matin? 18. Je me suis levé à cinq heures; je me lève ordinairement de bonne heure. 19. Ne cherchâtes vous pas à vous échapper de votre prison l'année dernière? 20. Je n'ai jamais cherché à m'échapper. 21. Avez vous vendu vos propriétés? 22. Je ne les ai pas vendues. 23. Qu'avez vous donné au soldat. 24. Je ne lui ai rien donné. 25. Pendant son séjour à B., nous lui donnâmes tout ce qu'il voulut.

Exercise 100.

1. What did you receive last week? 2. We received fifty francs from your friend, and twenty-five from your brother. 3. Did you take your son to church with you yesterday? 4. I did not take him there *(y)*. 5. What did you lose last year? 6. We lost our money, our clothes, and our horses. 7. Have you looked (*cherché*) for them? 8. I looked for them, but did not find them. 9. Did they speak of your brother yesterday? 10. They spoke of him and of you. 11. What did the physician give you? 12. He gave me nothing. 13. At what hour did your sister rise yesterday? 14. She rose at five o'clock. 15. Did you rise early this morning? 16. We rose at half-past six. 17. Has your cousin sold all his property? 18. He has not sold it, he has given it to his eldest sister. 19. Has the traveller related his adventures to you? 20. He related them to me. 21. Did that man try (*cherché*) to speak to your father? 22. He tried to speak to him. 23. Did the professor speak of your brother during his stay at your house? 24. He spoke of him. 25. Has your friend worn his new coat? 26. He has not worn it yet. 27. Have you thanked your brother? 28. I have thanked him. 29. What have you given to your eldest sister? 30. I have given her nothing, I have nothing to give her. 31. When your brother gave you a book last year, did you thank him? 32. I did not thank him. 33. Is it late? 34. It is not late, it is only six. 35. Is it fine weather or bad weather? 36. It is very fine weather.

Section LI.

1. The terminations of the past definite of irregular verbs, are seldom arbitrary,* but an irregular verb of one conjugation will sometimes, in this tense, assume the terminations of another conjugation. In a few instances the *stem* [Sect. 22] of the verb is entirely changed.

	Avoir, *to have.*	Etre, *to be.*	Voir, *to see.*	Lire, *to read.*
J	e -us	f -us	v -is	l -us
Tu	e -us	f -us	v -is	l -us
Il	e -ut	f -ut	v -it	l -ut
Nous	e -ûmes	f -ûmes	v -îmes	l -ûmes
Vous	e -ûtes	f -ûtes	v -îtes	l -ûtes
Ils	e -urent	f -urent	v -irent	l -urent

2. Avoir and être, it will be perceived, take in this tense a new stem, *e*-us, *f*-us; être and lire, though belonging to the 4th conjugation, take the terminations of the 3rd, and voir, a verb of the 3rd, takes the terminations of the 4th.

3. In other instances, the stem of the verb drops some of its letters, and sometimes adopts others. This may be seen in the verbs

	Venir, *to come.*	Prendre, *to take.*	Craindre, *to fear.*	Connaître, *to know.*	Conduire, *to conduct.*
Je	v -ins	pr -is	craign -is	conn -us	conduis -is
Tu	v -ins	pr -is	craign -is	conn -us	conduis -is
Il	v -int	pr -it	craign -it	conn -ut	conduis -it
Nous	v -înmes	pr -îmes	craign -îmes	conn -ûmes	conduis -îmes
Vous	v -întes	pr -îtes	craign -îtes	conn -ûtes	conduis -îtes
Ils	v -inrent	pr -irent	craign -irent	conn -urent	conduis -irent

4. Like venir, are conjugated all verbs ending in *enir*; like craindre, connaître, and conduire, those ending in *indre, aître,* and *uire;* and like prendre, those composed of this verb and a prefix; as, comprendre, surprendre, &c.

5. We would at all times refer the student to the table of irregular verbs, § 62, for those tenses of the irregular verbs with which he is not familiar.

* This termination is arbitrary only in verbs ending in *enir* in which an *n* comes after the *i* of the termination: *vînmes, tînmes,* &c.

Resumé of Examples.

Ne conduisîtes vous point votre fils, en Espagne l'année dernière?	*Did you not take your son to Spain last year?*
Je l'y conduisis et je l'y laissai.	*I took him there and left him there*
Aussitôt que vous vîtes votre frère, ne le reconnûtes vous pas?	*As soon as you saw your brother, did you not recognise him?*
Je le reconnus aussitôt que je l'aperçus.	*I recognised him as soon as I perceived him.*
Le pharmacien ne vint-il pas vous voir?	*Did not the apothecary come to see you?*
Il vint me voir; il fut bien étonné de trouver chez moi, un de ses anciens amis.	*He came to see me; he was much astonished to find one of his old friends at my house.*
Ne prîtes-vous pas congé de vos amis, hier?	*Did you not take leave of your friends yesterday?*
Je pris congé d'eux, et jes les priai de m'écrire.	*I took leave of them, and begged them to write to me.*

Exercise 101.

Accompagn-er, 1. *to accompany.*	De mon mieux, *as well as I could.*	Histoire, f. *history.*
A la fin, *at last.*	Se dépêch-er, 1. ref. *to make haste.*	Inform-er, 1. *to inform.*
Amicalement, *kindly.*	Dès que, *as soon as.*	Notaire, m. *notary.*
Arrivée, f. *arrival.*	Ecolier, m. *scholar.*	Lu, *from* lire, 4 ir. *to read.*
Attend-re, 4. *to wait for.*	S'ennuy-er, 1. pec. *to become weary.*	Peintre, m. *painter.*
Au secours, *to the assistance.*	Se hât-er, 1. ref. *to hasten.*	Sans, *without.*
Congé, m. *leave.*		Secour-ir, 2 ir. *to succour.*
Cour-ir, 2 ir. *to run.*		

1. Nos écoliers s'ennuyèrent-ils hier, d'attendre si longtemps? 2. Ils furent obligés d'attendre si longtemps, qu'à la fin ils perdirent patience. 3. Ne reçûtes-vous point votre parent amicalement lorsqu'il vint vous voir? 4. Je le reçus de mon mieux. 5. Ne lûtes-vous pas la lettre de votre frère avant hier? 6. Je la lus et je l'envoyai à mon oncle. 7. Ne courûtes-vous pas au secours de votre frère aussitôt que vous le vîtes en danger? 8. Je me hâtai de le secourir. 9. Ne vous êtes-vous pas dépêchés de venir? 10. Nous nous sommes dépêchés. 11. Aussitôt que vous eûtes aperçu mon frère ne m'informâtes-vous pas de son arrivée? 12. Je vous en informai. 13. A quelle heure votre sœur est-elle venue aujourd'hui? 14. Elle est venue à midi. 15. Vos compagnons vinrent-ils hier vous prier de les accompagner? 16. Ils vinrent me voir, mais ils me quittèrent sans me parler de leur voyage. 17. Ne peignîtes-vous pas un tableau l'année dernière? 18. Je peignis un tableau d'histoire. 19. Le peintre italien a-t-il fini son portrait? 20. Il le finit hier. 21. Il l'a fini ce matin. 22. Dès que j'eus reçu cette nouvelle, j'envoyai chercher le notaire. 23. Ce jeune homme a-t-il pris congé de son père. 24. Il a pris congé de lui. 25. Il prit congé de lui hier.

Exercise 102.

1. Did the notary accompany you yesterday? 2. He accompanied me as far as (*jusque chez*) your brother's. 3. Did your companion take leave of you yesterday? 4. He took leave of me this morning. 5. Did you read yesterday, the book which I have lent you? 6. I read it the day before yesterday (*avant hier*). 7. At what time did the painter come this morning? 8. He came at half-past nine. 9. Has he finished your father's portrait? 10. He painted all day yesterday, but the portrait is not yet finished. 11. Did you not run to your father's relief when you saw him in danger? 12. I hastened to succour him. 13. What did you do when you came? 14. As soon as I came I sent for my brother. 15. Did you take your sister to Germany last year? 16. I took her there this year. 17. Did you take your children to school yesterday? 18. I took them to my brother's. 19. Do you paint an historical picture? 20. I painted last year an historical picture. 21. Did your sister beg you to accompany her? 22. She begged me to accompany her. 23. Did you send for the notary as soon as you heard from your father? 24. I sent for him. 25. When did the notary take leave of you? 26. He took leave of me this morning at nine. 27. Has the apothecary finished his letter? 28. He has not yet finished it. 29. Were you not astonished yesterday to see that lady? 30. I was not astonished to see her. 31. Did you make haste to read your book last night (*hier au soir*)? 32. I made haste to read it. 33. Have you finished it? 34. I have not yet finished it.

LESSONS IN GEOLOGY.—No. XIII.

By Thomas W. Jenkyn, D.D., F.G.S., &c.

CHAPTER I.

ON THE ACTION OF VOLCANOES ON THE EARTH'S CRUST.

SECTION VIII.

ON THE ELEVATION AND SUBSIDENCE OF LAND *(continued)*.

In our last lesson, the elevation and depression of land by the action of earthquakes was considered. Earthquakes produce these changes in the level of the surface, by effecting a separation of enormous masses of ground from each other by means of faults, fissures, or slips, and then causing some of these portions to rise to a higher elevation, and occasioning others to sink to a lower level. Geological inquiries, however, furnish us with many instances of elevation and depression of land, which the action of earthquakes will not explain. To give sufficient distinctness to these two classes of phenomena, I have divided this section into two parts. The first part treated of elevation and subsidence of land by earthquake power; the second part will show how these changes in the level of land and sea have taken place without that agency.

§ ii. *Elevation and subsidence of land without earthquakes.*

Whenever the surface of the land is raised above its usual elevation, it must be either by a force from below rending great masses of the earth's crust by means of fissures and faults, and then propelling them suddenly upwards; or by the expansion of subterranean matter lying deep in the interior of the earth. Science has not discovered anything that could produce sufficient expansion to effect this, but subterranean heat. If the temperature of subterranean rocks becomes increased the heated rocks will expand and swell out, and thus raise the strata that rest upon them. If this heat diminish again the interior rocks will contract, and the incumbent beds will sink and subside.

It is scarcely necessary to prove to you that heat expands a body. Take any bar of iron, your own poker for instance; put it first in any orifice, opening, or hole which it just fits; place it then in the fire till it become heated into good red-heat. If now you try to put it in the same orifice or hole, you find that it will not enter. Why? It is because the fire has expanded and enlarged it.

Heat produces the same effect in stone; yet all stones do not expand alike when heated. An American geologist has made very cautious and accurate experiments upon the capacities of different stones, such as granite, crystalline marble, and sandstone, under the influence of increased temperature. These experiments, conducted with mathematical precision, have shown that if a portion of the earth's crust, ten miles deep or thick, were to be heated to the degree of 600 Fahr., the expansion of the subterranean rocks would cause the surface to rise two hundred feet above its former level. They have also shown that a greater thickness than a series of ten miles deep might be heated, provided any new focus of heat should be produced at any given spot in the interior of the earth.

You will at once perceive that if this intense heat becomes dissipated by radiation, the swelled rocks below will contract and become of smaller dimensions; and, by consequence, the strata resting on them will again subside in proportion to the diminished temperature below.

This theory of the expansion and contraction of rocks at great depths, in connexion with a philosophical allowance of sufficient geological time, will account for all the elevations and dislocations which are found in continents and in mountain chains. Still it is right to state to you that this theory is not without its difficulties. The several systems of elevation, which are found in the same continents, and the numerous examples of strata tilted up and thrown into a vertical position, seem to require some other hypothesis to account for them. There are also, in the north of England, instances of elevation which were accompanied by prodigious dislocations of rocks; and these elevations, being to the extent of several thousand feet in height, seem to have been produced by a single paroxysm of earthquake power. These circumstances will be examined in a future chapter on the architecture of rocks in the crust of the earth.

It is well known that changes in the level of land and sea have taken place in districts, which are not known to have been subject to earthquakes, or to volcanic power, in any visible [illegible]. Of these changes, instances are numerous,—in the rise [illegible] pression of land which are taking place at the present [illegible] in the submarine forests which have been submerged in [illegible] ries comparatively recent, and in ancient sea-beaches [illegible] are now found at a high elevation.

I. The rise of the coast of Sweden and Norw[illegible] our own day, an immense tract of land, about a t[illegible] miles in length, and fifty or sixty in breadth, situate[illegible] northern shores of the Baltic Sea, has been rising f[illegible] years, and is still rising. Take a map of the north of [illegible] which you can now buy for a penny, and mark the are[illegible] phenomenon. From Gottenburg to Torneo, and thence [illegible] North Cape, the whole country, with its towns and peo[illegible] already risen from 100 to 200 feet above the level of the [illegible] times apparently very modern.

It has been ascertained that this elevation goes on [illegible] rate of about four feet in every century. What is rem[illegible] is, that the rising is not uniform; but advances at d[illegible] rates in different districts. This is probably owing [illegible] diversity of expansion, which takes place in different lo[illegible] of the rocks which are heated beneath. This change [illegible] was asserted by Celsius, in the last century, and ascr[illegible] that philosopher to the retirement of the sea. This [illegible] supposition is contradicted by the fact that, while the [illegible] of the sea retire and appear to sink at Torneo, in the [illegible] east of the Baltic, they maintain their former level at [illegible] hagen, to the north-west of that basin or gulf.

That the difference of this change of level is due to the [illegible] of the earth, and not to the sinking of the water, was [illegible] first by the Scottish Geologist, Playfair. He showed [illegible] sink or to raise the absolute level of the sea by an [illegible] quantity in any given place, there must, from the [illegible] Hydrostatics, be a corresponding depression or rise [illegible] same quantity over the whole surface of the earth.

The reality of the elevation of so large a district w[illegible] doubted. The German Geologist, Von Buch, in 180[illegible] a personal examination of the facts, was the first to [illegible] that the change was due to the elevation of the land. [illegible] convinced that the whole country, from Fredericks[illegible] Norway, to Abo in Finland, and perhaps as far as Pet[illegible] in Russia, was slowly and insensibly rising. This [illegible] has been set at rest by our countryman Sir Charles Ly[illegible] has visited this district on two different occasions, for [illegible] press purpose of settling this matter to the satisfactio[illegible] scientific men. In his survey, he examined the shore[illegible] Gulf of Bothnia from Stockholm to Gefle, and t[illegible] western coast of Sweden about Gothenburg and Ud[illegible] and found that everywhere the coast was higher than [illegible] marks which pilots had made on the rocks some twen[illegible] before his visit, and very much higher than the ind[illegible] which Celsius had pointed out in the preceding centur[illegible]

The evidence of this elevation is most satisfactory. [illegible] perhaps, aware that there are shellfish, some of wh[illegible] only in the waters of the ocean, and others which live [illegible] the salt water of inland seas, and gulfs, &c. No[illegible] Uddevalla, on the western coast of Sweden, which bor[illegible] the Atlantic Ocean, there are elevated deposits of sh[illegible] longing to species now living in that ocean; while [illegible] eastern coast, about places bordering on the Gulf of [illegible] there are upraised beds containing the shells of spec[illegible] racteristic of the Baltic Sea. Very numerous, and a [illegible] variety of proofs of this elevation, are enumerated b[illegible] Lyell in his work on the Principles of Geology.

Though it is capable of demonstration that this e[illegible] district is now rising out of the sea, there are proofs, a[illegible] dant and as satisfactory, that in some earlier centuries [illegible] sinking instead of rising. This shows to you that th[illegible] be an alternate depression and elevation of the same [illegible] taking place, corresponding to the increase or dimin[illegible] the expansive forces in the mineral regions below.

In digging a canal to the south of Stockholm, in 1[illegible] excavators came to marine strata,—that is, beds depo[illegible] the sea, and containing fossil shells of the same fish wh[illegible] now peculiar to the Baltic. This proves, that at one ti[illegible] district had been covered by the Baltic Sea. In the [illegible] tion of this canal a deep cutting had to be made, abou[illegible] feet in depth. When the workmen came to this dep[illegible]

found a fishing-hut, constructed of wood, which soon crumbled on being exposed to the air. The lowest part, however, of this hut—the part that stood on a level with the sea of that age—was in a more perfect state of preservation. On the floor of this hut there was a rude fireplace, formed by a circle of stones; and, within this circle, were cinders and burnt wood.

You must now use your own mind and knowledge to account for these very interesting facts. Sweden was, once before, of the elevation at which it is now. It then subsided gradually to the depth of sixty feet. While it was in the course of subsiding, the fisherman's hut became covered over with gravel and shelly marl. After continuing some centuries in this submerged state, it began again to rise, and, as was mentioned, is still rising.

Similar phenomena take place in other parts of the globe, but our space will not allow a description of them.

II. Submarine Forests.—On the shores of England, France, North America, &c., are found peat, trees, and stumps, which are usually only a few feet beneath low water-mark. They seem to have been ancient swamps and thickets or forests which have subsided in consequence either of earthquakes, or, which is more probable, of other causes of subsidence, that have operated on other portions of the earth's surface. In these cases the stumps appear to stand in the spots where they originally grew, and the accumulations of wood and plants do not seem to differ from those now existing in the neighbourhood, but, on the contrary, are identical with them.

In a submarine forest on the coast of Lincolnshire, roots, trunks, branches, and leaves of birch, fir, and oak, are found, intermixed with aquatic plants. Here the roots or stumps stood where they had grown, but the trunks of the trees lay prostrate. In other cases are found horns of deer, bones of oxen, and freshwater shells. In England submarine forests of this description are found on the east coast of Yorkshire, and Mount's Bay, near Penzance, in Cornwall; near Stolford, in Somersetshire. In Scotland, at the Frith of Tay, the Frith of Forth, on the west coast of the mainland of Orkney, and at Tiree, one of the Hebrides. In Wales, at Swansea, and on the coast of North Wales from Aberystwith to Barmouth.

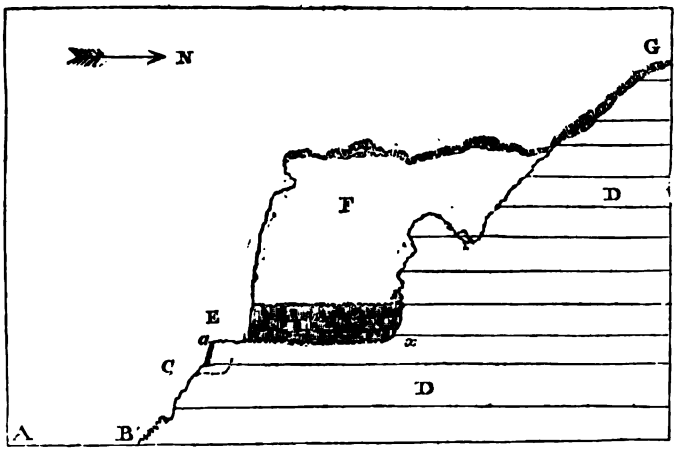
Attempts have been made to account for the submergence of these recent forests, by supposing that they were originally swamps sheltered from the sea by a low barrier, and that when the water of the upper part of the swamp became drained off, the spongy matter of the soil would contract and sink down several feet, so as to let the waters of the sea overflow it. This theory is contradicted by the fact that certain firs, and other trees, which are not marsh plants, are found to have grown in situations which could have received no drainage at any retreat of the tide.

The submergence of these forests, therefore, can be accounted for only on the hypothesis of a change taking place in the relative level of sea and land occasioned, as we have supposed, by the cooling and consequent contraction of subterranean rocks. Such a depression would bring the lower extremities of extensive and sloping woody plains, and also the accumulations of vegetable matter that had collected behind banks and sand dunes, within the action of breakers and even beneath low water-mark. Such a cause is sufficient to account for the phenomena, and the change is in perfect accordance with other geological facts as verified in different parts of the globe.

III. Elevated Beaches of ancient Seas.—Strata, which were once the beaches of ancient seas, but which are now at high elevations, are found, in many parts of England, as well as in many other countries of the globe. These beaches often consist of clays, muds, rounded pebbles, and deposits of shells of fish which now live in the neighbouring seas. Wherever they are found, they present indisputable evidence that the relative level of land and sea has undergone great changes within, geologically speaking, comparatively recent periods.

In my first lesson I took you on an excursion to Brighton, and called your attention to the strata in the direction of Rottingdean. There, close to the water-side, was a low bank or cliff of chalk, on which rested a mass of loose soil, abounding with shingle and rounded pebbles. I will now present this section to you in this woodcut, fig. 27.

Fig. 27.



Elevated strata and beach, east of Kemp Town, Brighton.

In this diagram A B is the level of the present sea. C *x* is a terrace of chalk, being part of the ancient chalk rock D D. E is a bed of shingle that formed a beach when the sea was at that level. F is a stratum or bed of loam and chalk rubble, in which the teeth and bones of elephants have been found, resting partly on the bed of shingle, but chiefly on the sloping cliffs of the chalk rock. You observe that between the lower projection of the chalk D and the elephant bed F there is the stratum E. This stratum consists of rolled chalk flints, pebbles, sand, with small boulders of granite, &c. This, in fact, is an ancient sea-beach, formed in the same manner as the lower bed of shingle which to-day skirts the base of the cliffs. Among the rolled pebbles in E are pieces of chalk and limestone, perforated by boring shells, and having cavities like those which are produced in the masses of chalk now, by the same shells called *pholades* and *mytili*. The strata which I present to you in this diagram were all deposited beneath the sea, though they now form a line of high cliffs for many miles along the sea-coast.

Such are the facts of the case, and similar facts might have been collected from hundreds of districts on the earth's surface. I now want you to reason out, for yourself, the causes and the principles which will account for such phenomena. I will help you with a few hints of solution.

1. The entire chalk rock D D was, for miles in all directions, deposited by the waters of the sea, and formed the bottom of the ocean.

2. The chalk bottom of the ocean began to rise, and during its elevation, was worn or scooped away by the action of sea-currents, which wore it along the line G *x a* C B.

3. The level of the sea continued for ages on the level of *a x* while the sea currents tore away vast quantities of the chalk.

4. The chalk beds began to rise again gradually, and the beach F was formed, by the action of the waves on the then existing cliffs of the chalk, and by the accumulation of other masses which the sea currents brought to the neighbourhood.

5. After the formation of this bed of shingle as a beach, the whole rock, together with the shingle, sank again to such a depth as to allow of the deposition of the thick stratum F, which forms a good three-fourths of cliff as now existing.

6. The entire chalk rock, the elephant bed, and the ancient beach, began again to rise, and to continue to rise, until the sea stood at its present level and formed the existing sea-beach.

LESSONS IN GERMAN.—No. XIV.

Section XXVI.

When not preceded by an auxiliary, the infinitive generally takes the preposition zu (see, however, § 146) before it. Ex.: Ich habe Zeit zu lesen; I have time *to* read. Er geht in die Schule, um zu lernen; he goes to school, in order to learn. Er geht auf den Markt, um Fleisch zu kaufen; he goes to market, in order to buy meat. Um, in order, is as in English, often omitted. Ex.: Er geht auf den Markt, Fleisch zu kaufen; he goes to market to buy meat.

I. Können often signifies to know, to have learned a thing, and may be followed by a noun in the accusative. Ex.: Können Sie Deutsch? Do you know (understand) German? Followed by a verb, können signifies either to be able (see Sect. 25. I.), or to know how; as, Kann er schreiben? Can he write? or, does he know how to write, has he learned to write?

II. Wissen, to know, is frequently placed before an infinitive with zu, and corresponds to our phrase "to know how." Ex.: Er weiß zu schreiben; he knows (how) to write. Er weiß zu leben; he knows (how) to live. Er weiß sich zu helfen; he knows (how) to help himself.

III. Kennen also signifies to know, but only in the sense of to be acquainted with. Ex.: Kennen Sie diese Leute? Do you know these people? Ich kenne sie; I know them, I am acquainted with them.

IV. The indefinite pronoun „man" has no exact correspondent in English. It is variously translated, according to its position; thus, Man sollte immer ehrlich handeln; *one* should always act honourably. Man läuft; they are running. Man schreit; they are crying. Ertragen muß man, was der Himmel sendet; what (the) Heaven sends, must we endure (§ 59. 1. 2.) Man is often nominative to an active verb, which latter is best rendered by a passive one. Ex.: Man weiß, wo er ist; it is known where he is. Man hat den Dieb gefangen; the thief has been caught.

The above use obtains especially in the phrase „man sagt" (French *on dit*), which, though more literally "one says," is often better rendered by "it is said, rumoured, reported," &c.

Exercise 26.

Elend, wretched;	Latei'nisch, Latin;	Sollen, shall;
Hei'delberg, n. Heidelberg;	Machen, to make, to do;	Sprache, *f.* language;
Holen, to go for;	Schneiden, to cut;	Um (§ 114. 4);
Käse, *m.* cheese;	Schule, *f.* school;	Wahl, *f.* choice

Er ist fleißig, nicht nur um das Lob seines Lehrers zu bekom'men, sondern um seine Kennt'nisse zu erwei'tern.	He is diligent not only to obtain the praise of his teacher, but in order to extend his knowledge.
Wir essen, um zu leben; aber wir leben nicht, um zu essen.	We eat in order to live, but we do not live in order to eat.
Ein kluger Mann weiß zu schweigen.	A judicious man knows (how) to be silent.
Ein un'befleckt*es* Herz ist ein stiller heller See, den man auf den Grund sieht.	An unspotted heart is a still clear sea, which one sees to the bottom.
Ein Freund ist eine Münze, man prüft sie, ehe man sie nimmt.	A friend is a coin, it is proved before it is received.

1. Ich muß auf die Wiese gehen, Heu zu holen. 2. Was soll Ihr Bruder in der Schule thun? 3. Er soll in die Schule gehen, um die lateinische (§ 5. Note VIII.) Sprache zu lernen. 4. Der Mensch muß ehrlich oder elend sein. 5. Was soll ich thun? 6. Sie können thun, was Sie wollen, und sollten thun, was Sie können. 7. Warum sind Sie nicht gestern zu uns (Sect. 24) gekommen? 8. Ich wollte, aber ich konnte nicht, ich mußte zu Hause bleiben und lesen. 9. Wird der Schneider mir einen Rock machen wollen? 10. Er wird Ihnen einen machen wollen, aber er wird es nicht thun können. 11. Warum wird er es nicht thun können? 12. Er wird morgen auf das Land gehen müssen, seinen kranken Bruder zu sehen. 13. Was will der Knabe mit seinem Messer? 14. Er will Brod und Käse schneiden. 15. Haben Sie Zeit in den Stadt zu gehen? 16. Ich habe Zeit, aber ich will nicht gehen, ich will zu Hause bleiben. 17. Was haben Sie zu Hause zu thun? 18. Ich habe Briefe zu lesen und zu schreiben. 19 Müssen Sie sie heute schreiben? 20. Ich muß sie heute schreiben, weil ich morgen nach Heidelberg gehen will. 21. Man muß in der Wahl seiner Freunde vorsichtig sein. 22. Dieser Knabe hat heute gar nichts gelernt. 23. Haben Sie auch nichts gelernt? 24. Ich habe etwas gelernt, aber nicht viel.

Exercise 27.

Aus, out, of, from;	Fenster, *n.* window;	Schachtel, *f.* box;
Baier, *m.* Bavarian;	Flinte, *f.* gun;	Schloß, *n.* castle, palace;
Berg, *m.* mountain;	Hausknecht, *m.* house-servant;	Ungarn, Hungary;
Böhme, *m.* Bohemian;	Hesse, *m.* Hessian;	Warschau, *n.* Warsaw.
Brunnen, *m.* well;	Krakau, *n.* Cracow;	
Dienst'mädchen, *n.* servant-girl;	Neu'igkeit, *f.* news;	

1. Zu wem gehen Sie? 2. Ich gehe zu meinem Bruder. 3. Mit wem geht dieser Knabe? 4. Er geht mit seinem Vater nach der Stadt. 5. Von wem haben Sie diese Neuigkeiten gehört? 6. Ich habe sie von meinem alten Freunde gehört. 7. Mit wem gehen Sie nach dem Dorfe? 8. Ich gehe nicht nach dem Dorfe, ich gehe mit meinem Vater nach der großen Stadt. 9. Wann gehen Sie aus der Stadt zu unsern Freunden? 10. Wir gehen nicht zu Ihren Freunden, wir kommen morgen wieder nach Hause. 11. Ich gehe heute weder zu meinem Freunde, noch nach dem Dorfe, noch aus dem Hause. 12. Der Graf hat ein großes Schloß mit kleinen Fenstern. 13. Der Fluß kommt aus den Bergen. 14. Hat Ihr Vater etwas von seinem Bruder gehört? 15. Ja, dieser Mann ist aus Ungarn und hat meinem Vater eine Schachtel von meinem Oheim gebracht. 16. Geht er nach Wien? 17. Nein, er geht nach Warschau und von Warschau nach Krakau. 18. Der Baier, der Böhme und der Hesse kommen aus Deutschland. 19. Der Jäger mit seiner Flinte kommt aus dem Walde 20. Der Knecht geht nach der Stadt. 21. Ich habe von meinen Brüdern gehört, sie gingen zu ihrem Freunde. 22. Das Dienstmädchen kommt vom Brunnen, und der Hausknecht geht zum Fleischer.

1. If we desire to be happy, we must not deviate from the path of virtue. 2. I know that he is not your friend, but I know likewise[1] that he is a man of probity.[2] 3. Let them know that this news is only a rumour.[3] 4. They must not say everything they know. 5. You must be very careful in the choice of your friends. 6. We ought to know to whom we apply. 7. Will you tell the tailor, when he has finished your coat, to call on me. 8. Have you time to go with me to the city? 9. If he had not been able to perform[4] the work he would not have undertaken[5] it. 10. Have you time to read this letter? 11. He goes to school, in order to learn the Latin language.

[1]also. [2]Redlichkeit. [3]Gerücht. [4]nicht hätte zu Stande bringen können. [5]unternommen haben.

Section XXVII.

SEPARABLE PARTICLES.

The particles ab, an, auf, aus, bei, mit, nieder, um, voraus, &c., (§ 89. 1. 90. 92) are often compounded with verbs, and, as they may stand apart from the verb, they are called *separable* particles.

I. In *principal sentences* (§ 160) the particle is separated from the verb and placed at the end. In *subordinate sentences*, however, introduced by a relative pronoun or some other connective word, the particle and the verb remain always in union. Ex.: Er wirft den Wagen um; he overturns the waggon. Der Wagen, den er um wirft; the waggon which he overturns. Ich hob den Stein auf; I lifted the stone up. Der Stein, welchen ich auf hob; the stone which I lifted up. Der Mann geht aus; the man goes out. Der Mann, welcher aus geht; the man who goes out. Er schrieb den Brief ab; he copied the letter. Der Brief, den er abschrieb; the letter which he copied. Er brach die Blumen ab; he broke off the flowers. Sie ist traurig, weil er die Blumen ab brach; she is sad, because he broke off the flowers.

In the above words, "overturn and uplift," it will be seen that the usage of the two languages is similar. In nearly all other English compounds, however, this resemblance to the German does not exist; thus, for „ich kann den Wagen umwerfen," we may say, I can overturn the waggon, or I can turn the waggon over. The sentence, Er kann ausgehen, however, we can only translate by placing the particle at the end of the sentence; as, he can go *out*.

II. In the Infinitive mood, the particle is never separated from the verb, except by zu, which, when used, stands between the two. Ex.: Er will ausgehen, he will go out. Kann sie abschreiben? can she copy? Er ist bereit den Wagen umzuwerfen; he is ready to overturn the waggon.

III. In the past participle, the augment, ge, comes between the particle and the radical; the particle of course being always *prefixed*. Ex.: Er hat den Brief abgeschrieben; he has copied the letter. Er hat den Wagen umgeworfen; he has overturned the waggon. Ich habe den Brief, welchen er abgeschrieben hat; I have the letter which he has copied.

Exercise 28.

Ab'danken, (to) discharge;	Aussicht, *f.* prospect;	Magnet'nadel, *f.* magnetic-needle;
Ab'geschieden, separated;	Been'digung, *f.* termination;	Mehr, more;
Ab'setzen, to dispose of;	Belohnung, *f.* reward;	Mit'gehen, to go with;
Ab'steigen, to descend, dismount;	Bibel, *f.* Bible;	Müde, tired, weary;
An'deuten, to indicate, declare;	Blitz, *m.* lightning;	Nord, *m.* North;
An'preisen, to praise, extol;	Doch, yet;	Pest, *f.* plague, pestilence;
An'spornen, to incite;	Drohung, *f.* threatening;	Rach'süchtig, revengeful;
An'treiben, to urge, drive;	Drücken, to afflict, oppress;	Reichlich, rich;
An'wenden, to apply, employ;	Eile, *f.* haste, speed;	Reiter, *m.* rider;
An'zeigen, to point out, show;	Ein'sammeln, to collect;	Retten, to save, rescue;
An'ziehen, to attract;	Ein'schließen, to shut up, confine;	Sanft, mild, soft;
Auf'heben, to revoke, give up;	Eremit', *m.* hermit;	Sonne, *f.* sun;
Auf'richten, to elevate, support;	Erfül'len, to fill;	Sprichwort, *n.* adage;
Auf'schieben, to defer, put off;	Feldfrucht, *f.* fruit of the field;	Steigen, to rise;
Auf'speichern, to garner, store up;	Gebet', *n.* prayer;	Süd, *m.* South;
Auf'steigen, to ascend, mount;	Gebirge', *n.* chain of mountains;	Um'bringen, to destroy;
Aus'dreschen, to thrash;	Grünspan, *m.* verdigris;	Un'tergehen, to go down, set;
	Klause, *f.* cell;	Un'terirdisch, subterranean;
	Kunde, *m.* customer;	Verhei'ßung, *f.* promise;
	Licht, *n.* light;	Weg'fliegen, to fly away;
	Liebe, *f.* love;	Welt, *f.* world;
	Magnet', *m.* lodestone;	Zeisig, *m.* greenfinch.

Das Gewis'sen ist die Stimme der Seele; die Lei'denschaften sind die Stimmen des Körpers; welche von beiden Stimmen soll man anhören?	The conscience is the voice of the soul, the passions are the voices of the body; to which of these (both) voices shall one listen?
Und sie gingen Jo'nathan nach, als er hinaus'zog zu David.	And they went after Jonathan as he drew (forth) toward David.
Das geht mich nicht an (Sect. 79. VI).	That does not concern me.
Die Sonne geht um fünf Uhr auf.	The sun rises (goes up) at five o'clock.
Der Sonne ist schon aufgegangen.	The sun has already risen.

1. Die Reiter trieben bei dieser Nachricht ihre Pferde zu größerer Eile an. 2. Der schöne Zeisig ist dem (§ 129. 3.) Knaben weggeflogen. 3. Die Aussicht einer reichlichen Belohnung spornte sie an, das Kind des reichen Ersel'mannes zu retten. 4. Der Bauer hat seine Feldfrüchte eingesammelt, ausgedroschen und aufgespeichert. 5. Der Rachsüchtige wendet gern (Sect. 44. I.) das Sprichwort an: „aufgeschoben ist nicht aufgehoben." 6. Abgeschieden von den Menschen lebt der Eremit in seiner Klause. 7. Der Krieg hat viele Menschen umgebracht, aber doch noch mehr die Pest. 8. Die Sonne ist untergegangen. 9. Der König hat nach Beendigung des Krieges viele Soldaten abgedankt. 10. Der Magnet zieht das Eisen und den Blitz an. 11. Die Magnetnadel zeigt dem Steuermann Nord und Süd an. 12. Die Drohungen sowohl als die Verheißungen in der Bibel deuten die Liebe Gottes an. 13. Der kupferne Kessel hat Grünspan angezogen. 14. Der Müller hat sein Mehl abgesetzt 15 Der Vater hat den Hund in sein Zimmer eingeschlossen. 16. Der Kaufmann preist das Tuch seinen Kunden an. 17. Das Gebet richtet ein gedrücktes Herz auf. 18. Der Mond steigt hinter dem Gebirge auf und erfüllt die Erde mit seinem sanften Lichte. 19. Ich steige in den Wagen, Sie steigen aus dem Wagen, und er steigt auf das Pferd. 20. Die müden Reiter steigen von ihren Pferden ab. 21. Wollen Sie mich mitnehmen, wenn Sie nach Deutschland reisen? 22. Ich glaube nicht, daß Sie mitgehen wollen.

1. After the termination of the war, the soldiers will be paid off. 2. I shall go with your brother to the hermit, who lives separated from the world. 3. The farmer has collected the corn in the field. 4. The citizens are shut up in the town from the enemy. 5. The war and the plague have destroyed a great many people. 6. The weary rider dismounted his horse. 7. The merchant has disposed of his stock. 8. The sun rises in the east. 9. The sun rises at twenty minutes past five o'clock, and sets at half-past six. 10. You must incite your scholars to be more studious. 11. Will you defer your visit for to-morrow? 12. The magnetic-needle points to the north. 13. The scholar has copied his lessons.

LESSONS IN BOTANY.—No. XIV.

CLASS XVII.—DIADELPHIA.

Filaments united, forming two sets.

Hexandria.

In this order stands the fumitory, of which there are several very pretty species, by no means uncommon in fields and gardens, both wild and cultivated. Yellow fumitory is a native perennial, not very common in a wild state, but frequently cultivated as a very pretty small flower, which blows profusely throughout the summer, from May till it is killed by the frost. The stems are spreading and angular; the seed-pods nearly cylindrical, and shorter than their foot-stalk; the leaves, which are of a light delicate green, continue throughout the winter.

The bulbous-rooted fumitory is a native perennial, not uncommon in gardens, though rare in a wild state, blowing early in spring, from February till March, with a pink blossom; the corolla has four petals, with a spear at the base; the seed-pod has two valves and many seeds; the leaves are twice ternate, the divisions being oblong and wedge-shaped; and the stem erect.

The common herb fumitory is a very pretty, delicate-looking annual, common as a weed in gardens, corn-fields, and heaps of rubbish. The leaves are wing-cleft, with their segments lance-shaped, and of a light-green colour. The blossom is a pale-purplish pink. The late celebrated physician, Dr. Cullen, of Edinburgh, highly extolled the virtues of fumitory as a bitter, to be taken in the form of tea or as a decoction in affections of the liver; but, though in some cases it has doubtless proved efficacious, it has latterly fallen into disuse. Clare alludes to its employment for very different purposes:—

"And fumitory, too, a name
Which superstition holds to Fame,
Whose red and purple mottled flowers
Are cropp'd by maids in weeding hours,
To boil in water, milk, and whey,
For washes on a holiday,—
To make their beauty fair and sleek,
And scare the tan from summer's cheek;
And oft the dame will feel inclined,
As childhood's memory comes to mind,
To turn her hook away, and spare
The blooms it loved to gather there."

Octandria.

The milk-wort is a very small evergreen perennial, common on heaths, and in woods and copses in most parts of the kingdom, and blowing from May during the summer, with blue, white, or pale-pink blossoms. The corolla is crested; the calyx has five leaves, two of them being winged and coloured, three ribbed, blunt, and of the same length as the corolla; and the leaves grass-like and spear-pointed. It affords a good medicinal bitter by infusion, but not so powerful as the American snake-root, of the same genus.

Decandria.

Dyer's green-weed is a shrubby plant, frequently found in dry, barren banks, and the borders of fields. It blossoms in

July and August, bearing a yellow flower, which resembles broom, but is one-half smaller. The calyx is two lipped, with two teeth in the upper lip, and three in the lower; the leaves are spear-shaped and smooth; and the branches round and erect. The whole of the plant is used by dyers to dye yellow; and by means of woad, a green is afterwards produced,—the most esteemed of greens indeed, for woollen goods.

The royal appellation, Plantagenet, is said to have been derived from this plant (*Planta genista*), from the circumstance of Fulke, Earl of Anjou, who lived a century before the Norman conquest, having worn the genista in his cap, and adopted the title, which was kept up by his descendants. The broom is still the badge of the Highland Clan Forbes.

"Though the feeblest thing that Nature forms,
A frail and perishing flower art thou;
Yet thy race has survived a thousand storms
That have made the monarch and warrior bow.

The storied urn may be crumbled to dust,
And Time may the marble bust deface;
But thou wilt be faithful, and firm to thy trust,
The memorial flower of a princely race."

A more showy, and much more common plant, is broom,—a shrub which grows abundantly on dry, gravelly hills in all parts of England, flowering in May and June. It is, indeed, a much more splendid plant than many exotics which are cultivated with great care. In the following extract are brought into combination one of the most beautiful shrubs with one of the loveliest trees:—

"——— On the green slope
Of a romantic glade we sat us down,
Amid the fragrance of the yellow broom;
While o'er our heads the weeping beech-tree streamed
Its branches, arching like a fountain shower."

The common furze, whin, or gorse, is a very bushy shrub, from two to five feet high, beset with thorns. Its leaves are small, awl-shaped, and horn-tipped; its flowers are of a bright yellow, appearing in May, and, occasionally, at all seasons. The furze is common on dry pastures and heaths.

When Linnæus first saw it flowering in this country—for it cannot bear the winter of Sweden—he is said to have expressed his admiration of it in the strongest terms; and it is worthy of remark, that the first president of the Linnæan Society, Sir J. E. Smith, commenced his study of botany with the furze. Speaking of a celebrated work on science, he says:—"I received Berkenhout on the 9th of January, 1778, and began on the 11th, with infinite delight, to examine the *Ulex Europæus*, the only plant then in flower. I then first comprehended the nature of systematic arrangement and the Linnæan principles, little aware that, at that instant, the world was losing the great genius who was to be my future guide, for Linnæus died on the 11th of January, 1778." After the decease of the younger Linnæus in 1788, Sir J. E. Smith purchased the museum, books, &c., of the far-famed Swede.

The common red clover, or honeysuckle-trefoil, is one of the best-known plants in farm-fields, being extensively used for cattle. This plant is found in a wild state, particularly on chalky downs, and blowing about the end of June. The white clover, or Dutch trefoil, is a native perennial, blowing from May throughout the summer, with a white or reddish blossom, the flowers growing clustered into a head. The white clover appears to be the genuine Irish shamrock, though, like the Scotch thistle, and other native emblems, the species employed in heraldry is not much more like any botanical species, than the unicorn in the royal arms is like any known animal. There is also a species called the strawberry clover, not uncommon in most meadows, and distinguished by the calyx bulging out, so as to give the seed-heads some slight resemblance to the delicious fruit from which it derives its name.

A great number of plants may be observed with peas-blossom shaped flowers. Among them is the broad-leaved, everlasting pea, with a climbing stem, three or four feet long, growing in woods, with large, rose-coloured flowers, which appear in July and August. The sweet pea of our gardens is a native of Sicily, and the north of Africa. Its original blossom is white; but a great variety of colour, pink, scarlet, purple, and variegated, has been produced by cultivation. Of the sweet pea, it has been happily said:—"Almost all plants of the curly, twirly, winding, turning class, are looked upon with tenderness, and with almost tearful eyes. The sweet pea, like unto the convolvulus, doth seem to love all things that its wiry, spiry stem can touch. I doubt me not, that it would grow around your finger; you can try it, if it pleaseth you; but, at all events, set any sweet pea, and if it twine not itself around your finger, it will twine round your heart. It will grow on one side of the garden gate, or against the pallisades at the foot of the laburnum-tree; and it will look lovely anywhere."

The rest-harrow grows on barren and waste soil, and is sometimes seen growing plentifully on the green patches of chalk cliffs near the sea. But when it invades the cultivated soil, its long roots are troublesome, impeding the plough, while its thorny branches obstruct the harrow, and hence the old name which this plant has borne. The name which used to be given it in France, arrêtebœuf, is no less significant. Its stems are, however, more abundant, and possess greater strength when the plant grows in barren soils, than in those considered more nutritive. Here the donkey feeds upon it, while in pasture-lands it is grateful to the taste of cows and sheep. The roots of the young shoots are also very sweet; and the latter are boiled and eaten in some rural districts.

The saintfoin adorns the meadows with its rich leaves and flowers in the month of June. It flourishes on warm, chalky lands, and lasts from eight to ten years on a genial soil; but there have been instances of its continuance for a much longer period. But, though cultivated in fields, it is an English wild-flower. It is plentiful on Royston Heath and Salisbury Plain. Fuller says, with his usual quaintness:—"It is called saintfoin, or holyday. Superstition may seem in the name, but there is nothing but good husbandry in the sowing thereof. It was first fetched out of France from about Paris, and since is sown in divers places in England, especially at Cobham-park, in Kent, where it thriveth extraordinarily well on dry, chalky banks, where nothing else will grow."

LESSONS IN ENGLISH.—No. XV.

By JOHN R. BEARD, D.D.

DERIVATION: PREFIXES *(continued)*.

PAUSING, for a moment, in these somewhat dry details, I would ask you whether you know what words are. Take the word father. What is it? Father, as it stands here on the page, is a combination of straight and curved lines. What does the combination of lines represent? A combination of sounds. What does the combination of sounds represent? A state of mind; a mental conception. What does the mental conception represent? An external object; an external object that has the quality of being a father, or that bears the relation which we designate by the term father. So then the whole connexion between an external object and the written or printed name of this book, may be set forth thus:—Lines make letters; letters make syllables; syllables make words; words represent sounds; sounds represent ideas; ideas represent outward objects,—that is, persons or things. Consequently, objects are the basis of language; ideas are its essence; sounds are its medium, and lines are its forms. These outward objects, and internal realities, are set forth by signs,—signs made by the mouth—signs made by the hand. The lips, then, and the fingers, are the interpreters of the person. What progress in civilisation is implied in this connexion of the pen with the mind and with the universe; the pen describing, and the press diffusing, so as to be universally understood, the most subtle of all essences; states of thought and feeling; and the widest, as well as the wisest of all generalisations which we term the laws of God, or God's own operations in the government of the universe? The study of language, thus viewed, is the study of the mind of man, as well as the study of the works and the will of God. Deep and mysterious study! worthy of our best powers, and sure to be attended by an ample reward. And if the study of language is the study of the human mind, and the divine mind in their activity and their utterances, then no one who has not made some proficiency in the study, is, or can be competent to interpret or expound man's will or God's will, profane or sacred literature. To resume our subject:

Per, of Latin origin, *through, by*; as, *per*adventure, *by chance*. It is found in *per*ambulate (ambulo, Lat. *I walk*), to walk through, over.

"The ancients used to crown virgins with the flowers of this plant (milkwort) when they *perambulated* the fields, to implore fertility thereto."—*Miller*, "Gardener's Dictionary."

The *per* passes into *pol* in *pol*lute (polluo, per, and lutum, Lat. *mud*). *Pol* is found also in *pol*licitation, a promising, from polliceor, Lat. *I promise*.

Peri, of Greek origin, *around*; as, *peri*phery (phero, Gr. *I bear*), a circumference; also in *peri*phrasis (phrasis, Gr. *a phrase*, a *speech*), a circumlocution, or round-about mode of utterance; as, *the loss of life*, for death.

Phil, and *philo*, of Greek origin (philos, *a lover*), as in *philo*loger, a lover of science (particularly the science of language); *philo*sopher (sophia, Gr. *wisdom*), a lover of wisdom; *philo*mel (melos, Gr. *a song*), applied to the nightingale; *phil*anthropy (anthropos, Gr. *a man*), the love of mankind.

Phys, of Greek origin (physis, Gr. *nature*), physic, and physician, originally meant natural philosophy and a natural philosopher; but derivatively, the words came to refer to a knowledge of such natural objects as were held to conduce to the art of healing. *Physics*, plural, still means Natural Philosophy; and *physicien*, Fr. means a Natural Philosopher, or one acquainted with the laws of nature.

*Physio*gnomy, consists of physis, *nature*, and gnosco, Gr. *I know*; and so properly denotes a knowledge of nature by outward appearances; but, as employed, the word signifies a knowledge of a man's character, as gained from his countenance. *Physio*logy is the science of nature, but in a particular way; a science, that is, of the structure and laws of the human frame in particular, and of animal organisation in general.

"I find that the most eminent and original *physiologist* of the present age (M. Cuvier), has been led, by his enlightened researches concerning the laws of the animal economy, into a train of thinking strikingly similar."—*Dugald Stewart*, "Philosophy of the Mind."

Pleni, of Latin origin (plenus, *full*; hence *plenty*), is found in *pleni*potentiary (potens, Lat. *powerful*), one who has been intrusted with full power or authority.

"Let the *plenipotentiary* sophisters of England settle with the diplomatic sophisters of France in what manner right is to be corrected by an infusion of wrong, and how truth may be rendered more true by a due intermixture of falsehood."—*Burke*.

Pleos, in Greek, is the same as the Latin plenus, found in our "plenty." *Pleos* supplies the first syllable in *pleonasm*, a fulness of expression so as to become excessive.

"It is a *pleonasm*, a figure used in Scripture, by a multiplicity of expressions, to signify some one notable thing."—*South*.

Poly, of Greek origin (polys, *many, much*), appears in *poly*anthus (anthos, Gr. *a flower*), so called from its many flowers; and in *poly*gamy (gamos, Gr. *marriage*), having many wives.

"*Polygamy* was not commonly tolerated in Greece, for marriage was thought to be a conjunction of one man with one woman.—*Potter*, "Antiquities of Greece."

Poly is also the first syllable of *poly*glott (glotté, Gr. *a tongue*), one who knows *many* languages; also a book written in *many* languages, as the "Polyglott Bible."

Post, of Latin origin, *after, afterwards*, appears in *post*date, *to date after the time of writing*, at some later time; in *post*pone (pono, Lat. *I place*), *to put off*: and in *post*script (scriptum, Lat. *a writing*), something added to a letter.

Postumous, erroneously spelt posthumous, from the Latin postumus, the same as postremus (from post, *after*), signifies late, very late, the latest, the last. This word is applied to a child born, after the father's death; or a book published after the author's death.

Sometimes the word is spelt post*h*ume, for postume. We have here an instance of the effect on spelling of a supposed etymology. Postume was thought to be composed of post, *after*, and humus, the ground, and hence the word was written posthume. It is, however, the superlative of the Latin posterus, and is used in the Latin language with the same applications as in English. Richardson is wrong in the etymology which he gives of this word.

Pre, of Latin origin, *before*, as in *pre*caution (from cavere, Lat. *to beware*) forethought.

"*Precaution* trudging all about
To see the candles fairly out."
Churchill, "The Ghost."

Pre is found in *pre*cede (cedo, Lat. *I go*), in *pre*cipitous (caput, Lat. *the head*), headlong; in *pre*cocious (coquere, Lat. *to cook*), *cooked before, forward, too soon ready*.

"I had heard of divers forward and precose youths, and some I have known, but I never did either heare or read of anything like to this sweete child."—*Evelyn*, "Memoirs."

Preter, of Latin origin (praeter, *against*), is found in *preter*natural, *contrary to nature*.

Pro, of Latin origin, *fore, forward*, as in *pro*duce (duco, Lat. *I lead*), *to bring forward*. *Pro* appears in *pro*ceed (cedo, Lat. *I go*), in *pro*create (creo, Lat. *I beget*), in *pro*fer (fero, Lat. *I bear*), in *pro*lepsis, an anticipation, &c.

"We have evinced (proved) that the generality of mankind have constantly had a certain *prolepsis* or anticipation in their minds concerning the actual existence of a God."—*Cudworth*, "Intellectual System."

Pro becomes in French, *pour*, which again becomes *pur*, as in *pur*port (porto, Lat. *I carry*), *signification*. *Purchase* is given by Richardson as from a fancied French word,—namely, *pour-chasser*, and *purchase*, he says, means to chase, and so to obtain. Such derivations are enough to bring etymology into disgrace. *Purchase* is from a low Latin word, *perchauchare* (per-calcare), which meant to *tread over*, and to mark out, the limits of a piece of land, the necessary preliminary to the purchase of it. See Du Cange on the word, who gives the noun *purchacia* (purchase), as something acquired. *Purchacia* is common in old legal documents, and is the origin of the obsolete French word pourchasser (perchauchare); which has nothing whatever to do with chasser, *to chase* or *hunt*. *Pourchas*, in old French, signifies *labour*, and suggests the derivation which involves labour as the price paid in the acquisition of land, &c. This idea of *purchase*, as founded on labour, is in unison with the meaning of purchase. Whence it signifies a point for a lever to act upon, or the power which hence ensues, as in these words:—

"A politician, to do great things, looks for a power, which our workmen call a *purchase*, and if he finds that power in politics as in mechanics, he cannot be at a loss to apply it."—*Burke*.

Proto, of Greek origin (protos, *first*), occurs in *proto*martyr (martys, *a witness*), the first witness or martyr: applied to Stephen, in church history.

"With Hampden firm assertor of her laws,
And *protomartyr* in the glorious cause." *Boyse.*

Also in *proto*type. We have already had *anti*type, and *arche*type, here we have *proto*type, which means the first or original form or model.

Pseudo, of Greek origin (pseudos, *a falsehood*), signifies what is *not genuine, false*; as, *pseudo*-prophet, a false prophet.

"Out of a more tenacious cling to worldly respects, he stands up for all the rest to justify a long usurpation and convicted *pseudepiscopacy* (episcopos, Gr. *a bishop*), of prelates."—*Milton*.

Pusill, of Latin origin, comes from pusillus (*little*) or pupillus (E.R. *pupil*), the diminutive form of pusus or pupus, *a boy* (pupa, *a girl*), which is the source of our word puppet, in the French poupée, *a baby, a doll*. *Pusill* is found in union with animus, *mind*, forming *pusill*animous, *small in mind*, applied particularly to a want of spirit or courage.

Putri, of Latin origin (putris, *rotten*, E.R. *putrid*), enters into the composition of a class of words, namely, *putrefy* (facio, Lat. *I make*), *putre*faction, *putre*scent, *putre*scence, &c.

"It is such light as *putrefaction* breeds
In fly-blown flesh, whereon the maggot feeds,
Shines in the dark, but usher'd into day,
The stench remains, the lustre dies away." *Cowper.*

Exercises for Parsing.

April is come. The birds sing. The trees are in blossom. The flowers are coming out. The sun shines. Now it rains. It rains and the sun shines. There is a rainbow. Oh what fine colours! I cannot catch the rainbow. The rainbow is going away. It fades. It is quite gone. I hear the cuckoo. It is August. Let us go into the corn-fields. Is the corn ripe? This is a grain of corn. This is an ear of corn. This stalk makes straw. Now the corn must be tied up in sheaves.

EXERCISES IN COMPOSITION.

HISTORICAL THEME.

Moses is taken into Pharaoh's palace.

Write and carefully correct an account of the last sermon or speech you heard.

FRENCH EXTRACTS.

PENSEES MORALES ET MAXIMES.

CONSCIENCE.

La conscience est le meilleur livre de morale que nous ayons: c'est celui que l'on doit consulter le plus.—*Pascal.*

CONSEIL.

On ne donne rien si libéralement que ses conseils.—*La Rochefoucauld.*

CONVERSATION.

L'esprit de la conversation consiste bien moins à en montrer beaucoup, qu'à en faire trouver aux autres: celui qui sort de votre entretien content de soi et de son esprit, l'est de vous parfaitement.—*La Bruyère.*

Les gens qui savent peu parlent beaucoup, et les gens qui savent beaucoup parlent peu. Il est naturel de croire qu'un ignorant trouve important tout ce qu'il sait, et le dise à tout le monde; mais un homme instruit n'ouvre pas aisément son répertoire, il aurait trop à dire, et, comme il voit encore plus à dire après lui, il se tait. —*J. J. Rousseau.*

Les pensées sont des tapisseries roulées, la conversation les déploie et les expose au grand jour.—*Thémistocle.*

COUR.

La cour est comme un édifice bâti de marbre, je veux dire qu'elle est composée d'hommes durs, mais fort polis.—*La Bruyère.*

COURAGE.

Le vrai courage est une des qualités qui supposent le plus de grandeur d'âme. J'en remarque beaucoup de sortes: un courage contre la fortune, qui est philosophie; un courage contre les misères, qui est patience; un courage à la guerre, qui est valeur; un courage dans les entreprises, qui est hardiesse; un courage fier et téméraire, qui est audace; un courage contre l'injustice, qui est fermeté; un courage contre le vice, qui est sévérité; un courage de réflexion, de tempérament, &c.—*Vauvenargues.*

La parfaite valeur est de faire sans témoins ce qu'on serait capable de faire devant tout le monde.—*La Rochefoucauld.*

Courage toujours! Sans cette condition, point de vertu. Courage pour vaincre votre paresse et poursuivre toutes les études honorables; courage pour défendre la patrie et protéger votre semblable en toute rencontre; courage pour résister aux mauvais exemples et aux injustes dérisions; courage pour souffrir maladies, peines, angoisses de toute espèce, sans lâches lamentations; courage pour aspirer à une perfection à laquelle on ne doit pas cesser d'aspirer, si l'on ne veut pas perdre toute noblesse.—*Silvio Pellico.*

CRITIQUE.

Un critique n'est formé qu'après plusieurs années d'observations et d'études. Un critiqueur naît du soir au matin.—*La Bruyère.*

Ceux qui blâment l'esprit de critique ne songent pas assez que l'homme de goût a reçu vingt blessures avant d'en faire une.—*Rivarol.*

DEFAUTS.

Le trop d'attention qu'on met à observer les défauts d'autrui fait qu'on meurt sans avoir eu le temps de connaître les siens.—*La Bruyère.*

C'est augmenter ses défauts que de les désavouer quand on nous les reproche.—*La Rochefoucauld.*

DELATEURS.

Les princes ont à leurs côtés deux sortes de bêtes, les farouches et les privées: les privées sont les flatteurs; les farouches sont les délateurs.—*Diogène.*

DEPENDANCE.

Le grand dépend du petit, le petit du grand; le maître du valet, le valet du maître; la femme du mari, et plus souvent le mari de la femme; l'avare, de son argent; l'orgueilleux, de sa folie; l'ouvrier, de son travail; le libertin, du vice; l'honnête homme, de l'estime du public, et l'estime du public, de sa bonne conduite. Ainsi notre réputation, notre vie et nos biens dépendent des autres et de nos inclinations.—*J. J. Rousseau.*

Il est, sans comparison, plus sûr d'obéir que de commander, d'écouter que de parler, et de recevoir un conseil que de le donner. —*Thomas a-Kempis.*

DESAPPOINTEMENT.

Le désappointement marche en souriant derrière l'enthousiasme. —*Madame de Staël.*

DESIR.

Assez est un peu plus que ce que chacun a.—*Franklin.*

Nous désirerions peu de choses avec ardeur, si nous connaissions parfaitement ce que nous désirons.—*La Rochefoucauld.*

DEVOIR.

Tous les devoirs se mesurent en général par les rapports qui lient les hommes entre eux.—*Epictète.*

Celui qui ne pense à ses devoirs que lorsqu'on l'en avertit, n'est digne d'aucune estime.—*Plaute.*

DIEU.

Celui qui garde son âme en état de désirer qu'il y ait un Dieu, n'en doute jamais.

L'homme s'agite, Dieu le mène.—*Fénelon.*

DISCRETION.

Le fou montrera sa folie en écoutant par une porte; mais cette bassesse sera insupportable à l'homme prudent.—*Ecclésiastique.*

Les lois du secret et du dépôt sont les mêmes.—*Chamfort.*

DISSIMULATION.

La dissimulation est un certain art de composer ses paroles et ses actions pour une mauvaise fin.—*Théophraste.*

Fuis pour un moment l'homme colère, et pour toujours l'homme dissimulé.—*Confucius.*

La dissimulation est une imposture réfléchie.—*Vauvenargues.*

DOCILITE.

Celui dont l'oreille écoute les réprimandes salutaires demeurera au milieu des sages. Celui qui rejette la correction méprise son âme; mais celui qui se rend aux remontrances possède son cœur —*Salomon.*

C'est être sage que de savoir être docile quand il le faut, et de faire de bonne heure ce qu'on serait obligé de faire par la suite.—*Térence.*

DOUCEUR.

La réponse douce apaise la colère; la parole fâcheuse augmente la fureur.—*Salomon.*

Qui commande avec trop d'empire à ceux qui sont au-dessous de lui, trouve souvent un maître qui lui commande de même.—*Maximes des Orientaux.*

SOLUTIONS OF PROBLEMS AND QUERIES.

REQUIRED a number such that when added to or subtracted from its square, the sum or remainder shall be a square number.

Let x be the required number; then, by the question x^2+x and x^2-x are both square numbers.

Make $x^2+x=(x-y)^2$; then we have

$x^2+x=x^2-2xy+y^2$, by expansion;

$(2y+1)x=y^2$, by transposition, &c.;

and $x=\dfrac{y^2}{2y+1}$, by division.

Substituting this value of x in the expression x^2-x, we have

$$\left(\frac{y^2}{2y+1}\right)^2-\frac{y^2}{2y+1}=\text{a square number};$$ or, by reducing these fractions to a common denominator, and separating factors, we have

$$\frac{y^4-2y^3-y^2}{(2y+1)^2}=\frac{y^2}{(2y+1)^2}(y^2-2y-1)=\text{a square number.}$$

Here the first factor being a square, so is the other, viz. y^2-2y-1.

Make $y^2-2y-1=(y-z)^2$; then we have

$y^2-2y-1=y^2-2yz+z^2$, by expansion;

$2(z-1)y=z^2+1$, by transposition, &c.;

and $y=\dfrac{z^2+1}{2(z-1)}$, by division.

In this expression for y, assume z as any number greater than unity; and substitute the value of y in the expression for x; this will give the number required by the question. Thus, assuming $z=2$, y becomes $\frac{5}{2}$, and $x=\frac{25}{12}$, which satisfies the conditions of the question; for

$$(\tfrac{25}{12})^2+\tfrac{25}{12}=(\tfrac{35}{12})^2;\text{ and }(\tfrac{25}{12})^2-\tfrac{25}{12}=(\tfrac{5}{12})^2.$$

This being one of Bonnycastle's questions, a solution will be found in his Key.

Solutions similar to the above were sent by the following correspondents:—R. G. (Dundee), J. S. (Ayrshire), T. Morley (Bromley), A. Skerritt (Holbrook), Douglas, and others. Different solutions were sent by Carolus (Padiham), J. Macowan (Auchterarder), J. Sowden, and others.

CORRESPONDENCE.

SIR,—You must have often been struck with a singular circumstance to which I find it difficult to give a designation,*—namely, that when you have met with anything in the course of your reading that particularly struck or interested you, perhaps in the next book you take up, though it be only to while away a leisure hour, you unexpectedly fall in with something that throws more light on the subject, or something having a remarkable connexion with it. As an instance, I was yesterday reading in the POPULAR EDUCATOR, the biography of Franklin, and particularly noticed that it was from two tracts on rhetoric and logic, annexed to an English grammar, that he obtained a knowledge of the Socratic method of reasoning. Well, I had just picked up a few old books at a stall, and taking up one of them, I found it to be the very grammar, with treatises on the art of poetry; rhetoric and logic annexed; and also a recommendation, with examples, of the Socratic method of disputing, that Franklin had studied; and well worthy of being studied it seems to be. Though from the preface it appears to have been the first of our English grammars, except those of Dr. Wallis and Johnson (not Samuel), yet to me it seems the most philosophic and sensible *English* English grammar that I have seen. The title is wanting, but it is dedicated to Queen Anne, and contains the preface to the second edition, without date; but, in the explanation of abbreviations at the end of the grammar, the Roman numerals for 1736 are given, which indicates the true date. The authors utterly discard all the grammatical terms borrowed from the grammars of the classics. They divide grammar into four parts,—viz., letters, syllables, words, and sentences. All the portions to be committed to memory are "put into as smooth and sonorous verse as the nature of the subject would bear." To this is added an explanation in prose, along with additional observations, reasons, and exceptions; and below these are copious, useful, and very interesting notes and learned disquisitions on universal grammar, &c. To pass by the first and second parts, we find the authors make only four parts of speech,—viz., names, qualities, affirmations, and particles, or the manner of words. The affirmation spoken of as "the soul of the sentence," is thus defined:—

> "An *affirmation* (as the word does show)
> Something *affirms*; and does *number* know,
> And *time* and *person*; whether it express
> *Action*, *being*, *passion*, or their want confess;
> Two *times* the English language only knows,
> The first the *present*, next the *passing* shows: &c."

Truly more modern grammarians have grievously retrograded. Under the term *Qualities*, are comprehended not only what we term adjectives, but also the possessive cases of nouns and pronouns, participles and articles; for, as the authors justly observe,

> "*A*, *an*, and *the*, we qualities may name,
> Because their use and nature are the same."

The particles are divided into three sorts; the 1st, showing the *manners* or *qualities of words*; the 2nd, denoting circumstances of *actions*; and the 3rd, joining sentence to sentence. What modern grammarians treat of under the head of prosody, is here reserved for the first part of "the art of poetry," which also includes a good deal that might fairly come under the head of orthography. The remainder of this book treats of the different kinds of poetical composition, as, epigram, pastoral, elegy, lyric, satire, comedy, and tragedy, with rules, examples, and criticisms. The epic or heroic poem comes last, and is summarily dismissed in half a page, concluding thus:—"The rules at large would be too extensive for this treatise, and but of little use: the poem being not to be undertaken but by a *master*, and by a *genius* that does not appear once in a thousand years."

The treatises on rhetoric and logic appear to be very useful and sensibly written compendiums, but I cannot say that I admire either the *manner* or the *matter* of the example of the Socratic method of disputing, which the authors have subjoined.—Yours, &c.,

JAMES ADAMSON.

[We give place to this letter for several reasons: First, it is a fair specimen of epistolary correspondence for our younger readers; second, the subject is both curious and interesting, and serves to verify some judicious remarks made by Dr. Beard on the modern method of teaching English Grammar; and third, it shows how useful it is to reflect on what you read, to associate it in your mind with the names of eminent individuals, and to be on the alert to observe everything that bears upon any important or useful subject.]

SIR,—In answer to your correspondent, who signs himself "Pitt," I beg to say that the rock harmonicon is made of stone taken from the mountain of Skiddaw, in Cumberland. Perhaps the origin of this harmonicon is unknown to your correspondent. A traveller in passing over the mountain chanced to strike his foot against one of the loose stones. He was surprised at the tone produced, and the idea of forming an harmonicon occurred to him. With what success I need not mention. Mr. Nelson, the clown at Welsh and Hernandez' horsemanship, is a skilful performer on this instrument. The tone produced by him is almost equal to a pianoforte. He has also an harmonicon made of pine cane, the music of which delights and astonishes the listeners. I am not aware of any other stone possessing these musical properties.—I am, Sir,

A MUSICAL MOMUS.

Exeter, August 14, 1852.

* The law of the Association of Ideas.—ED.

AUTOBIOGRAPHY OF A SELF-TAUGHT MAN.

SIR,—I was sent to school at a very early age; but, being frequently sent from one school to another it was found that when I left school at the age of nine years, I knew little more than the letters of the alphabet. Being a big boy it was thought that I should be sent to work; this was accordingly done; but before I was fifteen I had served seventeen different masters,* for I never remained six months in any of my situations. The opinion which the different masters formed of me was that I did not like work.

At the age of fifteen I left home, and continued to roam about the country, leading a many-sided life, till I was nearly twenty. I then returned home, and was received like the prodigal son. My relatives soon procured employment for me, and by my steadiness then, I gave them and my employers great satisfaction. I had not been in my situation many days before my ignorance was made apparent both to myself and others. I was requested to read to the workmen at meal-times; for we had all our meals in the factory, except supper. The blush rose to my face when I was compelled to decline the duty. I felt degraded, as I was considered to be what was termed "respectable," and it was discovered that I was not able to read. I felt then determined to remove the stigma of ignorance, and for this purpose went to an evening school for three nights in the week to learn to read, write, and cipher. I remained there till it was given up for the season, and then had to get on the best way I could. I was determined to make the best of my *little* time—for I had to be at work at five in the morning, and it was frequently eight at night before I left, with only two hours for meals, so that I had no time to devote to study in the day-time. At the night-school I learnt but little, being left too much to myself. Books were put into my hands, and I had to use them the best way I could; but not knowing the force and meaning of words, I could not get on.

A new era opened to me at this period, in consequence of my joining a Young Men's Society. Their discussions threw a new light upon everything, at least so it seemed to me; and it was not long before I took part in them. I bought Lennie's Grammar, and mastered its contents in about six months; during the same time I went halfway through Crossley's Calculator. Just about the time I joined the Young Men's Society, I went to work as a "navvy," so that I had more time for study, for I left off working at six o'clock evening. In about twelve months afterwards I gave up this occupation and obtained another, where I had more time still, and endeavoured to profit by it. A little before I gave up being a "navvy," a well-thumbed volume of Euclid came in my way, and with its difficulties I was pleased. I had not forgotten to read books upon general subjects, during the preceding twelve months, and to make extracts of what I read. Soon after I had commenced studying Lennie's Grammar, Todd's "Student's Manual" came into my hands, and from it I derived much benefit. A friend, finding that I was making such rapid progress, advised me to apply for admission into the Normal School, London; and having done so, I was admitted, when, in less than six months, the time for which I entered, I was appointed to a school in the south-west of England.

Since then I have extended my knowledge of Geography, History, Ancient and Modern, Mathematics, Natural History and Natural Philosophy, Music, Drawing, and Latin, and I am now keeping you company in the pages of the POPULAR EDUCATOR.

The element of success is *determination*. However great the difficulties are, they may be overcome if one will only *try*. My difficulties seemed at times insurmountable; but I was determined to overcome them; and I have succeeded. What has been done by one man can be done by another. I am now about thirty years of age, and I am determined to work harder than ever.—I am, Mr. Editor, yours faithfully,

XIX.

* This I afterwards found useful to me, as it gave me an insight into many trades, and put me in possession of information which I could not have obtained without considerable reading.

LITERARY NOTICES.

CASSELL'S ELEMENTS OF ARITHMETIC, will be issued early in October, price 1s. in stiff covers, or 1s. 6d. cloth, uniform with Cassell's Edition of Euclid, edited by Professor Wallace, A.M., of the University of Glasgow, Editor of Cassell's "Euclid," the POPULAR EDUCATOR, &c.

THE POPULAR EDUCATOR ALMANACK, price 2d., containing a large amount of Educational Statistics, compiled from the most authentic sources, with brief notices of the various arts, sciences, languages, &c., will be ready for delivery November 1st.

ANSWERS TO CORRESPONDENTS.

Our SERIES OF MAPS, in illustration of the Lessons in Geography will begin with No. 27, the commencement of our Second Volume, in which EUROPE (measuring 12 inches by 9), engraved expressly for the POPULAR EDUCATOR, will appear.

W. D. (St. James's): Latin and Greek are the keys to many languages, but not to all. French is useful in relation to the English, and in a commercial and international point of view.—B. C. P. (Blackfriars-road): There will be an article on *Wood Engraving* in the Illustrated Exhibitor in an early number.—J. T. (Manchester): The proper expression is "before a mute h."—AN APPRENTICE (Edinburgh) is right; we wish our students would take his admirable hint; viz., "We ought not to begin the study of Euclid with a mind overwhelmed with the difficulty we have to encounter, but prepared to receive the easiest reasoning that can be adduced."—LATIN AND ENGLISH: No.—GEORGE COX (West Bromwich) is right; the Bible is intended to convince the ungodly, but not to be made their laughing-stock. "Whoever comes to God, must believe that he is, and that he is a rewarder of them that diligently seek him." Gesenius's Hebrew Lexicon is reckoned the best; but be sure to buy Bagster's edition. Gesenius's views of Bible truth are exceedingly erroneous; but the student is carefully warned at every step, in the edition we recommend. Bagster's Analytical Dictionary is invaluable to a student of the Scriptures. Liddell and Scott's Greek Lexicon is much the best.—H. S. WATLING (Clare): We have proposed the question of multiplying £99 19s. 11¾d. by itself, in a rational way, in No. 23, p. 368, and we here solve it: First,

£1 : £99 19s. 11¾d. :: £99 19s. 11¾d. : the answer.

Now, reducing all into farthings, this becomes

960 : 95999 :: 95999 : 9599800$\frac{1}{960}$,

where the fourth term is obtained in the usual way by multiplying the second and third terms together, and dividing by the first. The fourth term being now in farthings, if it be reduced to pounds, it will give the answer £9999 15s. 10$\frac{960}{960}$d. This might be done very shortly as follows:—First, we have

£1 : £99$\frac{959}{960}$ :: £99$\frac{959}{960}$: the answer.

or putting this statement in the following form, we have

£1 : £100$-\frac{1}{960}$ :: £100$-\frac{1}{960}$: the answer.

Then, $(100-\frac{1}{960})\times(100-\frac{1}{960})=10000-\frac{959}{960}+\frac{1}{960^2}=$£10000—(200 farthings)$+\frac{1}{960}$ of a farthing = £9999 15s. 10$\frac{960}{960}$d. the answer.—J. J. B. (Taunton): The subject of Greek is ever before us.—S. C. (Salford): Answered before.—A YOUNG GARDENER: We shall see.—F. BEETS (Grimstone); J. LATTA (Watten): Received.

A. BOYD (Glasgow) requests us to solve the equation $\sqrt[3]{(a+x)}+\sqrt[3]{(a-x)}=b$. Putting $\sqrt[3]{(a+x)}=m$, and $3\sqrt[3]{(a-x)}=n$, you have $m+n=b$. Cubing both sides of this, you have $m^3+3m^2n+3mn^2+n^3=b^3$; which may be put thus, $m^3+n^3+3mn(m+n)=b^3$; or thus, $m^3+n^3+3mnb=b^3$ (A). But by cubing, you have $a+x=m^3$, and $a-x=n^3$; also, by multiplying, you have $\sqrt[3]{(a+x)}\times\sqrt[3]{(a-x)}=mn$, or $\sqrt[3]{(a^2-x^2)}=mn$. Now, substituting these values in equation (A), you have $a+x+a-x+3b\sqrt[3]{(a^2-x^2)}=b^3$, or $2a+3b\sqrt[3]{(a^2-x^2)}=b^3$; whence by transposing and dividing, you have $\sqrt[3]{(a^2-x^2)}=\frac{b^3-2a}{3b}$. Now cubing this, transposing and changing signs, you have $x^2=\left(\frac{b^3-2a}{3b}\right)^3-2a$; whence, extracting the square root, you have $x=\sqrt{\left\{\left(\frac{b^3-2a}{3b}\right)^3-2a\right\}}$.

MUSIC.—W. FORD, A PIANOFORTE PLAYER, ENQUIRER, CHARLES, AMY LAWRENCE, and JOSHUA: Look at Lesson VIII.—G. F.; J. S. (Vauxhall); M. B. S. C. (Edinburgh): See Lesson IX. We are much interested in the account, by the last-named, of the monochord which he has made, and in the thorough way in which he has tested our assertions and calculations on the structure of the scale. Several other correspondents have sent us drawings and descriptions of the monochords which they have constructed. Their intelligent communications will be made use of in future lessons.—W. S. (Portsea): Among the best of the cheap books on "Thorough Bass" is "Hamilton's Grammar," published by Cocks. His "Catechism of Counterpoint" (2s.) is also well written, and a good book for beginners. The mode of tuition employed in our lessons has peculiar facilities for making the principles of harmony easily understood. One chapter in the "Grammar of Vocal Music" (2s. 6d., Messrs. Ward and Co.) contains all the rules which a beginner requires. There is an admirable little "First Book of Musical Grammar," by Mr. James Gall, of Edinburgh, who adopts to a great extent the same principles with us, only using the figures instead of the better-sounding solfa syllables. Of the more expensive works, Dr. Marx's "School of Musical Composition," just published by Cocks and Co., is recommended as the best. It is admirably progressive in its lessons and exercises.—MR. SIDNEY BIRD, Professor of Music (Whitechapel): We are obliged by his communication. We hope to treat the subject briefly and practically in our present course of lessons.—N. T. P. (Merthyr Tydfil): Answered partly above. For singing, we have tried to make our own course of lessons the most thorough and practical course that has appeared for *adults and self-teachers generally*. A similar course adapted to the *young* is given in "Pupil's Manual;" another for *congregations* is appended to "Solfa People's Service of Song;" and a book for teachers and thorough students is presented in the "Grammar" above referred to, all published by Messrs. Ward and Co.—Mr. SOMES, who inquires for a separate manual for teachers on the plan of our own lessons, will find it in the book last named.—W. S. (Chelsea) is reminded that we do not wish to teach any "system," but to teach the verities of *music itself*. Like thousands in the present day, and like ourselves many years ago, he has probably only learnt a system, and is quite surprised, as we were, to find how different a thing music itself is from that which is often taught for it.—ANNETTE, "nearly eleven years old, with a tolerable voice:" You are just at the right age for learning to sing. A little at a time, and a little every day, should be your rule. The little girl mentioned in Lesson VIII. is about six years old. Be as fond of pointing on the modulator as she is.—W. R. (Kinross): The middle or tenor C, as it is called, is *now* commonly reckoned to have two hundred and fifty vibrations. In books less than a century old it was reckoned at two hundred and forty. There is no *authoritative* standard. Make a "syren."—F. P. A.: Our business *at present* is with vocal music. The voice is the best instrument, and the easiest learnt. Learn *music* in connexion with the voice; the mere manipulation of an instrument easily follows. *The sequential system* we have carefully examined. We think some of its principles may, at a future time, be adopted generally, but not the whole as it now stands. See preface to the "Grammar" mentioned above.—SUBSCRIBER should write to Collard and Co., and to Broadwood and Co. (direction, London), inquiring the price of the cheapest piano they make. Mr. Sprague, of the Pavement, Finsbury, London, makes harmoniums in plain deal cases, very cheap and none the worse for the plain deal cases. We have pleasure in naming thus any man who cheapens music and musical instruments for the people.—J. J. (Wood-street) should use his German concertina in connexion with the solfa syllables, and not puzzle himself about the staff at present. See Lesson VIII. He can only play in the key of C, or, if he has a double instrument, in the keys of C and G. If he takes C for DOH, then, of course, ME will be E, and SOH G, &c. The earlier exercises may be sung in the key of C very well. They are written (on the staff) in the key of D.—Let NIL DESPERANDUM, "who loses his breath on the lower notes," attend steadily to our instructions on the management of the voice. Let him take the trouble of inquiring for himself, at the nearest music-shops, the cost of hiring pianos.—T. N. B. (Southgate): The English concertina is incomparably a better instrument for leading than the violin "*in the hands of a middling performer*."—A. E. (Thurso): "The old wine is the best." But our correspondent may yet be gratified by seeing *good* original songs in the EDUCATOR. Original songs are easy to get, but few are so good as those which have stood the test of years.—W. S. (Portsea): Hamilton's "Modern Instructions for the Pianoforte" (4s.) is so good a book for the purpose, that we need not name another. Even Cramer's, if we remember rightly, three times the price, would not take its place.—W. GALT, C. J. E. S., R. T. T., G. T. C.: The violin, of all instruments, most imperatively demands for you the instructions of a master; it requires to be so delicately and perfectly played. It is better not played at all than badly played. *With a master* you would probably use the instruction-books of Parry (4s.), Blagrove (8s.), or Loader (12s.). The price of Dr. Marx's great work on Composition and Harmony is one guinea.

Received: T. U. P.—W. NICHOLSON—J. HOUGH—BELL'S steno phonography from the author.—W. F. RANKINE (Seskanore).—W. D. (Southampton).—ENGLISH (St. Pancras): Smart's Walker is the best edition.—SOCIETY OF LITERARY FRIENDS (Exeter): We certainly advise them to buy all Cassell's publications, on account of their extraordinary cheapness; a list will be sent on application to this office.—AGRICOLA (Belfast) has made some mistakes which will disappear as he studies our Euclid.—CAROLUS (Manchester): In attempting to translate a Latin sentence, always look first for the *nominative*, then the *verb*, and then the *case* governed by the verb, which is generally the *accusative*, but sometimes the *dative*. In the sentence *amicorum fidei debemus salutem in adversis rebus*, you will look in vain for a nominative, because it is contained in the verb itself; you then look for the verb, which is *debemus*, then for the accusative, which is *salutem*; now translate: *we owe safety*; this is good English. Next, ask yourself: *to whom do we owe safety?* Look for the answer, and you find it in *fidei amicorum*, which means, *to the fidelity of friends*. Again, ask yourself: *in what circumstances, do we owe safety to the fidelity of friends?* Look for the answer, and you find it in the words *in adversis rebus*, which means *in adverse circumstances*. Now the whole sentence is translated into good English: *we owe safety to the fidelity of friends, in adverse circumstances*; or, more elegantly, *in adverse circumstances, we owe safety to the fidelity of friends*.

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LESSONS IN GEOGRAPHY.—No. X.

DISCOVERIES OF THE NINETEENTH CENTURY *(concluded)*.

The Russian Admiral Krusenstern, in 1804-5, made an exploratory voyage in Oceanica, which enlarged our hydrographical knowledge of the Pacific. In 1819, Bellinghausen revisited a part of the Polynesia, and made additions to some of the groups. About the same period, Freycinet discovered Rose Island, and solved some interesting questions relating to those distant seas. In 1823 and 1824, Captain Duperré made some additional discoveries in Polynesia, and re-explored the Papuan group and New Zealand. Captain Lütke, of the Imperial Russian Marine, who navigated the seas of Oceanica, discovered some new islands in the Caroline group, and Olimarau, between them and the Ladrone Islands. Recently, the French Commodore Laplace, of the frigate l'Artemise, and Captain Du Petit-Thouars, of the Venus, having navigated the Pacific in different directions; the former has explored the coasts of Arabia, and the latter, besides other countries, those of Kamtchatka, California, and Australia. The Russian Admiral, Krusenstern, also made additions to the geography of the Kurile Isles, the coasts of Japan, and the sea of Okhotsk. Captain Maxwell, of the suite of Lord Amherst, our ambassador to China, extended our knowledge of these Asiatic regions. The squadron under his command made several important discoveries in the Yellow Sea, particularly Sir James Hall's Islands. This expedition ascertained that the western coast of the peninsula of Corea had been placed on our maps greatly to the westward of its true position; and made known to the world a vast archipelago which no European had previously visited. Captain Maxwell also visited the Loo-Choo Islands, where he was only welcomed by feigning shipwreck, and seeking the assistance of the inhabitants.

The northern coasts of Asia having been previously imperfectly known, M. Gedenchtrom was commissioned to explore them in 1808; but his efforts were limited. Lieutenant, afterwards Admiral, Wrangell was charged to complete the exploration of these coasts, and to fill up the blanks which then existed in the maps of Siberia, by revisiting the most northern latitudes of these dreary regions. The object of this expedition was to examine the whole of the coast from Cape Chelagsk to Cape North, discovered by Cook to the west of Bhering's Straits, and to determine whether there existed in the vicinity of these capes an isthmus uniting Asia and America. This dangerous expedition occupied from 1820 to 1824. Beyond Cape Chelagsk, he discovered Cape Baranoff, and surveyed the coast from this cape to the mouth of the river Kolyma. He discovered that the hypothesis of the existence of land in this vicinity was unfounded; and he rectified and completed the geography of this part of the continent of Asia. In 1843, M. Middendorff successfully explored, in the midst of innumerable dangers, the coasts of the Frozen Ocean between Turukansk, the sources of the Khatounga, and Cape Taimoura. Traversing Siberia from north-west to south-west, he visited the coasts of the Sea of Okhotsk, and part of Tartary.

BAY OF AITAKOA, NEW ZEALAND.

Expeditions into the interior of Asia have, from time to

time, thrown great light on the geography of this part of the old world. We owe much of our knowledge of China to the Jesuit missionaries who laboured in that country; of the northern frontiers of this empire, to Klaproth, Timkowsky, De Humboldt, and Pierre de Tchihatcheff; of Thibet, to Turner; of the Himmalaya chain of mountains and the adjacent countries, to Lieutenant Webb, Captain Raper, Moorcraft, Colonel Crawford, M. Fraser, Victor Jacquemont, and Major Rennell. H. Pottinger made us acquainted with Beloochistan and Scinde; Elphinstone and Burnes with Afghanistan; Burnes with Bokhara; and M. Mouravief with Turcomania and Khiva. Persia has, at different periods, been visited by a number of able travellers, to whom we owe a knowledge of this country; as, Tavernier, Chardin, A. Jubert, Moorcraft, Morier, Frazer, Kerr Porter, Alexander, and Messrs. Coste and Flaudin. Of Arabia, we have gained information from Niebuhr, Burkhardt, and Rüppel.

After the travels of Sporrman, Shaw, Norden, Bruce, Le Vaillant, Mungo Park, and Horneman, which threw a flood of light upon the geography of Africa in the last century, we owe much to Adams, Tuckey, Bowditch, Mollien, Major Laing, and Messrs. Ritchie and Lyon in the present century. The necessity of bringing our introductory lessons to a close, permits us only to mention the labours of Messrs. Denham and Clapperton, and Dr. Oudney, in exploring the interior of this continent in 1822. When we look upon a modern map of Africa, all the geographical positions which are laid down in Bornou, round Lake Tchad, the lake itself, the direction of the course of rivers in this region, the rectification of the course of the Niger, and other topographical details, such as the position of mountains, &c., are due to the last mentioned travellers. Clapperton closed his successful career by reaching Sakkatoo from the gulf of Benin, and died in 1826, leaving his labours unfinished, after having accomplished the remarkable journey from Tripoli to Benin, and enriched geography with a vast collection of new and accurate discoveries. Timbuctoo, that singular object of African travellers, was reached by Major Laing in the same year, but at a later period, when he also paid the debt of nature. In 1830, Richard and John Lander undertook to resolve the problem of the direction of the Niger to the point where it had been traced by Park and Clapperton. They proposed to descend the river along its course from Boussa, where it had so far been traced, and to follow its course to the Atlantic Ocean, in order to ascertain its embouchure. After encountering many and great dangers they reached the sea by the central or principal branch of the Niger, which is the river called Nun, and which disembogues itself into the Atlantic between the bights of Benin and Biafra. Thus, the source of this river, as determined by Laing, was at the foot of Mount Loma, between Soulimana and Sangara. From this point to Timbuctoo its course was known; but the brothers Lander made it known from this town to the ocean, and resolved a part of the geographical problem which so long existed without a satisfactory solution. More recent explorations have been made in this continent, especially with regard to the source of the Nile; but we must hasten to the explanation of the different countries and states of the world, whose history is better known, and which are of more practical importance to the general reader. Our pupils may, perhaps, think that we have spent a longer time and space than was necessary on the history of geographical discovery; but when we consider that this is rarely attempted in the ordinary treatises on geography, we believe that the preceding lessons will be duly appreciated. In our next number, which will commence our second volume, we shall give some account of the earth as a globe, of the map of the world, with its divisions and geographical circles, and a map of Europe, which will form the subject of several succeeding lessons.

LESSONS IN FRENCH.—No. XXV.

By Professor Louis Fasquelle, LL.D.

Section LII.

The Imperfect (§ 119).

1. The imperfect or simultaneous past tense may be called the descriptive tense of the French. The action which it represents, or the situation which it describes, is imperfect of itself. This tense leaves the beginning, duration, and end of an action undetermined. It may often be rendered in English by the auxiliary *was*, &c., and the participle present of the verb [§ 119. 120] :—

J'écrivais ce matin quand vous êtes entré.	*I was writing this morning when you came in.*
Je passais hier quand vous m'appeliâtes.	*I was passing yesterday when you called me.*

2. The imperfect is also used to express an action which is customary or often repeated. It may then be rendered in English by the words *used to* placed before the verb :—

L'année dernière, j'allais tous les jours à l'école.	*Last year, I went (used to go) every day to school.*
Quand nous demeurions à la campagne, nous nous couchions ordinairement à neuf heures.	*When we were (used to be) in the country, we used to go to bed at nine o'clock.*

3. The imperfect can seldom be rendered in English by the past tense which takes *did** as an auxiliary. The past definite never corresponds in meaning to the English imperfect composed of the auxiliary "*was*," and the participle present. It cannot be rendered by the verb preceded by "*used to*."

J'allais à la chasse hier matin quand nous nous rencontrâmes.	*I was going a hunting yesterday morning when we met (did meet)*
J'allai à la chasse hier matin.	*I went (did go) a hunting yesterday morning.*

4. The imperfect is formed from the participle present, by changing *ant* into *ais*, &c. § 61. It may also be formed by adding *ais*, &c., to the stem of the verb for the 1st and 4th conjugations, *issais*, &c., for the 2nd, and *evais*, &c., for the 3rd.

5. Terminations of the Imperfect Tense of the four Conjugations.

Je	chant	-ais	fin	-issais	rec	-evais	rend	-ais
I	*was singing*		*was finishing*		*was receiving*		*was rendering*	
Tu	parl	-ais	chér	-issais	aperc	-evais	vend	-ais
Thou	*wast speaking*		*wast cherishing*		*wast perceiving*		*wast selling*	
Il	donn	-ait	fourn	-issait	perc	-evait	tend	-ait
He	*was giving*		*was furnishing*		*was gathering*		*was tending*	
Nous	cherch	-ions	pun	-issions	conc	-evions	entend	-ions
We	*were seeking*		*were punishing*		*were conceiving*		*were hearing*	
Vous	port	-iez	sais	-issiez	d	-eviez	perd	-iez
You	*were carrying*		*were seizing*		*were owing*		*were losing*	
Ils	aim	-aient	un	-issaient	dec	-evaient	mord	-aient
They	*were loving*		*were uniting*		*were deceiving*		*were biting.*	

Résumé of Examples.

Je chantais quand on m'apporta votre lettre.	*I was singing when they brought me your letter.*
J'aimais autrefois à lire les poètes anglais.	*I used to like formerly to read the English poets.*
J'étais dans votre chamber lorsque vous êtes entré.	*I was in your room when you came in.*
Je parlai hier toute la matinée.	*I spoke yesterday the whole morning.*
Je parlais hier à votre père, lorsque votre ami nous rencontra.	*I was speaking to your father when your friend met us yesterday.*
Je cherchais votre père.	*I was looking for your father.*

Exercise 103.

Autrefois, *formerly.*	Ecolier, m. *scholar.*	Presque pas, *almost none.*
Brun, e, *brown.*	Noir, e, *black.*	
Chambre, f *room.*	Mérit-er, 1. *to deserve.*	Retrouv-er, 1. *to find again.*
Crayon, m· *pencil.*	Pantoufle, f. *slipper.*	
Demeur-er, *to live, dwell.*	Parchemin, m. *parchment.*	Thème, m. *exercise.*
De nouveau, *again.*		Vert, e, *green.*

1. De qui parliez-vous ce matin quand je suis venu vous trouver? 2. Ma cousine parlait de son frère et je parlais du mien. 3. N'aimiez-vous pas mieux le bœuf que le mouton, autrefois? 4. J'aimais le bœuf, mais je n'ai jamais aimé le mouton. 5. Ne vendiez-vous pas beaucoup de livres, lorsque vous demeuriez à Paris? 6. J'en vendais beaucoup parceque j'étais libraire. 7. Le libraire a-t-il vendu beaucoup de crayons ce matin? 8. Il a vendu beaucoup de crayons aujourd'hui. 9. Vendiez-vous beaucoup de parchemin lorsque vous étiez libraire? 10. Je n'en vendais presque pas. 11. Votre frère portait-il un habit vert lorsqu'il demeurait à Londres? 12. Il portait un habit brun et des pantoufles noires. 13. Que cherchiez-vous? 14. Je cherchais mon livre. 15. Depuis quand l'aviez-vous perdu? 16. Je l'avais perdu depuis hier. 17. L'avez-vous retrouvé? 18. Je l'avais retrouvé, mais je l'ai

* Except when, in interrogative sentences, *did* is used as an auxiliary to *used to* expressed or understood.

perdu de nouveau. 19. Ce boulanger vous fournissait-il de bon pain? 20. Il nous en fournissait d'excellent. 21. Punissiez-vous souvent vos écoliers? 22. Je les punissais quand ils le méritaient. 23. Où étiez-vous ce matin quand je vous cherchais? 24. J'étais dans ma chambre. 25. Je finissais mon thême.

Exercise 104.

1. Who was at your house this morning? 2. My friend G. was there, and was looking for you. 3. Did you speak to my father yesterday? 4. I was speaking to him when they brought me your letter. 5. Did your father used to wear a white hat when he lived in London? 6. He use to wear a black hat, and my brother wore a black coat. 7. Were you singing when my father came? 8. No, Sir, I was finishing my exercise. 9. Had you lost your pencil this morning? 10. I had lost it, and was looking for it when you spoke to me. 11. You used to like reading (*la lecture*), did your sister (use to) like it also? 12. She liked it also. 13. What song were you singing this morning? 14. I was singing an Italian song. 15. Have you been afraid to speak to me? 16. I have never been afraid to speak to you. 17. Have you brought my book? 18. I have not brought it.

Section LIII.

The Imperfect (*continued*).

1. The imperfect of the indicative of every French verb, regular or irregular, ends in *ais, ais, ait, ions, iez, aient.*

2. No verb of the first conjugation, ER, is irregular in this tense.

3. The only irregularity found in the irregular verbs of the second conjugation, IR, is that, to form the imperfect, the stem of these verbs takes *ais*, &c., instead of *issais*: as, ven-ir, *je ven-ais*; cour-ir, *je cour-ais*; cueill-ir, *je cueill-ais*. Exception: Fuir, *to flee—je fuyais.*

4. The irregular verbs of the third conjugation, OIR, change that termination (oir) into ais, &c., like the regular verbs of the same; as, sav-oir, *je sav-ais*; av-oir, *j'av-ais*. Exceptions: se-oir, *to become*; voir, *to see*; and their compounds, and échoir [*see* § 62].

5. The changes which the stem of the irregular verbs of the fourth conjugation undergoes, in this tense, are too various to admit of a complete classification. We, however, offer the following:—

PRENDRE, *to take.*	ECRIRE, *to write.*	CRAINDRE, *to fear.*
Je pren -ais, etc.	écriv -ais, etc.	craign -ais, etc.
CONNAITRE, *to know.*	CONDUIRE, *to conduct.*	
Connais -ais, etc.	Conduis -ais, etc.	

6. Like prendre and écrire are conjugated, in this tense, those verbs in which *prendre* and *crire* appear in composition: as, comprendre, *je comprenais*; souscrire, *je souscrivais.*—Like craindre and connaître, those ending in *indre* and *aître*: teindre, *je teignais*; paraître, *je paraissais.*—Like conduire, those ending in *ire*: as, lire, *je lisais*; faire, *je faisais*; luire, *je luisais*; dire, *je disais*, &c.—Exceptions: rire, traire, écrire, and their compounds.

7. Mettre and its compounds, and être are regular in this tense.

8. The participle present, from which the French grammarians *derive* the imperfect, presents of course the same irregularities: as, venant, valant, prenant, écrivant, craignant, connaissant, conduisant. Exceptions: avoir, *ayant*; savoir, *sachant.*

Résumé of Examples.

De quoi notre ami avait-il peur?	*Of what was our friend afraid?*
Il n'avait peur de rien.	*He was afraid of nothing.*
N'aviez-vous pas besoin de mon frère?	*Did you not want my brother?*
Nous avions besoin de lui.	*We wanted him.*
Le marchand n'avait-il pas besoin d'argent?	*Did not the merchant want money?*
Il en avait grand besoin.	*He had great need of it.*
Quelle voiture conduisiez-vous?	*What carriage were you driving?*
Pour qui me preniez-vous?	*For whom were you taking me?*
Je venais vous trouver quand je vous rencontrai.	*I was coming to you when I met you.*
A qui écriviez-vous ce matin?	*To whom were you writing this morning?*
J'écrivais à ma sœur et à mon frère.	*I was writing to my sister and to my brother.*

Exercise 105.

Autrement, *otherwise.*	Oubli-er, 1. *to forget.*	Teind-re, 4. ir. *to dye.*
Cass-er, 1. *to break.*	Pêche, *f. fishing.*	Teinturier, m. *dyer.*
Chasse, *f. hunting.*	Peind-re, 4. ir. *to paint.*	Toile, *f. linen cloth.*
Dire, 4 ir. *to say.*	Reven-ir, 2. ir. *to return.*	Rencontr-er, 1 *to meet.*
Montre, *f. watch.*		Val-oir, 3 ir. *to be worth.*
Moins (au), *at least.*	Sav-oir, 3 ir. *to know.*	Ven-ir, 2. ir. *to come, to have just.*
Mort, e, *dead.*	Se tromp-er, 1. *to be mistaken.*	
Offens-er, *to offend.*		Vite, *quickly.*

1. Pourquoi n'écriviez-vous pas plus vite ce matin? 2. Parceque j'avais peur de me tromper. 3. Ne craigniez-vous pas d'offenser cette dame? 4. Je craignais de l'offenser, mais je ne pouvais faire autrement? 5. Que peigniez-vous ce matin? 6. Je peignais un tableau d'histoire. 7. Votre teinturier que teignait-il? 8. Il teignait du drap, de la soie et de la toile. 9. De quelle couleur les teignait-il? 10. Il teignait le drap en noir, et la soie et la toile en vert. 11. Conduisiez-vous le jeune Polonais à l'école lorsque je vous ai rencontré? 12. Je conduisais mon fils aîné à l'église. 13. Que lisiez-vous? 14. Je lisais des livres que je venais d'acheter 15. Ne saviez-vous pas que ce monsieur est mort? 16. Je l'avais oublié. 17. Combien la montre que vous avez cassée valait-elle? 18. Elle valait au moins deux cents francs. 19. Ne valait-il pas mieux rester ici que d'aller à la chasse? 20. Il valait beaucoup mieux aller à l'école. 21. Votre ami que vous disait-il? 22. Il me disait que son frère est revenu d'Espagne. 23. N'alliez-vous pas à la chasse tous le jours lorsque vous demeuriez à la campagne? 24. J'allais souvent à la pêche. 25. Mon frère allait tous les jours à l'école quand il était ici.

Exercise 106.

1. Were you afraid this morning when you came to our house? 2. I was afraid. 3. Of what were you afraid? 4. I was afraid of the horse. 5. Was not your friend afraid of falling? (*de tomber. See* Sect. 20, R. 2. 4.) 6. He was not afraid of falling, but he was afraid of making a mistake (*de se tromper. See* 2. *in Exercise above*). 7. Were you taking your son to school? 8. I was conducting him to school. 9. What colour was the dyer dyeing the silk? 10. He was dyeing some red and some green. 11. Was he dyeing his linen cloth black or green? 12. He was neither dyeing it black nor green, he was dyeing it pink (*rose*). 13. What was the gentleman reading? 14. He was reading a letter which he had just received. 15. Were you cold when you came here? 16. I was cold, hungry, and thirsty. 17. Were you not ashamed of your conduct (*conduite*)? 18. I was ashamed of it. 19. Whither were you going when I met you? 20. I was going to your house. 21. Were you driving your brother's carriage? 22. I was driving my own (*la mienne*). 23. Were you writing to me or to my father? 24. I was writing to your friend's cousin.

LESSONS IN GEOLOGY.—No. XIV.

By THOMAS W. JENKYN, D.D., F.G.S., &c.

CHAPTER I.

ON THE ACTION OF VOLCANOES ON THE EARTH'S CRUST.

SECTION IX.

ON SUBMARINE VOLCANOES.

THE subterranean fires that lie deep in the earth's crust, and cause the elevation of land described in the last lesson, act, not only on the rocks which are in the open air, but also on the beds which form the bottom of the sea. When the vents, which are formed by these interior fires, act beneath the waters of the ocean, they are called submarine volcanoes.

It had been long suspected that such volcanic phenomena were occasionally taking place in the bed of the sea. Officers and crews of vessels had frequently reported that, on their voyages, they had seen in different places sulphureous smoke, jets of flame, and spouts of water, rising up from the sea. In other places the waters of the ocean were found greatly discoloured, and appeared in violent agitation, as if boiling. At some points, shoals and reefs of rocks were observed as having just emerged, where, on a previous voyage, the water was known to have been many fathoms deep. These reports led scientific men to infer, that a power from below must be pro-

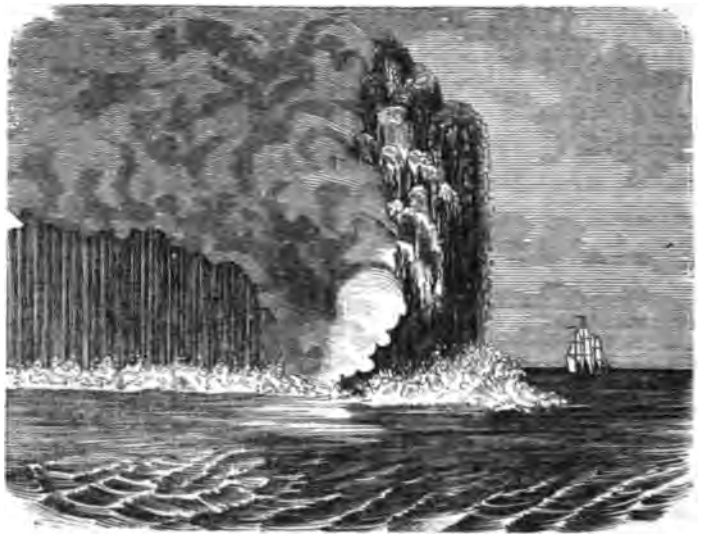
pelling the bottom of the sea upwards towards the surface. This philosophical conjecture or inference has been established by a copious variety of facts, in the formation of new islands above the waters of the ocean.

The first well-ascertained instance of an island being elevated by a submarine volcano, was that near St. Michael in the Azores. In the same neighbourhood, various eruptions had been known in the years 1638, 1691, and 1719; but in the year 1811, a most terrific earthquake was felt at St. Michael. For more than half a year previously several shocks had been felt, but on January 31st, the convulsions were at the height of violence. On February 1st, at a spot about two miles out at sea, from the village of Genites, volumes of sulphureous vapours were seen to rise out of the sea, which spread themselves in all directions. These were accompanied with jets of fire. At the same time, the wind carried volcanic ashes from the sea as far as the town of Ponta del Gada, 18 miles off, where they fell and covered the houses and the adjacent fields.

The columns of ashes and erupted materials, as they were rising from the sea, could be seen for many miles round, and appeared by night like pillars of fire. While these were rising, the sea boiled in terrible agitation.

In about eight days these eruptions ended, and the bottom of the sea was raised nearly to a level with the water. This was in a part of the sea which was known to be from 300 to 500 feet deep. On June 13th another earthquake announced the approach of another eruption, which broke out at the distance of two miles and a half from the other spot, a little to the west of Cape Pico das Camarinhas, and on the 17th it was at its greatest violence. Columns upon columns of ashes and smoke rose at intervals with fearful agitations, to the height of many hundred feet above the sea, and spread themselves out in thick clouds, which were rendered more terrible by frequent flashes of lightning.

Fig. 30.



Submarine Eruption, near St. Michael, in the Azores, 1811.

At the close of this eruption, an island became visible, and rose gradually to the height of three hundred feet. It had, at one end, a summit, in the form of a cone, and at the other, a deep crater, out of which violent flames of fire were gushing, though it was under water at full tide.

Captain Tillard, who was in the neighbourhood, visited the island, and called it, after the name of his ship, "Sabrina." He found its mass of ashes and cinders too hot for walking on it. He could see that when the tide returned, the sea flowed with tremendous violence into the burning crater, where the water was boiling as in a hot caldron. Through the continued eruptions of burning stones, sands, and ashes, from the crater, the conical hill already mentioned, on one side of the island, rose eventually six hundred feet above the sea. After all, in the last days of February, 1812, the entire island sank into the sea and completely disappeared. The annexed engraving (fig. 30) will assist you in imagining the appearance of these phenomena at sea.

In a former lesson it was mentioned that some of the cavities of subterranean fires must be of immense areas. This is proved by the fact that the reservoir of volcanic fires, which lies under the southern part of Italy, extends far and wide beneath the bed of the Mediterranean, and sometimes occasions the rise of fresh shoals and new islands in that sea.

In 1831, at a spot about thirty miles to the south-west of Sicily, a submarine volcano rose out of the sea, and formed an island. Before its appearance, it was well known that the depth of the sea at that place was 600 feet. The process of its rise was this. First, there were violent spoutings of steam and water from the bed of the sea, jetting sixty feet high. Then a small island of dry ground appeared with a burning crater in the centre of it. This crater ejected ashes, scoriæ, and thick volumes of smoke; and the whole sea around became covered with floating cinders and with shoals of dead fishes.

This volcanic island rose gradually till it reached the elevation of nearly 200 feet, with a circumference of about three miles at the base. In its centre was the crater, which was now a basin, six hundred feet in diameter, full of dingy red water in a boiling state, and continued so for three weeks.

This volcanic island continued above the sea for nearly three months, and then it sank gradually again into the sea. Before it began to sink, its circumference became much diminished by the continued action of the waves on all its sides. It appeared July 18, 1831. Towards the close of October, the whole was nearly on a level with the surface of the sea. After it disappeared, it left behind it a dangerous reef of hard volcanic rock just eleven feet under water, encompassed by shoals consisting of scoriæ and sand. Fig. 31 is a representation of its general appearance when at its highest elevation.

This little island received seven different names. It was well known by the name of Ferdinandea; but the name "Graham Island" has been fixed upon by both the Royal and the Geographical Societies.

I want you now to apply your geological knowledge to the investigation of this phenomenon. Here was a sea 600 feet deep, and here is an island raised, in a few weeks, 200 feet high. Here is, therefore, a quantity of land three miles in circumference, raised up to a total elevation of 800 feet in a very brief period. The shoals of dead fish, which were found in the volcanic sands around it, will explain similar facts which have been discovered in strata connected with volcanic districts. When the crater of this little island was ejecting mineral masses, it is probable that they would envelop some of the dead fish at the sea bottom, and that, when the erupted ashes fell again, both they and the fish which they contained were ingulfed in the bottom of the ocean. You can imagine that if ever this sea bottom will become elevated above the waters of the sea, and be explored by some future geologist or ichthyologist, the fossil fish of the Mediterranean, imbedded in volcanic tufa, will prove an important study.

Graham Island presents to you the advantage of having been carefully examined by scientific men. On this account, the study of its structure will much aid your inquiries into the volcanic formation of rocks. As much of the island as was visible was formed of loose incoherent materials, such as sand, scoriæ, pumice, &c., ejected from the crater. These loose materials, after having been hurled to a considerable height, fell again on each side of the central basin, and settled down in regular strata, as represented by the dark lines on the left and the right of fig. 31, and parallel to the deep inward slopes of the crater. But at some distance from the rims around the

crater, these fallen materials formed strata inclining outwards, as represented in fig. 32.

The section in fig. 32 represents an imaginary restoration of the island as represented in fig. 31. The dotted lines denote the upper parts of the cone, which surrounded the crater in the centre. All those parts, which were once visible, have been washed away by the denuding action of the sea. The strong lines represent the parts of the island, which are still under water. In the centre is a dyke of solid lava, one

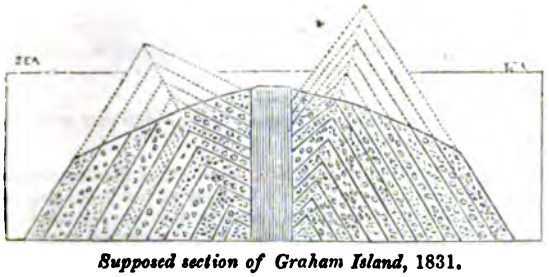
Fig. 31.

Graham Island, near Sciaccia, in 1831.

hundred feet in diameter, which has cooled in the vent of the crater, where it was once in a fused state. It is this solid lava that now forms the reef already mentioned as being eleven feet under water. This has withstood the action of the waves, while all the loose materials around it, represented by the dotted lines, have been washed away to a lower level.

The beds which have settled on it are formed some of sand, and some of stones and volcanic fragments. The stones which were ejected never exceeded a foot in diameter, and consisted of dolomitic limestone. At no time did the island present the appearance of any overflowing of lava from the crater. It is, nevertheless, possible that melted matter may have flowed out

Fig 32.



Supposed section of Graham Island, 1831.

from the flames of the cone, at some depth under water, as is often the case on land, and this flowing of lava may have spread in a broad sheet over the bed of the ocean, and enveloped some Mediterranean fish.

This reef furnishes an instance of what has been regarded by some as a geological paradox, in which the lava, which was the lowest part of the island while rising, and a part which scarcely rose to the level of the sea, is now become the highest point of the land.

These two islands, Sabrina, in the Azores, and Graham, in the Mediterranean, as being the most modern and the best examined, are instances sufficient to explain to you the phenomena of submarine volcanoes. I would, otherwise, have referred you to the rise of an island called Nyöe, on the coast of Iceland, during the tremendous eruption of Skaptar Jokul, which occurred in 1783; an island which afterwards disappeared: and to another which, in the form of a peak, with some low conical hills upon it, rose from the sea a little to the east of Kamtschatka. This island still remains.

Islands of this description are not always raised to their full elevation by a single paroxysm of volcanic power, but are raised by a succession of efforts which are repeated for months and years. Though the surfaces of these islands are formed much by the volcanic materials which are thrown up and fall again, there are instances in which they consist mainly of the rocks which had formed the bottom of the sea, the beds of which have been upheaved by the power from below. This is the case with an island called New Kameni, near Santorin, in the Grecian Archipelago, which was raised up in 1707, and is composed in great measure of limestone covered with shells.

LESSONS IN GERMAN.—No. XV

Section XXVIII.

Wo refers to the *place* where anything may be supposed to *exist* or *transpire*. Ex.: Wo iſt mein Meſſer? Where is my knife? Wo laufen die Kinder? Where (in what place) are the children running?

Da is used in answer to wo; that is, to *designate* some particular place; as, Da iſt es; da laufen ſie.

Hin denotes direction, or motion from the speaker; as, Warum laufen die Kinder hin? Why are the children running thither?

Her is the opposite, in signification, to hin; denoting motion or direction toward the speaker; as, Warum laufen die Kinder her? Why are the children running hither?

Hier signifies "in this place;" as, Warum bleiben die Kinder hier? Why do the children remain here?

These words are frequently compounded, one with the other; thus, from wo and hin; we have the compound wohin; from wo and her, woher; from da and hin, dahin; from da and her, daher, from hier and hin, hierhin; and from hier and her, hierher (sometimes contracted to hi.her). § 103. 3.

Examples of the use of wo, da, hin, her and hier *compounded.*

Wo reiſen unſere Freunde hin? oder,	Where do our friends travel to? or,
Wohin reiſen unſere Freunde?	Whither do our friends travel?
Sie reiſen dahin, wo ihre Verwandten wohnen.	They travel thither, where their relatives reside.
Wo kommen dieſe Zugvögel her? oder,	Where do these birds of passage come from? or,
Woher kommen dieſe Zugvögel?	Whence do these birds of passage come?
Sie kommen daher, wo es jetzt zu kalt für ſie iſt.	They come from (there) where it is now too cold for them.

Exercise 29.

Back'ſtube, *f.* bake-house;	Liegen, to lie;	Seiler, *m.* rope-maker;
Bald, soon;	Mütze, *f.* cap;	Sitzen, to sit;
Bil'dergallerie, *f.* picture-gallery;	Nirgends, no-where;	Springen, to spring, leap;
Froſch, *m.* frog;	Obgleich', although, notwithstanding;	Stehen, to stand;
Gans, *f.* goose;	O'pernhaus, *n.* opera-house;	Teich, *m.* pond;
Hin'gehen, to go away;	Ritter, *m.* knight;	Werkſtatt, *f.* work-shop;
Hirte, *m.* shepherd;	Schau'ſpieler, *m.* actor;	Wohin'? whither? what way?
Irgendwo, some-where;	Schon, already;	Zuck'erbäcker, *m.* confectioner.
Jetzt, now;	Schwager, *m.* brother-in-law;	
Kopf, *m.* head;	Schwimmen, to swim;	

Wo iſt das größte Glück, an dem Hofe eines tyran'niſchen Königs, oder in der Hütte eines zufrie'denen Tag'löhners?	Where is the greatest happiness, at the court of a tyrannical king, or in the cottage of a contented day-laborer?
Wo gehen Sie hin? an den Hof oder in die Hütte?	Whither do you go? to the court or into the cottage?
Der Feldherr ſitzt auf dem Pferde und reitet ruhig längſt den Reihen der Solda'ten hin und her.	The commander-in-chief upon the horse rides tranquilly along the ranks of the soldiers to and fro

Morgen reitet er mit seinen Schaaren auf das Schlachtfeld	To-morrow he rides with his troops to the battle-field.
In der Hoffnung finden die Unglücklichen Trost.	The unfortunate find consolation in hope.
Der Vater ist da, aber der Bruder ist in der Stadt.	The father is here, but the brother is in the city.
Ich gehe heute dahin, wohin ich schon gestern gehen wollte.	I go to-day (thither) where I wished (already) to go yesterday.

1. Wo ist der Schwager? 2. Er ist an dem (am) Tische. 3. Wo geht der Zuckerbäcker hin? 4. Er geht in die Backstube. 5. Wo ist sein Freund, der Schauspieler? 6. Er ist in dem Opernhause. 7. Wo geht sein Freund, der Seiler, hin? 8. Er geht in seine Werkstatt. 9. Wo ist der Hirte? 10. Er ist auf dem Berge. 11. Wo geht der Hirte hin? 12. Er geht auf den Berg. 13. Wo geht unser alter Nachbar hin? or, Wohin geht unser alter Nachbar? (§ 89. I.) 14. Er ist jetzt in dem kleinen Garten, aber er geht bald in den großen Garten. 15. Seine Frau ist in diesem Hause, aber sein Vetter geht in jene Bildergallerie 16. Ich stehe an dem (am) Fenster, und sie kommen ans (§ 4. 2) Fenster. 17. Der Ritter sitzt schon auf seinem guten Pferde, und der Knecht springt auch so eben auf sein gutes Pferd. 18. Der Mann sitzt am (§ 4. 2) Tische, und das Buch liegt auf dem Tische. 19. Ich habe keinen Hut auf dem Kopfe. 20. Wo geht der Soldat hin? 21. Die Soldaten gehen aufs (§ 4. 2) Feld; sie sind schon auf dem Felde. 22. Der Frosch springt in den Fluß und schwimmt in dem Flusse, und die Gans schwimmt in dem Teiche. 23. Ich habe diese Worte irgendwo gelesen. 24. Ich kann meine Mütze nirgends finden, obgleich sie irgendwo in diesem Zimmer sein muß.

1. Where is the picture-gallery of this town? 2. Where was that gentleman born[1]? 3. He was born in Bohemia. 4. Where does your friend, the actor, reside? 5. He resides in the city. 6. Whither do these emigrants go? 7. Whence do these immigrants come? 8. They come from France. 9. Where much is given, much is required. 10. Here the revenge[2] and whetted sword[4] of a traitor enter not[2];—beneath[5] the shade of this tree comes no king 11. He threw down the book before me. 12. Whither art thou going? 13. I am going to my brother-in-law. 14. Will these emigrants go to America. 15. No, they will stop here. 16. There is water in the pond. 17. Where does she come from? 18. She comes from Germany.

[1]geboren. [2]dringt nicht. [3]Rache. [4]gewetzte Dolch. [5]unter.

Exercise 30.

Aus'wanderer, *m.* emigrant;	Dahin ziehen, to proceed thither;	Italie'ner, *m.* Italian;
Bedien'te, *m.* servant;	Ein'wanderer, *m* immigrant;	Italie'nisch, Italian (adj.);
Bekann'te, *m.* acquaintance;	Englisch, English;	Nie, never;
Böhmen, *n.* Bohemia;	Euro'pa, *n.* Europe;	Spa'nien, *n.* Spain;
Bremen, *n.* Bremen;	Feldherr, *m.* commander-in-chief;	Spanisch, Spanish;
Dahin'gegen, to go thither;	Französisch, French;	Theil, *m.* part;
Dahin'reisen, to travel thither;	Fremde, *m.* stranger;	Venedig, *n.* Venice;
Dahin'schicken, to send thither;	Havre, *n.* Havre;	Wie viel? how much? how many?
	Hierher'kommen, to come hither;	Wohl, well.

1. Die Soldaten sind hier, und der Feldherr kommt auch hierher. 2. Der Feind ist schon da, und unsere tapfern Brüder müssen dahin ziehen. 3. Wann gehen sie nach Spanien? 4 Ich will gar (Sect. 15. III.) nicht dahin gehen, aber mein Vater will in nächster Woche dahin reisen. 5. Sind Sie schon da gewesen? 6. Nein, aber einer meiner Bekannten war da und will nie wieder dahin gehen 7. Wir gehen auf den Berg, wollen Sie mit uns gehen? 8. Will der Russe seinen Bedienten in die Stadt schicken? 9. Er hat ihn schon dahin geschickt. 10. Werden die Truppen hierher kommen? 11. Sie werden nicht hierher kommen. 12. Wo kommen diese Fremden her? 13. Sie sind Einwanderer und kommen aus Böhmen. 14. Ist dieses Schiff von Bremen oder Havre? 15. Es ist weder von Bremen, noch von Havre, es ist von Venedig. 16. Gehen diese französischen Einwanderer nach Milwaukee? 17. Ein Theil von ihnen geht dahin, die andern bleiben in New-York. 18. Die Einwanderer in Amerika sind Auswanderer aus Europa und aus andern Theilen der alten Welt. 19. Wann wollen Sie auf das Feld gehen? 20. Ich bin schon auf dem Felde gewesen, und kann nicht wieder dahin gehen, aber ich muß jetzt bald in den Garten gehen, denn mein Lehrer ist da und will mich sehen. 21. Warum will dieser Italiener nicht englisch sprechen? 22. Er wollte es wohl (Sect. 44. IV.) sprechen, aber er kann es noch nicht; er spricht nur italienisch und spanisch. 23. Wie viel Sprachen können Sie sprechen? 24. Ich spreche nur zwei, aber ich will noch andere lernen.

1. When did he live? 2. He lived in the fourteenth century[1]. 3. My friend told me he would never go there again[2]. 4. Do you go to Spain? 5. No, I shall not go thither. 6. The commander-in-chief has sent his troops where the danger was most[3]. 7. Is this ship from Spain or from Havre? 8. No, it is neither[4] from Spain nor[5] from Havre; it comes from Hamburg. 9. These immigrants are going to Milwaukee, and are emigrants from Bohemia and Venedig. 10 Can you leap over that gate[6]? 11. I could when I was young. 12. He bade[7] me to go thither that he might speak to me about it.

[1]im vierzehnten Jahrhundert. [2]wieder. [3]die meiste Gefahr. [4]weder. [5]noch. [6]Thor. [7]bat.

LESSONS IN GEOMETRY.—No. XI.

LECTURES ON EUCLID.

Definitions. Book I. From XIII. to XVIII. inclusive.

XIII.

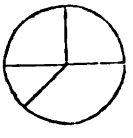
[A term or boundary is the extremity of any thing.] This definition is unnecessary, being merely verbal.

XIV.

A figure is that which is enclosed by one or more boundaries. This definition is applicable to solid figures, as well as to plane figures.

XV.

A circle is a plane figure contained [or, bounded] by one line, which is called the circumference, and is such that all straight lines drawn from a certain point within the figure to the circumference, are equal to one another. The circumference of a circle is its boundary. The space contained within the boundary, is called the circle.



XVI.

And this point is called the centre of the circle. The straight line drawn from the centre to the circumference, is called the radius.

XVII.

A diameter of a circle is a straight line drawn through the centre, and terminated both ways by the circumference.

XVIII

A semicircle is the figure contained by a diameter and the part of the circumference cut off by the diameter.

From the 14th definition it will appear that the diagrams of the preceding definitions, as well as those of a few subsequent definitions, and of many propositions in Euclid, are not to be considered as figures in the geometrical sense of the word. The common meaning of the term figure is, according to Johnson, as used by Addison, "something formed in resemblance of somewhat else." This definition applies to the use of the term figure as denoting diagrams, representations, or drawings of every kind; but it does not apply to the ideas formed in the mind of what are called geometrical figures, which are entirely creatures of the understanding.

With regard to the definition of a circle this has already been explained at some length in Lesson VIII. p. 277, and, therefore, it will only be necessary to advert to some additional particulars of importance relating to the circle. We find that geometers in general are not sufficiently precise in speaking of the circle; very often when they use this term they mean only the *circumference* of the circle, i.e., the outward boundary exclusive of the *space* contained within it. Now by the circle, as defined in the 15th definition, is meant the space contained within the boundary, and the boundary too; for we cannot conceive of space of a certain form without including its out-

line or contour in the idea. But we can conceive of the boundary of a circle, without the space contained within it, just as we can conceive of a ring without the finger which fills up the space within the ring. It is better, therefore, when the space is included in the idea of a circle, to use the term *circle* only; but when the outline or circumference only is meant to say the *circumference of the circle*. Here it may be added, that any part of the circumference of a circle is called an *arc*, a term evidently borrowed from its likeness to a *bow*, which in Latin is called *arcus*. In like manner, carrying out the analogy, the straight line which joins the extremities of an *arc* is called a *chord*, from the Latin *chorda*, a string; while the space included within the *arc* and its *chord* is called a *segment*, i. e., *a cutting*, from the Latin secare, *to cut*. As to the term *radius*, it is also taken from the Latin, in which it first signified a *rod* or staff, and then the *spoke* of a wheel, whence it came to be applied to the *straight line* drawn from the centre to the circumference. Then, as to the term *diameter*, this comes from the Greek, and signifies *a measuring off* or *through*, that is, the *greatest measure* of the circle, being right across the *centre*, which gives the fullest or truest measure of the circle; it is also applied to the straight line which joins the extreme points of any figure; and hence, metaphorically, to points or questions in metaphysics, which are exactly opposite to each other. Hence, the meaning of the emphatic expression, *diametrically opposite* to each other. From their definition it is plain that the *diameter* of a circle is *double* of its *radius*.

But the question may be asked—What is the ratio or proportion of the circumference to the diameter? At first sight, this question seems quite absurd; for what ratio can possibly exist between two things that are perfectly unlike? the diameter of a circle is a straight line; but the circumference of a circle is a curve line; therefore it does not appear that we can compare two such unlike things together,—that is, they have no ratio to each other; and, taking them as they actually exist in the circle, this is perfectly true. But if we say, supposing that the circumference of a circle were stretched out in a straight line to its full extent, just as we should do with a wire ring, by cutting it through in one part, and then stretching it out into a straight piece of wire; what would then be the proportion of the circumference thus stretched out, to the diameter of the circle? The question is easily put, but not so easily answered. Mechanics have, in all ages, fancied that they could reach the determination of this proportion by mechanical means; but from the days of Archimedes until now, they have signally failed; and that failure is simply owing to the nature of the thing. We can never compare the physical with the ideal; the mechanical operations of the finest arts, with the pure and simple abstractions of the mind. Even in the fine arts, there is an ideal beauty which no artist or connoisseur could ever reach; so in the mathematical sciences, there is an accuracy of ratio or proportion, which the finest instruments ever constructed, or ever to be constructed by man, can never attain. But ideas can reach it; mathematical expression can reach it; and yet it surpasses the simply arithmetical and practical. We can only approximate to this proportion by ordinary numbers; for, it is positively an infinite series of which the law cannot be expressed in the ordinary terms of the decimal notation. It is between $3\frac{10}{71}$ and $3\frac{1}{7}$ as found by Archimedes; that is, the circumference of a circle is less than $3\frac{1}{7}$ times the diameter and greater than $3\frac{10}{71}$ times the diameter. As $3\frac{1}{7}$ is the same as $3\frac{7}{7}$ or $\frac{22}{7}$, it is usually said that the ratio of the circumference to the diameter is that of $3\frac{1}{7}$ to 1, or of 22 to 7; in other words, that if the diameter of a circle be 1 foot, its circumference will be $3\frac{1}{7}$ feet; or if the diameter be 7 feet, the circumference will be 22 feet. This approximation is very well adapted for rough calculations, but it is not sufficiently accurate for many important purposes. It gives the circumference too large by rather more than 1 part when the diameter is divided into 800 parts; that is, if the diameter of a circle were 800 feet, the circumference found from the Archimedean proportion, would be rather more than 1 foot too much.

Many persons think that it is a very easy matter to determine this ratio. For instance, suppose, say they, that we take the crown of a hat, and measure it *right across*; well, perhaps this is 7 inches. Now take a string or tape and measure it *round*; well, perhaps this is found to be 22 inches. Here, then, is the proportion in question, what more do you want? it must be right, for we have measured. But, my good friends, measure as often as you like, and take more exact things than the crown of the hat, if you will; still this ratio is erroneous to the extent that we have said. And mind, that a small error in the circumference, leads to a greater error in the surface or area of the circle; and to still greater error in the cubic content of the sphere; for errors are increased by multiplication.

Seeing the necessity of being more accurate in regard to the ratio of the diameter to the circumference, Metius, a Dutch mathematician of the 17th century, discovered the proportion 113 : 355; that is, the diameter of a circle is to its circumference, very nearly as 113 is to 355. Besides its close approximation to the truth, this ratio is also easily remembered; for we have only to write the first three odd numbers in pairs, thus: 113355 and then divide them into triplets, thus, 113 : 355, and we have the ratio in question. The Hindoos, however, appear to have been early acquainted with a convenient approximation much used by us in the present day. In the *Ayeen Akberry*, or Institutes of Akbar, the diameter is said to be to the circumference as 1250 is to 3927; now if we multiply both terms of this ratio by 8, which does not alter its value or meaning, we have that of 10000 to 31416, or decimally that of 1 to 3·1416,—a very commonly used proportion. The meaning of this proportion is that the circumference is equal to 3 times the diameter and a part of the diameter, additional to this three times, denoted by the fraction $\frac{1416}{10000}$ or $\frac{177}{1250}$; this fraction again, means that if the diameter were divided into 10000 parts, we must add 1416 of these parts to 3 times its length to get the length of the circumference; or if the diameter were divided into 1250 parts, we must add 177 of these parts to three times its length to get the length of the circumference. The proportion of Metius, however, is really more accurate than the preceding; for it states that the circumference is 3 times the diameter, and a part of the diameter denoted by $\frac{16}{113}$; that is, if the diameter were divided into 113 parts, we must add 16 of these parts to three times its length to get the circumference. The following list of proportions will show the most important and useful approximations to the truth, the last being true to the lowest figure of the decimal, but capable of indefinite extension.

Authors.	*Original Ratios.*	*The Same in Decimals.*
Archimedes	7 : 22	1 : 3·142857142857+
Lambert	106 : 333	1 : 3·141509433962+
Hindoos	1250 : 3927	1 : 3·141600000000
Metius	113 : 355	1 : 3·141592920353+
Lambert	33102 : 103993	1 : 3·141592653011+
Lambert	33215 : 104348	1 : 3·141592653921+
Lambert	66317 : 208341	1 : 3·141592653467+
Wallis	$1 : 2\left(\frac{2^2}{1\cdot3}\cdot\frac{4^2}{3\cdot5}\cdot\frac{6^2}{5\cdot7}\cdot\frac{8^2}{7\cdot9}\ \&c.\right)$	1 : 3·141592653589+

In the latter ratio, that of Wallis, the series continues to infinity, the numerators of the fractions in the parenthesis being the series of the squares of the even numbers, and the denominators being the series of odd numbers reduplicated as factors in the denominators in the manner shown. The fractions in this series are continually approaching to the value 1, or unity. By comparing these ratios as reduced to their decimal values with the last, which is correct as far as it goes, the amount of error in each can be duly appreciated. Thus, in the case of that of Metius, it will be seen that his ratio makes the circumference too great by a little more than 1, or unity, when the diameter is 4 millions. This is what we call "being down upon the circle;" but we must delay the rest of our lesson on this subject till our next opportunity.

LESSONS IN ENGLISH.—No. XVI.

By JOHN R. BEARD, D.D.

PREFIXES (*concluded*).

Quadr, *quadra*, of Latin origin (quatuor, *four*), is found in *quadr*angle, *four-angled*; *quadr*uped (pes, Lat. *a foot*), *four-footed*; *quadr*uple (plica, Lat. *a fold*), *fourfold*; also *quater*, as in *quater*nion (quaternio, *the number four*), &c.

> "Aire and ye elements, the eldest birth
> Of Nature's womb, that in *quaternion* run,
> Perpetual circle, multiform; and mix
> And nourish all things." *Milton*, "Paradise Lost."

[redacted]

"In the yeare 1228, one Reginald was *vice*roy, or petie king of Man."—*Holinshed.*

Vicar (Lat. *vicarius*), comes from *vice*, and so denotes one *who is in the place of another*, hence a "vicarious sacrifice." How strange that Richardson, in his Dictionary, should have given out the idea that *vicar* could come from *vix* (*with difficulty*), "one to perform a work of difficulty."

"Nature, *the vicare* of the Almighty Lo·d,
That hote, colde, hevie, light, moist, and drie
Hath knit, by even number of accord,
In easie voice, began to speak and say." *Chaucer.*

"Then it was devised that, by their common seal (which is the tongue of their corporation), they might appoint a deputy or *vicar* to do it for them."—*Spelman*, "On Tythes."

Viscount is made up of the same prefix; that is, *vice;* and comes, Lat. *a companion*, in low Latin count or earl; so that viscount (pronounced vi'count) is the deputy, the lieutenant of the count or earl.

"The viscont, called either *procomes* or *vicecomes*, in time past, governed in the countie under the earle, but now without any such service or office; it is also become a name of dignity next after the earle, and in degree before the baron."—*Holinshed*, "Description of England."

Ultra, of Latin origin (ultra, *beyond*), is used in *ultra*marine (mare, Lat. *the sea*), properly beyond the sea; applied to colour, *fine blue.*

"Ultramarine or azure is a very light and a very sweet colour."—*Dryden*, "On Painting."

The blue colouring matter of the lapis-lazuli, or azure stone.

Vivi (Latin, vivus, *alive*) appears in *vivify*, *to make alive;* and in *vivi*parous (pario, Lat. *I bring forth*), bearing (its young) alive.

"The usual distinction of animals, with respect to their manner of generation, has been into the *ovi*parous (ovum, Lat. *an egg*) and *vivi*parous kinds; or, in other words, into those that bring an egg, which is afterwards hatched into life; and those that bring forth their young alive and perfect."—*Goldsmith*, "Animated Nature."

Un, of Saxon origin, *not*, reverses the meaning of the word to which it is prefixed, as *un*natural, *not natural*, the opposite of natural.

"Thus was I, sleeping, by a brother's hand,
Of life, of crowne, and queene at once dispatcht;
Cut off even in the blossomes of my sinne,
*Un*houzled, disappointed, *un*aneld."
Shakspeare, "Hamlet."

*Un*aneld is *unoiled*, not having received the oil of extreme unction; disappointed means *not prepared.* To *housel* is to minister the communion to one who is on his deathbed. *Housel* comes from the Saxon husel, *the host*, or sacrifice of "the sacrament of the Lord's supper."

Un, from the Latin unus, *one*, is exemplified in *un*animous (animus, Lat. *mind*), *of one mind;* in *uni*parous, bearing one at a birth; in *uni*son (sonus, Lat. *sound*), *one single sound;* in *uni*vocal (vox, Lat. *a voice*), *having one voice* or *meaning.* *Un*, of Saxon origin, has in some measure yielded to *in;* thus, for the old form *un*perfect we now say *im*perfect. "*Unpossible*" is quite obsolete.

Under, of Saxon origin, is found in such words as *under*sell, *under*prop, *under*value, *under*went. In the word *under*stand, the derivative or secondary meaning is very remote from its primitive; namely, *to stand under.* *Under*taker and *under*writer have, in process of time, come to have very special significations. *Under*taker, originally one who took on himself a certain duty, is at present applied to persons who are intrusted with the management of funerals; and *under*writers, properly signifying those who wrote (their names) *under* a legal document, in Latin, *subscriptor*, is a word limited to persons who render themselves liable in a policy of marine insurance.

Uni, of Latin origin (unus, *one*), occurs in unicorn (cornu, Lat. *a horn*), an animal with *one* horn; and *uni*form (forma, Lat. *form*), having *one* form.

Up, of Saxon origin, is found in *up*hill, *up*hold, *up*lift, *up*spring, *up*start, &c. *Upbraid* Richardson derives from a Saxon term not having the necessary import, and is in consequence obliged to twist his deductions into the most suitable shapes he can find. *Upbraid* comes from the classical Latin *opprobrium*, a reproach, through the low Latin word opprobrare, *to reproach.* The *up* in this case comes from the Latin *ob*, changed for the sake of euphony into *op* and *up.*

LESSONS IN LATIN.—No. XXIV.

By JOHN R. BEARD, D.D.

THE FOUR CONJUGATIONS.

SOME verbs of the third conjugation seem to partake of qualities of the verbs of the fourth. In the present tense the stem with the parts formed from it is strengthened by the vowel *i*, and so partly corresponds to the forms of the fourth conjugation The *i*, however, disappears before a consonant. I give a specimen in capio 3, *I take.*

ACTIVE VOICE.

		Indicative.	*Subjunctive.*	*Imperative.*	*Infinitive.*	*Participle.*
PRESENT.	*Sing.*	*capio*	*capiam*	[pito	capere	*capiens*
		capis	*capias*	cape, ca-		
		capit	*capiat*	capito		
	Plural.	capimus	*capiamus*	[pitote		
		capitis	*capiatis*	capite, ca-		
		capiunt	*capiant*	*capiunto*		
IMP.	*Sing.*	*capiebam*	caperem			
		&c.	&c.			
I. FUT.	*Sing.*	*capiam*				
		capies				
		&c.				

PASSIVE VOICE.

PRESENT.	*Sing.*	*capior*	*capiar*	[pitor		
		capĕris	*capiaris*	capere, ca-		
		capĭtur	*capiatur*	capitor		
	Plural.	capimur	*capiamur*	[pimnor		
		capimini	*capiamini*	capimini, ca-		
		capiuntur	*capiantur*	*capiuntor*		
IMP.	*Sing.*	*capiebar*	caperer			
		&c.	&c.			
I. FUT.	*Sing.*	*capiar*				
		capieris				
		&c.				

Thus conjugate cupio 3, *I wish, desire;* facio 3, *I do, make;* fodio 3, *I dig;* jacio 3, *I throw;* pario 3, *I bring forth;* rapio 3, *I plunder;* sapio 3, *I taste;* &c. dico 3, *I say;* duco 3, *I lead;* facio, *I do or make;* fero 3, *I bear;* the 2nd person singular of the imperatives of these four verbs, are respectively dic, duc, fac, fer.

Let it be again remarked, that the participles in *us* are declined like adjectives in *us*, thus:—

amatus, a, um	docturus, a, um
amati, ae, i	docturi, ae, i
amato, ae, o	docturo, ae, o
amatum, am, um, &c.	docturum, am, um, &c.

In all instances they must agree with their nouns. So also must the infinitive passive of the past tense, as eruditum esse, eruditam esse; eruditos esse, *to have been instructed*, the participle changing as the noun changes.

The participle future in *rus* is frequently used after a verb, denoting motion to point out the object or design; as, veniunt expugnaturi urbem, *they come with a view to capture the city.*

Besides the conjugations now set forth, there is another recognised by grammarians. This is called the Periphrastic Conjugation. It is called periphrastic (Greek, peri, *about;* and phrasis, *a speech*) because it is a kind of circumlocution; the changes of idea not being expressed by additions to the stem, as in the ordinary conjugations, but by two separate words. Thus such a conjugation or form is made by the participles and the several tenses of the verb esse, *to be;* e. g.,—

amans, amaturus, amatus, amandus
sum, eram, ero, fui, fueram, fuero

I supply the meanings of these forms:—

Amans sum, *I am loving;* the action proceeding and incomplete.

Amaturus sum, *I am about to love;* an intended and immediately future action.

ES IN THE LATIN

XVII.

-ENGLISH.

[illegible] if hope is great in the [illegible] great in thy mind? boys [illegible] the hope of hap- [illegible]. thou refreshest the [illegible] by vain hope, we are [illegible] uncertain and doubtful; [illegible]: thou oughtest to op- [illegible] thou oughtest to withstand [illegible] adversity; O human [illegible] of man! the mind of a [illegible].

-LATIN.

[illegible] [illegible] [illegible] est vana; spe animum [illegible]; fortium animos [illegible] animum animi adversis [illegible] reficitur; vir- [illegible]; conditionis [illegible] mittis.

-ENGLISH.

[illegible] [illegible] in the wretched- [illegible] are rare; to the [illegible] adversity: a true friend [illegible]: fidelity prepares [illegible] prepared for me; an [illegible] in the fidelity [illegible] sweet: the day flies [illegible] calls together the [illegible] a fixed day, my [illegible]: but are the days of the [illegible].

-LATIN.

[illegible]: [illegible] [illegible]: [illegible] non [illegible] amici? in [illegible] (ut [illegible] part) debemus [illegible] convocat; cito [illegible] constituta [illegible] venia expecto; [illegible].

-ENGLISH.

[illegible] [illegible] is unfaithful; the [illegible]: hunger and thirst [illegible] [illegible]: the king is [illegible] [illegible] of my father is re- [illegible] [illegible]. the generals have [illegible] all men; the stag [illegible] animal; here are vast [illegible] [illegible] of one incenses boys; men [illegible] always happy; the ice is [illegible] [illegible] all soldiers are brave; [illegible] [illegible] harbour is conveni- [illegible] [illegible] long and cold; a good [illegible] [illegible] age is often morose [illegible] [illegible] vast, deep, swelling; [illegible] [illegible] [illegible] Latin; dost thou not [illegible] [illegible] [illegible] fearful hares fly away; [illegible] [illegible] [illegible] a running; riches are un- [illegible] [illegible] [illegible], my words are hard; [illegible] [illegible] are not easily tilled in winter.

-LATIN.

[illegible] [illegible] [illegible] magnae divitiae, or magnae [illegible] sunt; expectatam amici- [illegible] [illegible] humus humida; acuti [illegible] [illegible] solum nunes; fortes sunt [illegible] [illegible] [illegible]

Page 154, col. 2—LATIN-ENGLISH.

Nothing is more suited to the nature of man than benevolence; nothing is more lovely than virtue; light is swifter than sound; nothing is better than wisdom; many men are more chattering than swallows; the poor are often more munificent than the rich; in adversity men are often more prudent than in prosperity; the life of the richest is often very miserable; the pretence of love is worse than hatred; nothing is better than reason; the sun is greater than the earth; the moon is less than the earth; the sage is the happiest of all men; Homer is the most ancient of all the Greek poets; flattery is a very great evil; the city of Syracuse (in Latin, the city Syracuse) is the greatest and most beautiful of all the Grecian cities; evil-speakers are very bad men; thy brothers are of all men the most given to evil speaking; in friendship, similarity of character has more power than relationship; thy sister is more amiable than mine.

Page 154, col. 3—ENGLISH-LATIN.

Nihil est pejus quam ameris simulatio; maximus est sol; sol major est quam luna; brevissima est hominum vita; divitissime saepe sunt infelicissimi; pauperrimi nonnunquam sunt felicissimi; labor est facilimus; meus labor facilior est quam tuus; mores hominum sunt dissimillim; rex est munificentissimus; pessimi non saepe sunt felices; boni sunt felicissimi; optimi sunt felicissimi; felicissimus omnium est Deus; optimi a pessimis nonnunquam contemnuntur; infirmissima est amicorum valetudo; patris hortus pulcherrimus est; filii hortus pulchrior est; difficilimus est labor; urbis muri sunt humillimi; patriam amant plurimi; nihil melius est quam virtus; portus est celeberrimus; Deus omnium est maximus, optimus et sapientissimus; Lacedemoniorum mores erant simplicissimi; velocissimus est equus; corvi sunt nigerrimi; pater tuus est benevolentissimus et munificentissimus; frater tuus domum pulcherrimam aedificat; pulcherrima domus aedificatur a fratre tuo; modestissimae esse debent virgines; soror tua modestur est quam frater; similis hominibis est simia; similissima ne est simia hominibus? Omnium animalium similissima hominibus est simia; nihil dulcius est quam amicitia; Lacedemonii fortissimi erunt; velocissima est lux; lux velocior est quam sonitus.

Page 165, col. 2.—LATIN-ENGLISH.

The soldiers fight bravely; do the soldiers fight bravely? do not the soldiers fight bravely? the Romans fight more bravely than their enemies; of Greece I think more and more; dost thou not think much on thy father; we every day more and more expect a letter; most desiringly thou lookest for the coming of thy mother; the country pleases (my) father every day more and more; thou art building a house well; does he build a house very well? the letter is very badly written; thy words sound badly; slaves think very ill concerning their master; girls labour more patiently than boys; very hidden dangers are avoided with very great difficulty; it is difficult to overcome the Greeks; the Greeks fight very bravely; sedition is put down more easily than war; the state is excellently administered; he boldly denies (it); the citizens inhabit the city in happiness.

Page 165, col. 2.—ENGLISH-LATIN.

Facile ne bellum sedatur? difficillime bellum sedatur; pugnet fortiter; fortius pugnant; fortissime pugnant Graeci; magnopere expectas veris adventum; a pueris puellisque omnibus cupidissime expectatur adventus veris; epistolam tuam in dies plus plusque expectant; male mala verba sonant; milites magis atque magis dimicant; occulta non facile evitantur; matres patientius quam filiae laborant; seditio feliciter sedatur; pulchre litteras scribit; Romani fortius quam Graeci pugnant; rus animum meum maxime delectat; multum ne animus tuus delectatur a rure? maxime cogito de domo mea, de fratribus et de sororibus; pessime administratur civitas a Romanis.

Page 166, col. 1.—LATIN-ENGLISH.

I sing, thou shoutest, the friend calls; we narrate, you dance, brothers labour; I weep, thou laughest, brother grieves; we teachers teach, you scholars learn; I play, thou learnest; sister paints with the needle, that is, embroiders; we write, you read, brothers paint; I leap, thou strikest, the boy sleeps; we masters instruct you, O pupils; you, O good pupils, attentively hear our precepts; virtues are equal among themselves (one to another); to command one's self is the greatest command; an angry man is not his own master; the pursuit (handling) of letters is salutary to us; truth is always pleasant to me.

Page 166, col. 2.—ENGLISH-LATIN.

Ego nato, tu saltas, frater laborat; nos cantámus, vos laborátis, amici saltant; ego, praeceptor doceo, vos, O discipuli, discitis; nos dolemus, tu pingis, juvenes feriunt; nos praeceptores non tentamus docere vos, O irati pueri; boni discipuli debent sibi imperare; imperare sibi est virtus; difficile est irato sibi imperare; irati non sunt apud se; imperium semper est tibi gratum; nonne gratum nobis est imperium? tibi haud mihi grata est veritas; veritas est salutaris tibi, mihi, nobis, omnibus.

Page 166, 2nd col.—LATIN-ENGLISH.

Vices creep on us under the name of virtues; we favour you, you do not favour us; thou lovest me, I love thee; my life is dear to me, thine (is dear) to thee; virtue always shines of itself (by its own light); the song delights us; (our) parents are loved by us; O my son, thou never obeyest me; (our) brother loves me and thee; I am nearest to myself; thou well commandest thyself; virtue is cultivated on its own account (for itself); virtue is sought for, for its own nature (for its own qualities); the citizens fight for their own heads (lives); the sage carries with him all his property; we rejoice with you on the return of (our) father; thou well contendest with thyself; God is with thee; often the mind is in discord (disagrees with itself); the enemies fight earnestly with us; thy speech is not is unison with thyself.

Page 166, col. 2—ENGLISH-LATIN.

Omnia mea mecum porto; secumne omnia sua portant sapientes? tu me amas, ego te amo; vita tua mihi est cara, mea tibi; mali semper secum discordant; tractatio litterarum gratissima est nobis; amant se se homines; amantne se se mulieres? pessime amant se se mali; per se pulchra est virtus; propter teipsum te amo; mea patria gratior est mihi quam tua tibi.

Page 166, col. 2.—LATIN-ENGLISH.

Every nature is preservative of itself; a wonderful desire for the city, for my friends, and for thee holds (possesses) me; thy father is very much delighted by thy remembrance of him; anger has no power over itself; a wise man has always power over himself; care for you makes me uneasy; all men are kind judges of themselves; thy recollection of us is exceedingly pleasant to me; the friend is mindful of me and of thee; (our) father in his absence is held by a great longing after me, and after you, my brother, and after you, O sisters; (our) friends are mindful of us; many of you please me; very many of us greatly love thee.

(To be continued.)

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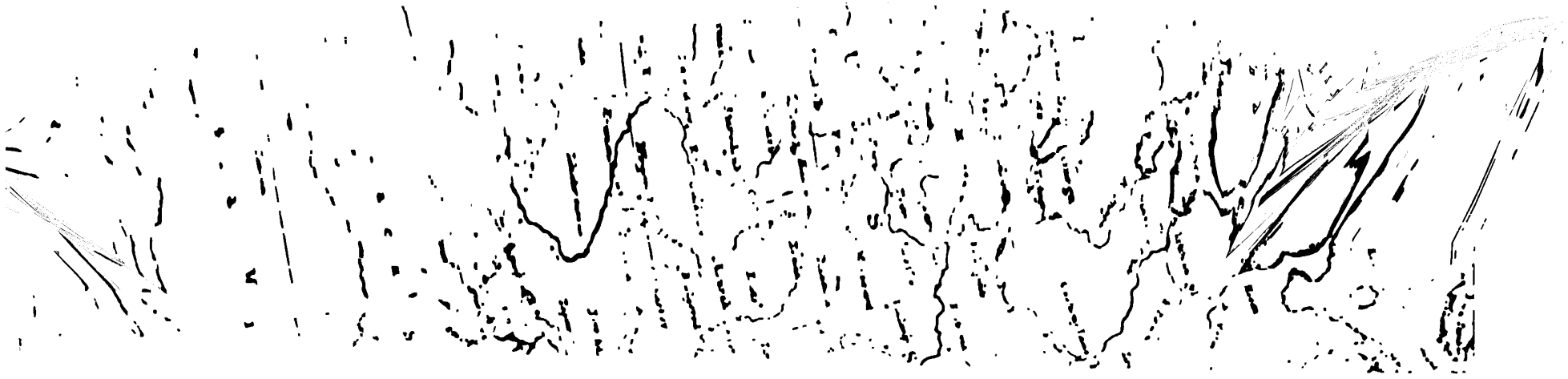
ERRATA CORRECTED.—Latin 112, 128, 160, 176, 192, 256, 336, 412; Geometry, 176; Arithmetic 208, 412; French 224, 272, 336, 412.

ERRATA IN SOME COPIES.

p.	13	col.	1	line 23	*for* were	*read* was.
„	21	„	„	„ 57	*for* am	*read* are.
„	71	„	2	last line	*for* f ample	*read* f. ample.
„	72	„	1	line 25	*for* f. libera	*read* f. liberae.
„	84	„	1	16	*for* XIII.	*read* XII.
„	94	„	1	line 4 from bottom *for* 1	*read* 8
„	103	„	1	line 18 from bottom *for* matre	*read* matri.
„	122	„	1	„ 34 from top *for* $(a \times b)$	*read* $(a+b)$.
„	„	„	2	„ 28 „ *for* bd	*read* 2bd.
„	136	„	2	„ 7 „ *for* A	*read* C.
„	304	„	2	„ 9 from bottom *for* all	*read* half.
„	320	„	1	„ 36 and 37 from top *for* ax^{n+1}	*read* x^{n+1}.



EUROPE.

BOUNDARIES.

NORTH: The Arctic Ocean.
SOUTH: The Mediterranean, &c
EAST: Asia and the Caspian.
WEST: The Atlantic Ocean.

NORTHERN DIVISIONS.

Countries.	*Capitals.*
NORWAY,	Christiana.
SWEDEN,	Stockholm.
DENMARK,	Copenhagen.
RUSSIA,	Petersburg.

MIDDLE ISLANDS.

GREAT BRITAIN AND IRELAND.

Countries.	*Capitals.*
ENGLAND,	London.
SCOTLAND,	Edinburgh.
IRELAND,	Dublin.

MIDDLE DIVISIONS.

Countries.	*Capitals.*
FRANCE,	Paris.
GERMANY,	Frankfort.
AUSTRIA,	Vienna.
(HUNGARY),	(Pesth).
PRUSSIA,	Berlin.
HOLLAND,	Amsterdam.
BELGIUM,	Brussels.
(POLAND),	(Warsaw).
SAXONY,	Dresden.
BAVARIA,	Munich.
HANOVER,	Hanover.
WURTEMBERG,	Stuttgard.
BADEN,	Carlsruhe.
HESSE,	Cassel.
SWITZERLAND,	Berne.

FREE CITIES.

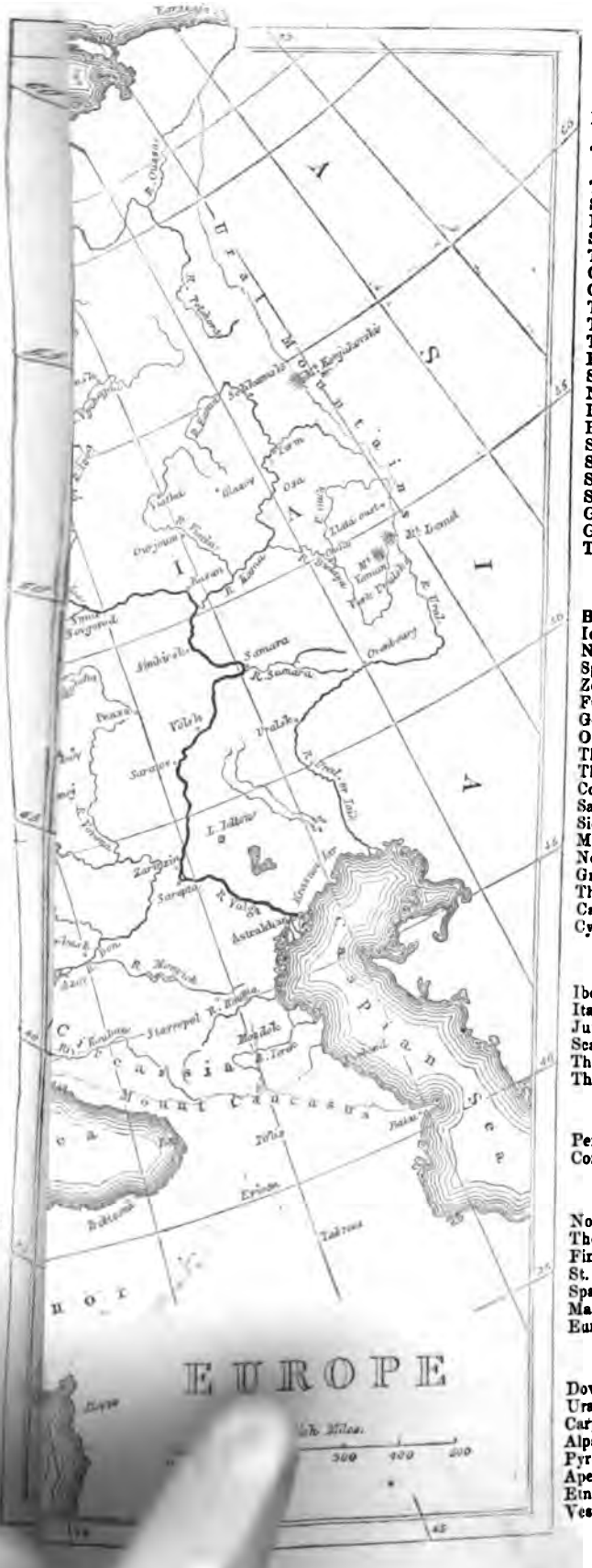
HAMBURG,	LUBECK.
BREMEN,	FRANKFORT.

SOUTHERN DIVISIONS.

Countries.	*Capitals.*
SPAIN,	Madrid.
PORTUGAL,	Lisbon.
TURKEY,	Constantinople.
GREECE,	Athens.

ITALIAN STATES.

SARDINIA,	Turin.
(LOMBARDY),	(Milan).
(VENICE),	(Venice).
TUSCANY,	Florence.
POPEDOM,	Rome.
NAPLES,	Naples.
MODENA,	Modena.
LUCCA,	Lucca.
SAN MARINO,	S. Marino.



EUROPE.

SEAS, STRAITS, AND GULFS.

White Sea, N. of Russia.
The Baltic, N. of Germany.
North Sea, or German Ocean, E. of Britain.
The Adriatic, or Gulf of Venice, Mediterranean.
The Archipelago, Mediterranean.
Sea of Marmora, S. of Turkey.
Black Sea, E. of Turkey.
Sea of Azof, S. of Russia.
The Caspian, S. of Russia.
Gulf of Bothnia, Baltic.
Gulf of Finland, Baltic.
The Skager Rack, Baltic.
The Kattegat, Baltic.
The Sound, Baltic.
English Channel, S. of England.
St. George's Channel, Irish Sea.
North Channel, N. of Ireland.
Irish Sea, Isle of Man.
Bay of Biscay, W. of France.
Straits of Gibraltar, Mediterranean.
Straits of Dover, English Channel.
Straits of Messina, E. of Sicily.
Straits of Bonifacio, S. of Corsica.
Gulf of Genoa, S. of K. of Sardinia.
Gulf of Taranto, S. of Italy.
The Levant, E. of Mediterranean.

ISLANDS.

British Islands, N. Atlantic.
Iceland, Arctic Circle.
Nova Zembla, Arctic Ocean.
Spitzbergen, Arctic Ocean.
Zealand, Kattegat.
Funen, W. of Zealand.
Gothland, Baltic.
Oland, Baltic.
The Azores, N. Atlantic.
The Balearic Isles, E. of Spain.
Corsica, S. of K. of Sardinia.
Sardinia, S. of Corsica.
Sicily, S. of Italy.
Malta, S. of Sicily.
Negropont, Archipelago.
Greek Isles, Archipelago.
The Ionian Isles, W. of Greece.
Candia, S. of Greece.
Cyprus, the Levant.

PENINSULAS.

Iberia—Spain and Portugal.
Italy—Tuscany, Popedom, Naples
Jutland—Denmark.
Scandinavia—Sweden and Norway
The Morea—Greece.
The Crimea—Russia.

ISTHMUSES.

Perecop, N. of Crimea.
Corinth, N.E. of Morea.

CAPES.

North Cape, Lapland.
The Naze, S. of Norway.
Finisterre, W. of Spain.
St. Vincent, S. of Portugal.
Spartivento, S. of Italy.
Matapan, S. of Morea.
Europa Point, Gibraltar.

MOUNTAINS.

Dovrefeld, Norway.
Ural, Russia.
Carpathian, Hungary.
Alps, N. of Italy.
Pyrenees, France.
Apennines, Italy
Etna, Sicily.
Vesuvius, Naples.

ASIA.

BOUNDARI

NORTH: The Arct

SOUTH: The India

EAST: The Pacific

WEST: Europe, nean, etc.

GREAT DIVI

Countries.

RUSSIA,
TURKEY,
ARABIA,
PERSIA,
AFGHANISTAN,
BELOOCHISTAN,
W. TARTARY,
E. TARTARY,
THIBET,
HINDOSTAN,
CHINA,
COREA,
BIRMAH,
SIAM,
ANNAM,

CHIEF ISL

Names.

CEYLON,
EAST INDIES,
PHILIPPINES,
JAPAN,

PENINSU

Asia Minor, in T
Arabia, E. of Re
India, S.E. of the
Malaya, S. of Sia
Corea, E. of Yell
Kamchatka, E. o

ISLAN

Laccadives, W stan.
Maldives, S. of I
Ceylon, S. of Hi
Andaman, Bay c
Nicobar, S. of A
Sumatra, S. W.
Java, S. E. of S
Borneo, E. of S
Celebes, E. of I
Moluccas, E. of
Philippines, N.
Hainan, S. of C
Formosa, N. of
Loo-choo, N.E.
Japan Isles, E.
Kuriles, N. of Ja
Sagalien, Sea of
Aleutian, Sea of

ASIA.

OCEANS, SEAS, GULFS, ETC.

Black Sea, N. of Turkey.
Caspian Sea, S. of Russia.
Red Sea, W. of Arabia.
Persian Gulf, E. of Arabia.
Sea of Aral, N. of Turkestan or Tartary.
Arabian Sea, S.W. of India or Hindostan.
Gulf of Manaar, E. of Ceylon.
Indian Ocean, S. of India.
Bay of Bengal, S.E. of India.
Chinese Sea, S. of China.
Gulf of Siam, S. of Siam.
Gulf of Tonquin, E. of Annam.
Celebes Sea, N. of Celebes.
Java Sea, N. of Java.
Yellow Sea, E. of China.
Sea of Japan, W. of Japan.
Sea of Ochotsk, S. of Siberia.
Sea of Kamchatka, E. of Siberia.
Pacific Ocean, E. of Asia.
Arctic Ocean, N. of Asia.

STRAITS.

Bab el Mandeb, Red Sea.
Ormus, Persian Gulf.
Palk's, N. of Ceylon.
Malacca, W. of Malaya.
Sunda, S. E of Sumatra.
Buering's, E. of Siberia.

ISTHMUSES.

Suez, N. of Red Sea.
Kraw, N. of Malaya.

CAPES.

Baba, Asia Minor.
Comorin, S. of India.
East Cape, E. of Siberia.
Severo-Vostocknoi, N. of Siberia.

MOUNTAINS.

Himalayan, N. of India.
Eastern Ghauts, Hindostan.
Western Ghauts, Hindostan.
Altaian, S. of Siberia.
Caucasus, Russia.
Beloor, Tartary.
Ararat, Armenia.
Lebanon, Syria.
Taurus, Asia Minor.

AFRICA.

BOUNDARIES.

NORTH: The Mediterranean.
SOUTH: S. Atlantic Ocean.
EAST: Red Sea, Indian Ocean.
WEST: The Atlantic Ocean.

DIVISIONS.

(ANCIENT AFRICA.)

Countries.	*Chief Towns.*
LOWER EGYPT,	Alexandria.
MIDDLE EGYPT,	Gnd. Cairo.
UPPER EGYPT,	Girgeh.
LOWER NUBIA,	Derr.
UPPER NUBIA,	Sennaar.
ABYSSINIA.	Gondar.

(NORTH AFRICA.)

MOROCCO,	Morocco.
ALGERIA,	Algiers.
TRIPOLI,	Tripoli.
TUNIS,	Tunis.
BELAD EL GERID,	Gardeia.

(CENTRAL AFRICA.)

FEZZAN,	Mourzook.
SAHARA,	Tarassa.
W. SOUDAN,	Timbuctoo
E. SOUDAN,	Saccatoo.

(WEST AFRICA.)

SENEGAMBIA,	Fort Goree
SIERRA LEONE,	Freetown.
LIBERIA,	Monrovia.
ASHANTEE,	Comassie.
DAHOMEY,	Abomey.
BRITISH GUINEA	Cape Coast Castle.
DUTCH GUINEA,	El Mina.
ANGOLA,	St. Paul de Loando.
BENGUELA,	St. Philip de B.

(SOUTH AFRICA.)

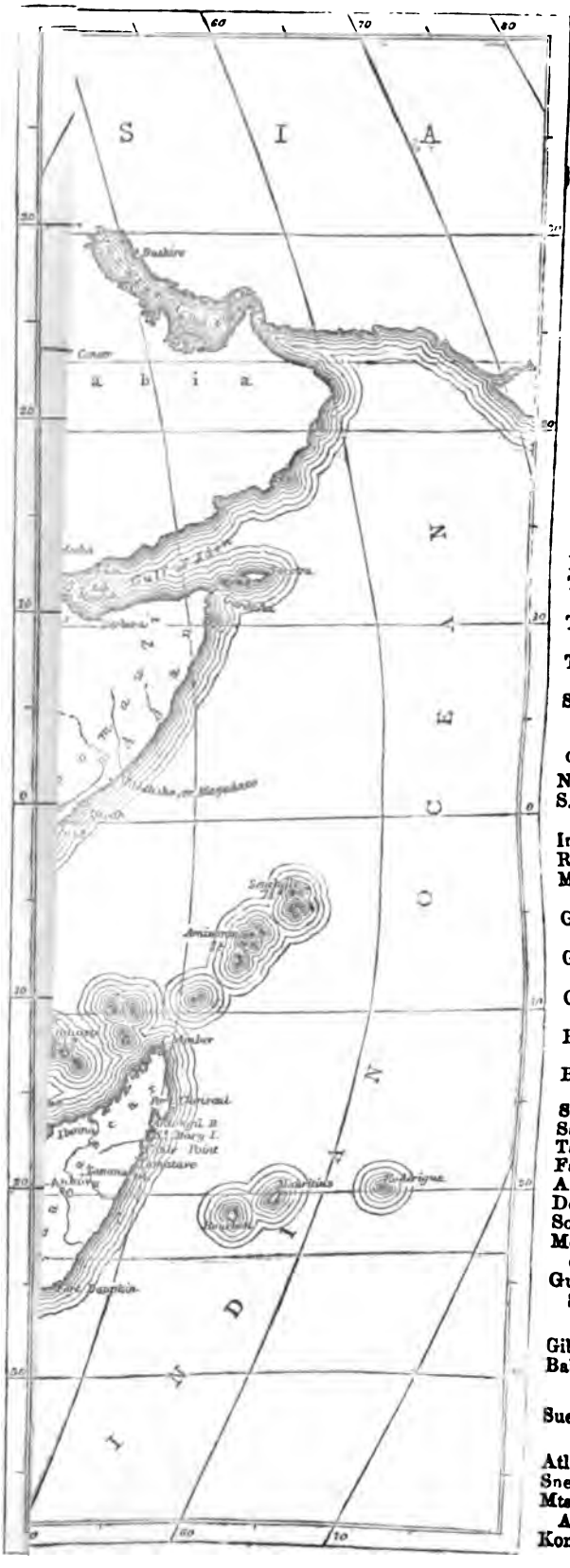
CAPE COLONY,	Cape Town.
CAFFRARIA,	Natal.
BETCHUANAS,	Lattakoo.

(EAST AFRICA.)

SOFALA,	Sofala.
MOZAMBIQUE,	Mozambique.
ZANGUEBAR,	Magadoxa.
AJAN,	Berbera.

CAPES.

Bon, Tunis.
Spartel, Morocco.
Pajador, W. of Africa.
Blanco, W. of Africa.
Verde, Senegambia.
Palmas, Guinea.
Three Points, Guinea.
Negro, Benguela.
Good Hope, False Bay.
Agulhas, E. of Cape of Good Hope.
Natal, Caffraria.
Corrientes, Sofala.
Delgado, Zanguebar.
Guardafui, Ajan.



AFRICA.

ISLANDS.

Madeira, W. of Morocco.
Porto Santo, N.E. of Madeira.
The Canaries, S. of Madeira.
The Cape Verde, W. of Cape Verde.
Ascension, S. of Sierra Leone.
St. Helena, S.E. of Ascension.
Fernando Po, Bight of Biafra.
Prince's Island, S. of Fernando Po.
St. Thomas, S. of Prince's Island.
Annabona, S. of St. Thomas.
Madagascar, E. of Sofala.
Bourbon, E. of Madagascar.
Mauritius, N.E. of Bourbon.
Rodrigue, E. of Mauritius.
The Comoro, N.W. of Madagascar.
The Amirante, N.E. of Madagascar.
The Seychelle, N.E. of Amirante.
Socotra, E. of Cape Guardafui.

OCEANS, SEAS, GULFS, &c.

N. Atlantic, W. of Africa.
S. Atlantic, W. and S. of Africa.
Indian Ocean, E. of Africa.
Red Sea, E. of Africa.
Mediterranean, N. of Africa.
Gulf of Sidra, Mediterranean.
Gulf of Cabes, Mediterranean.
Gulf of Guinea, S. of Guinea.
Bight of Benin, Gulf of Guinea.
Bight of Biafra, Gulf of Guinea.
St. Helena Bay, Cape Co.
Saldana Bay, Cape Colony.
Table Bay, Cape Town.
False Bay, Cape of G. Hope.
Algoa Bay, Cape Colony.
Delagoa Bay, N. of Natal.
Sofala Bay, Sofala.
Mozambique Channel, E. of Sofala.
Gulf of Aden, S.E. of Red Sea.

STRAITS.

Gibraltar, Mediterranean.
Bab el Mandeb, Red Sea.

ISTHMUS.

Suez, Red Sea.

MOUNTAINS.

Atlas, Morocco.
Sneuwberg, Cape Colony.
Mts. of Moon, Central Africa.
Kong, S. of Soudan.

AFRICA.

BOUNDARIES.

NORTH: The Mediterranean.
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DIVISIONS.

(ANCIENT AFRICA.)

Countries.	*Chief Towns.*
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UPPER NUBIA,	Sennaar.
ABYSSINIA.	Gondar.

(NORTH AFRICA.)

MOROCCO,	Morocco.
ALGERIA,	Algiers.
TRIPOLI,	Tripoli.
TUNIS,	Tunis.
BELAD EL GERID,	Gardeia.

(CENTRAL AFRICA.)

FEZZAN,	Mourzook.
SAHARA,	Tarassa.
W. SOUDAN,	Timbuctoo
E. SOUDAN,	Saccatoo.

(WEST AFRICA.)

SENEGAMBIA,	Fort Goree
SIERRA LEONE,	Freetown.
LIBERIA,	Monrovia.
ASHANTEE,	Comassie.
DAHOMEY,	Abomey.
BRITISH GUINEA	Cape Coast Castle.
DUTCH GUINEA,	El Mina.
ANGOLA,	St. Paul de Loando.
BENGUELA,	St. Philip de B.

(SOUTH AFRICA.)

CAPE COLONY,	Cape Town.
CAFFRARIA,	Natal.
BETCHUANAS,	Lattakoo.

(EAST AFRICA.)

SOFALA,	Sofala.
MOZAMBIQUE,	Mozambique.
ZANGUEBAR,	Magadoxa.
AJAN,	Berbera.

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Blanco, W. of Africa.
Verde, Senegambia.
Palmas, Guinea.
Three Points, Guinea.
Negro, Benguela.
Good Hope, False Bay.
Agulhas, E. of Cape of Good Hope.
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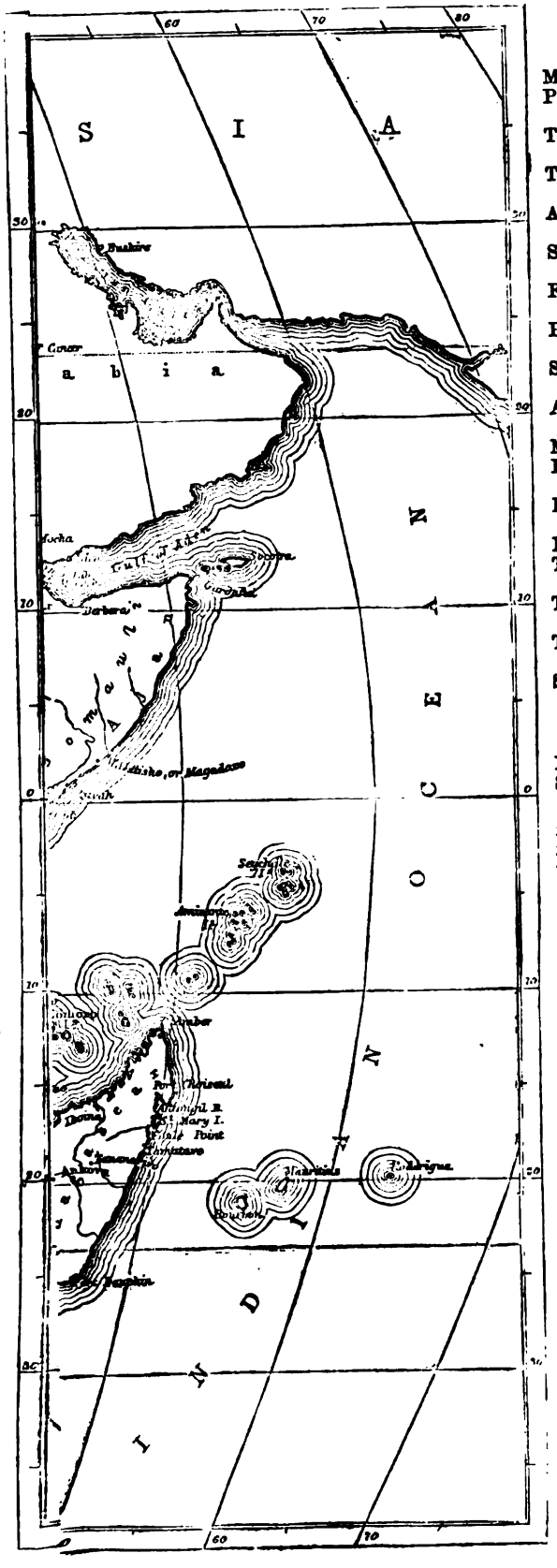
Corrientes, Sofala.
Delgado, Zanguebar.
Guardafui, Ajan.



AFRICA.

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St. Helena, S.E. of Ascension.
Fernando Po, Bight of Biafra.
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St. Thomas, S. of Prince's Island.
Annabona, S. of St. Thomas.
Madagascar, E. of Sofala.
Bourbon, E. of Madagascar.
Mauritius, N.E. of Bourbon.
Rodrigue, E. of Mauritius.
The Comoro, N.W. of Madagascar.
The Amirante, N.E. of Madagascar.
The Seychelle, N.E. of Amirante.
Socotra, E. of Cape Guardafui.

OCEANS, SEAS, GULFS, &c.

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S. Atlantic, W. and S. of Africa.
Indian Ocean, E. of Africa.
Red Sea, E. of Africa.
Mediterranean, N. of Africa.
Gulf of Sidra, Mediterranean.
Gulf of Cabes, Mediterranean.
Gulf of Guinea, S. of Guinea.
Bight of Benin, Gulf of Guinea.
Bight of Biafra, Gulf of Guinea.
St. Helena Bay, Cape Co.
Saldana Bay, Cape Colony.
Table Bay, Cape Town.
False Bay, Cape of G. Hope.
Algoa Bay, Cape Colony.
Delagoa Bay, N. of Natal.
Sofala Bay, Sofala.
Mozambique Channel, E. of Sofala.
Gulf of Aden, S.E. of Red Sea.

STRAITS.

Gibraltar, Mediterranean.
Bab el Mandeb, Red Sea.

ISTHMUS.

Suez, Red Sea.

MOUNTAINS.

Atlas, Morocco.
Sneuwberg, Cape Colony.
Mts. of Moon, Central Africa.
Kong, S. of Soudan.

ASIA.

BOUNDARI

NORTH: The Arct

SOUTH: The India

EAST: The Pacific

WEST: Europe, nean, etc.

GREAT DIVI

Countries.

RUSSIA,
TURKEY,
ARABIA,
PERSIA,
AFGHANISTAN,
BELOOCHISTAN,
W. TARTARY,
E. TARTARY,
THIBET,
HINDOSTAN,
CHINA,
COREA,
BIRMAH,
SIAM,
ANNAM,

CHIEF ISL

Names.

CEYLON,
EAST INDIES,
PHILIPPINES,
JAPAN,

PENINSU

Asia Minor, in T
Arabia, E. of Re
India, S.E. of th
Malaya, S. of Sia
Corea, E. of Yell
Kamchatka, E. o

ISLAN

Laccadives, W. stan.
Maldives, S. of I
Ceylon, S. of Hi
Andaman, Bay o
Nicobar, S. of A
Sumatra, S. W.
Java, S. E. of S
Borneo, E. of S
Celebes, E. of
Moluccas, E. of
Philippines, N.
Hainan, S. of C
Formosa, N. of
Loo-choo, N.E.
Japan Isles, E.
Kuriles, N. of J
Sagalien, Sea of
Aleutian, Sea of

ASIA.

OCEANS, SEAS, GULFS, ETC.

Black Sea, N. of Turkey.
Caspian Sea, S. of Russia.
Red Sea, W. of Arabia.
Persian Gulf, E. of Arabia.
Sea of Aral, N. of Turkestan or Tartary.
Arabian Sea, S.W. of India or Hindostan.
Gulf of Manaar, E. of Ceylon.
Indian Ocean, S. of India.
Bay of Bengal, S.E. of India.
Chinese Sea, S. of China.
Gulf of Siam, S. of Siam.
Gulf of Tonquin, E. of Annam.
Celebes Sea, N. of Celebes.
Java Sea, N. of Java.
Yellow Sea, E. of China.
Sea of Japan, W. of Japan.
Sea of Ochotsk, S. of Siberia.
Sea of Kamchatka, E. of Siberia.
Pacific Ocean, E. of Asia.
Arctic Ocean, N. of Asia.

STRAITS.

Bab el Mandeb, Red Sea.
Ormus, Persian Gulf.
Palk's, N. of Ceylon.
Malacca, W. of Malaya.
Sunda, S. E. of Sumatra.
Buering's, E. of Siberia.

ISTHMUSES.

Suez, N. of Red Sea.
Kraw, N. of Malaya.

CAPES.

Baba, Asia Minor.
Comorin, S. of India.
East Cape, E. of Siberia.
Severo-Vostocknoi, N. of Siberia.

MOUNTAINS.

Himalayan, N. of India.
Eastern Ghauts, Hindostan.
Western Ghauts, Hindostan.
Altaian, S. of Siberia.
Caucasus, Russia.
Beloor, Tartary.
Ararat, Armenia.
Lebanon, Syria.
Taurus, Asia Minor.

SOUTH AM E

BOUNDARI

NORTH : The Caril
&c.
SOUTH : The Strait
lan.
EAST : The Atlant
WEST : The Pacifi

DIVISION

NEW GRAN

Provinces.	*Ch*
ISTHMO,	P
MAGDALENA,	C
CAUCA,	P
CUNDINAMARCA,	B
BOYACA,	P

VENEZUEL

ZULIA,	M
VENEZUELA,	C
MATURIN,	C
ORINOCO,	A

EQUADO

EQUADOR,	Q
ASUAY,	C
GUAYAQUIL,	G

BRAZIL

GUIANA,	Vi
SOLIMOENS,	T
PARA,	P
MARANHAM,	I
PIAUHY,	O
SEARA,	S
N. RIO GRANDE,	N
PARAIBA,	P
PERNAMBUCO,	P
GOYAS,	V
MATTO GROSSO,	V
SERGIPPE,	S
BAHIA,	B
ILHEOS,	I
ESPIRITO SANTO,	E
SEGURO,	S
RIO JANEIRO,	R
MINAS GERAES,	V
SAO PAULO,	S
S. RIO GRANDE,	R
ST. CATHERINA,	S

INDEPENDENT

PARAQUAY,	A
URUGUAY,	A

PER

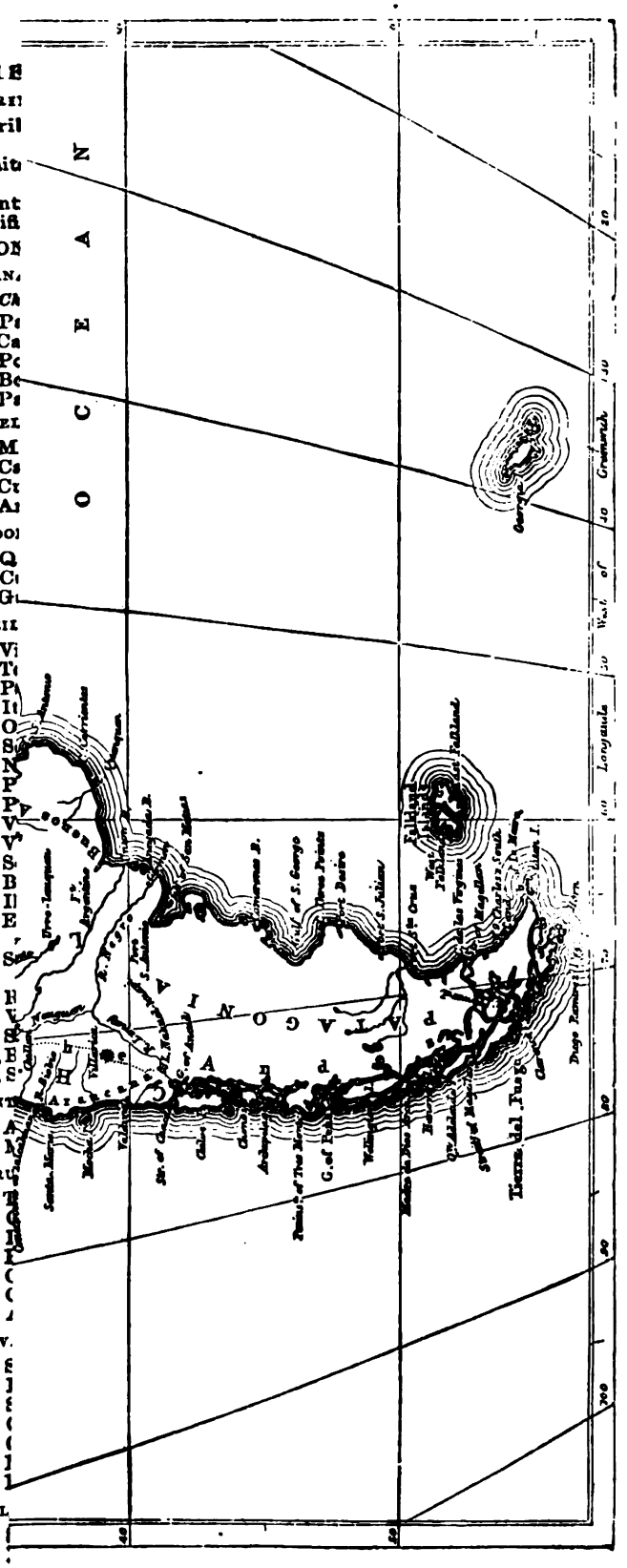
LIBERTAD,	
JUNIN,	
LIMA,	
AYACUCHO,	
CUZCO,	
PUNO,	
AREQUIPA,	

BOLIV

MOXOS,	
LA PAZ,	
STA. CRUZ,	
COCHABAMBA,	
CHARCAS,	
CHIQUITOS,	
POTOSI,	

CHIL

COPIAPO,	
HUASCO,	
COQUIMBO,	



SOUTH AMERICA.

Provinces.	*Chief Towns.*
CUSCOS,	S. Raphael de Ilesa.
SANTIAGO,	Santiago.
COLCHAGUA,	S. Fernando.
CONCEPTION,	Conception.
QUILLOTA,	Quillota.
ARAUCANOS.	Arauco.
VALDIVIA,	Valdivia.
CHILOE,	Castro.
&c.	&c.

LA PLATA.

BUENOS AYRES,	Buenos Ayres.
CHACO,	S. Yago.
SALTA,	S. Felippe.
TUCUMAN,	S. Miguel.
CORRIENTES,	Corrientes.
ENTRE RIOS,	Santa Fe.
MENDOZA,	Mendoza.
CORDOVA,	Cordova.

PATAGONIA.

PENINSULA OF DE S. JOSE,	Jose.
SOUTH COAST,	Port Desire.

ISLANDS.

Gallapagos, W. of Equador.
Lobos, W. of Peru.
Juan Fernandez, W. of Chili.
Chiloe, S. of Chili.
Chonos Archipelago, S. of Chiloe.
Wellington, W. of Patagonia.
M. de Dios Archipelago, S. of Wellington.
Hanover, W. of Patagonia.
Queen Adelaide, S. of Hanover
Terra Del Fuego, S. of Patagonia.
L' Hermite, S. of T. del Fuego.
Staten Land, E. of T. del Fuego.
Falklands, E. of Patagonia.
Georgia, S. E. of Falklands.
Fernando Noronha, N. E. of Cape St. Roque.
Caviana, M. of the Amazon.
Marajo, S. of Caviana.

PENINSULAS.

Patagonia, S. of La Plata.
Tres Montes, W. of Patagonia.
Buenos Ayres, La Plata.
Banda Orientale, La Plata.

CAPES.

Point Gallinas, Venezuela
St. Roque, Brazil.
Frio, Rio Janeiro.
Mary, Uruguay.
St. Antonio. Buenos Ayres.
Corrientes, Buenos Ayres.
Three Points, Patagonia.
Horn, L' Hermite.
Point Parina, Peru.
San Lorenzo, Equador.
San Francisco, Equador.

MOUNTAINS.

Andes, S. America.
Chimborazo, Equador.
Cotopaxi, Equador.
Anstisana, Equador.
Pichinca, Equador.
Lahama, Bolivia.
Aconcagua, Chili.
Marava, Guiana.
Sierro do Mar, Brazil.

RIVERS.

Amazon, Brazil.
Orinoco, Colombia.
La Plata, La Plata.

AUSTRALASIA.

BOUNDARIES.

NORTH: Oriental Archipelago.
SOUTH: South Pacific.
EAST: South Pacific.
WEST: Indian Ocean.

DIVISIONS.

AUSTRALIA, OR NEW HOLLAND.

1. NEW SOUTH WALES.

(Counties with their Towns marked in Italics.)

Bligh, Brisbane (*Segenhoe*), Durham (*Stroud*), Gloucester, Wellington, (*Wellington*), Philip, Hunter, Northumberland (*Newcastle, Maitland*), Bathurst (*Bathurst*), Roxburgh, Cook, Georgiana, Westmoreland, Cumberland (SYDNEY, *Paramatta, Windsor, Liverpool, Campbelltown*), King, Argylle (*Goulburn*), Camden (*Bong Bong*), Murray, St. Vincent, &c.

2. VICTORIA, OR PORT PHILIP.

(Chief Towns and Ports.)

MELBOURNE, Williamstown, Geelong, Port Philip, Alberton, Western Port, Belfast, Portland, &c.

3. SOUTH AUSTRALIA, OR SPENCER'S GULF.

(Chief Towns and Ports.)

ADELAIDE, Glenelg, Kooringa, Gawler, Port Lincoln, Kingscote in Kangaroo Island, &c.

4. WESTERN AUSTRALIA, OR SWAN RIVER.

(Counties with their Towns in Italics.)

Melbourne, Glenelg, Grey, Carnarvon, Twiss, Victoria, Durham, Lansdown, Perth (PERTH, *Freemantle, Guilford*), York (*York*), Howick (*Beverley*), Beaufort, Murray (*Peel, Pinjarra*), Grantham, Minte, Wellington (*Australind, Bunbury, Picton*), Wicklow (*Williamsburg, Bannister*), Peel, Sussex (*Augusta, Dunnsbro'*), Nelson, Goderich, Hay, Lanark, Stirling, Plantagenet (*Albany, Hamilton, Wyndham*), Kent, &c.

5. NORTH AUSTRALIA.

(No Settlement.)

VAN DIEMAN'S LAND.

(Counties with their Towns in Italics.)

Kingborough (HOBART TOWN), Queenborough, Argyle, Clarence Plain, Sussex (*Sorell*), Harrington, Caledster (*Orielton*), Caledon, Ulva, Jarvis, Drummond (*Brighton*), Glenorchy, Melville, New), Norfolk (*Elizabeth Town.*

AUSTRALASIA.

Macquarie (*Macquarie Town*), Sorell, Murray, Green Ponds, Strangford, Ormaig, Staffa, Bath, Methven, Beaumont, Amherst, Lake River, Lennox, Richmond (*Ross*), Bathurst (*Campbelltown*), Norfolk Plain, Western River (*Westbury*), George Town (*George Town*), Launceston (*Launceston*), North Esk (*Perth, Corrilin*), South Esk.

ISLANDS.

New Guinea, N. of Torres Strait.
Louisiade Archipelago, S.E. of New Guinea.
Prince of Wales', Torres Strait.
Groote Eylandt, Gulf of Carpentaria.
The Wellesley, G. of Carpentaria.
Mellville, Oriental Archipelago.
Bathurst, Oriental Archipelago.
King's, Bass's Strait.
Flinders', Bass's Strait.
Norfolk, E. of Australia.
New Britain, N.E. of New Guinea.
New Ireland, N.E. of New Britain.
The Solomon, S.E. of New Britain.
New Hebrides, E. of Australia.
New Caledonia, E. of Australia.

PENINSULAS.

Carpentaria, North Australia.
Cobourg, Arnheim's Land, North Australia.
Peron, Edel's Land, Western Australia.
Eyre Land, South Australia.
York, South Australia.
Gipp's Land, Victoria.
Tasman, Van Dieman's Land.

CAPES.

York, Carpentaria.
Arnheim, Arnheim's Land.
Pt. Dale, Arnheim's Land.
Londonderry, Tasman Land, North Australia.
Bougainville, Tasman Land.
Levesque, Tasman Land.
N.W. Cape, Endracht Land.
Pt. Naturaliste, West Australia.
Leewin, West Australia.
Catastrophe, Eyre Land.
Spencer, York Peninsula.
Wilson, Gipp's Land, Victoria.
Howe, Victoria.
Sandy, Sandy Island, North Australia.

GULFS AND BAYS.

Carpentaria, N. Australia.
Van Dieman's, Arnheim's Land.

THE

Popular Educator.

VOLUME THE SECOND.

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When Letters form the man of might,
And Knowledge lends her sacred light
All errors to redeem.

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LONDON:

JOHN CASSELL. LA BELLE SAUVAGE YARD, LUDGATE HILL,

MDCCCLIII.

TO OUR READERS.

WE have both pleasure and satisfaction in looking back upon our labours during the past year for the diffusion of real knowledge among the people. We know that the POPULAR EDUCATOR has been the means of opening up a new source of instruction and enjoyment to hundreds, nay thousands of individuals, among those classes which constitute the strength and the glory of a nation, and which but for the establishment of this JOURNAL would perhaps never have had an opportunity of acquiring even the elements of the common branches of education. To this, we have however added instructions in those branches which were in former times deemed accomplishments, even among the middle classes; and we are happy to say that our efforts have been responded to with a degree of ardent zeal and earnest thankfulness far beyond our merits and expectations. The patronage which we have experienced from all classes fills us with the most sanguine hopes for the future, and encourages us to proceed steadily and delightfully in the path which we have marked out for the benefit of the greatest possible number of our subscribers. We may, however, remark, that in our anxiety to meet the wishes of all, we have not been able to maintain that continuity in some of our lessons which their importance would seem to require;—in the next volume this shall be more carefully kept in view; and with this consideration pressing on our minds, we must be cautious in making promises of many new additions to the subjects already in hand. Some subjects, as Phonetic Short-hand and Latin, are fast drawing to a close; others, as Drawing, French, and probably German, will be finished in the next volume. The termination of these will leave us room for the new subjects which are chiefly in demand, as Book-keeping, Greek, Hebrew, Italian, and probably Spanish; while Chemistry, Natural Philosophy, and Mechanics, will follow as close upon the heels of the Mathematics as our space will allow. Our desire is to make our work a complete Cyclopædia of all human learning; but our subscribers must be fully aware that this is a work of time, and that the elements of every branch must be taught before its grand results can be brought to bear on their minds; otherwise, our JOURNAL would very soon and justly lose its title of the POPULAR EDUCATOR.

In conclusion, we have to observe, that in consequence of numerous and pressing requests made to us, by letter and otherwise, for *Lessons on Biblical and Religious Learning*, on a plan similar to that which we have adopted in reference to Secular Education, Mr. Cassell has determined to issue a new Journal for the express purpose of meeting this request. Early in May next, therefore, will appear the first Number of the POPULAR BIBLICAL EDUCATOR, and the following Numbers will be issued regularly for the first and fifteenth day of every succeeding month. The work will be printed on fine paper, each Number containing *thirty-two columns* in crown quarto, price Twopence, or the Numbers for the month in a neat wrapper, price Fourpence each. The list of contributors to the *Popular Biblical Educator* will include the names of some of the most eminent writers of the present day. The lessons will be written in a popular style, avoiding as much as possible all scholastic terms and technical phrases, so as to give to the plain English reader, not a formidable show of learning, but its intelligible results. Wherever the subject requires Pictorial Illustrations, they will be introduced; and no expense will be spared to render the work one of the most useful of the class ever issued.

LONDON, MARCH 26, 1853.

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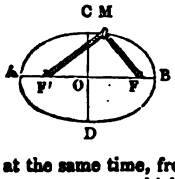
LESSONS IN GEOGRAPHY.—No. XI.

ASTRONOMICAL PRINCIPLES OF GEOGRAPHY.

Suppose that you were elevated in the heavens, or in the vast space in which roll all the stars, to a point millions of miles above the sun; and that you were furnished with a telescopic eye so powerful, that from that point you could observe the magnitudes, motions, and distances of all the bodies in the Solar System; that is, the bodies or planets which revolve round the sun in consequence of the laws of attraction and tangential impulse; you would perceive among them a highly-favoured planet called the Earth, accompanied by a satellite (an attendant) in its course, called the Moon. This Earth and her satellite, like all the other planets and their satellites which you would behold in this bird's-eye view, receive both their light and their heat from the sun; and the influences of these imponderable bodies are distributed to all the planets in the same ratio as the power of attraction which keeps them revolving in their orbits (tracks or paths); that is, in the inverse ratio of the squares of their distances; or, to express it more clearly, the power of the attraction, the light and the heat of the sun on one planet, is to that on another planet, as the square of the distance of the latter, is to the square of the distance of the former. In your elevated position, you would next perceive that the planets in their various revolutions, would at some times be nearer to the sun than at other times; and that if the orbit of each were traced by a white line in space, it would appear to your eye, if rightly placed, to have the form of an oval nearly, being in fact, what is called in the language of mathematics, an ellipse. In order that you may understand the nature of this curve, we shall explain it by means of a diagram.

Fig. 1.



Thus, in fig. 1, if you fix two pins on a board, at the points F and F', and fasten a string F M F, of any convenient length, but greater than the distance between the two points, by its extremities, at these points; and if you take a crayon or chalk pencil, and press it on the string horizontally at M, so as to keep it always tense (i. e. stretched), and parallel to the board, moving the pencil round and round at the same time, from one side to the other; you will describe the curve A C B D, which is called the ellipse. It is evident that the limits of the form of this curve are the circle and the straight line. If the two points F and F' are brought close together, the curve will be a circle; if they be separated as much as the string will allow, the curve will become a straight line. The two points F and F' are called the *foci* (the plural of *focus*) of the curve; the straight line A B drawn through them, and terminated both ways by the curve, is called the *major axis;* and the straight line C D drawn at right angles to this axis from its middle point O, and terminated both ways by the curve, is called its *minor axis.* If a straight line be drawn from F' to C, it will be equal to the straight line A O, or half the major axis. The point O is called the centre of the ellipse, and the ratio of F O to A O, that is, of the distance between the centre and the focus to half the major axis, is called the *eccentricity* of the ellipse. The distance from the focus F to any point M in the curve is called the *radius vector* of the ellipse; it is least at A, and greatest at B. With these explanations, while you are supposed to be looking at the orbit of a planet from your elevated position in space, you will now be able to comprehend the fundamental principles of Astronomy,—viz. Kepler's Laws.

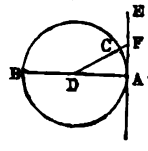
The eminent German astronomer just mentioned, who flourished at the close of the 16th century and the beginning of the 17th, discovered, by laborious observations and calculations, the following remarkable laws, which were afterwards mathematically demonstrated by Sir Isaac Newton:—1. That the planets all revolve in elliptic orbits, situated in planes passing through the centre of the sun; the sun itself being placed in one of the foci of the ellipse. 2. That the radius vector or straight line drawn from the centre of the sun to the centre of the planet passes over equal areas in equal times in every part of the orbit; that is, whether the planet be in its *aphelion*, or farthest from the sun, in its *perihelion*, or nearest to the sun, or at its *mean distance* from the sun. And 3. That the squares of the periodic times of the planets, that is, of the times of a complete revolution in their orbits, are proportional to the cubes of their mean distances from the sun; in other words, that the square of the periodic time of one planet is to the square of the periodic time of another planet, as the cube of the mean distance of the former from the sun is to the cube of the mean distance of the latter from it. Into the full explanation of these laws we cannot enter until we treat of astronomy; in the meantime it is necessary to give some explanation of the law which we have marked *first*, though it is generally accounted the *second*, in order to clear up some points connected with phenomena relating to the earth, and the circles drawn on the globe, which is the only true representation of the earth's surface. Supposing then the ellipse in fig. 1 to represent the earth's annual orbit round the sun, and the focus F' the place of the sun's centre; then the point A will represent the position of the earth's centre at mid-winter, when it is nearest the sun, or in its *perihelion*; B will represent its position at mid-summer when it is farthest from the sun, or in its *aphelion*; C will represent its position at the spring or vernal equinox, when it is at its *mean distance* from the sun; and D its position at the harvest or autumnal equinox, when it is also at its *mean distance* from the sun.

We think we hear some of our readers exclaiming, notwithstanding the elevated position in which we have supposed them to be placed, What! will you tell us that the sun is the cause of light and heat on the earth's surface, and yet you assert that the earth is nearer to the sun in winter than in summer? How can this be? Paradoxical as this may seem, it is nevertheless true; and the reason we shall now give. As you are supposed to be looking from a great distance, and to be able to discern all the motions of the planets, if you look narrowly at the earth, you will perceive that besides its *orbitual* motion round the sun, it has a *revolving* or journal motion on its own axis. By *axis* here is meant that imaginary straight line passing through the globe of the earth, on which its rotation is supposed to take place, and which is aptly represented in artificial globes by the strong wire passing from one side to the other, at the points called the *poles* (that is, *pivots*), which are the extremities of the axis. This motion may be likened to the spinning of a top, a motion which continues while the top is driven forward in any direction from one place to another. In fact, the analogy would be so far complete, independently of the causes of the motion, if the top, while it is spinning or revolving as it were on its own axis, were made to run regularly round in an oval ring on the ground, under the lash of the whip. Thus, the earth has two motions; one on its own axis, performed once every twenty-four hours; and one in its orbit, performed once every 365 days 6 hours; we have stated these periods in round numbers, in order that they may be easily remembered; but the exact period of the earth's daily revolution on its axis, is 23 hours, 56 minutes, 4 seconds, and 9 hundredth parts of a second; and the exact period of the earth's annual revolution in its orbit is 365 days, 5 hours, 48 minutes, 49 seconds. The analogy of the motions of the top, however, to the motions of the earth, as thus described, is incomplete in respect of the position of their axes. The axis of the spinning top is in general upright or perpendicular to the ground, which may be called the plane of its orbit, that is, of the oval ring in which it is supposed to move; but the axis of the earth in its daily motion is not perpendicular to the plane of its orbit, or the ellipse in which its annual motion is performed. In speaking of the plane of the earth's orbit our analogy fails, for there is nothing to represent the ground on which the motion of the

spinning top takes place. The mere attraction of the sun, coupled with the effect of an original impulse in the direction of a tangent to its orbit, is sufficient to preserve the earth in its orbitual motion in empty space. Hence, the sublimity and truth of the ancient passage in the book of Job: "He stretcheth out the north over the empty place, and hangeth the earth upon nothing." (Job xxvi. 7.) This passage is *singularly true* in regard to the first sentence as well as to the second. For the axis of the earth is inclined to the plane of its orbit, at an angle of 66 degrees, 32 minutes; that is, rather more than two-thirds of a right angle, so that literally and truly "the north is stretched over the empty place," and not over the body of the earth itself, in either of its motions, whether axial or orbitual. This inclination is preserved during the whole of its motion in its orbit, and is the cause of the variation of the seasons; the preservation of the inclination of this axis has been not unaptly called the parallelism of the earth's axis.

Before explaining the effect of this parallelism and inclination of the earth's axis in producing the seasons, it will be proper to explain what is meant by *tangential impulse*. In fig. 2, let A C B represent the orbit of the earth, which is nearly circular; let D represent the place of the sun, and A the place of the earth at the moment when it began its revolution in its orbit. At this moment the force of the sun's attraction would begin to act on the earth in the direction A D, and had this alone been allowed to operate, would have drawn it rapidly towards the sun in a straight line, until it had come finally in contact with the sun itself; but at the same moment, an original impulse was, or is supposed to have been given to the earth in the direction A E, which is that of a tangent, or straight line touching the circle at the point A; so that the earth, which under the action of the former force would in a certain time have been found at some point in A D, and under that of the latter force would, in the same time, have been found at the point F in A E, would, by the combined action of both forces, be found near the point C in the curvilinear orbit A C B. This original impulse, the effect of which remains to this day unaltered by the action of attraction, (seeing it has met with no resistance in empty space, and has been so balanced against the force of attraction as to retain the earth in its orbit,) is called the *tangential impulse* or force, which was imparted to it when it began its orbitual revolution. Young, in his "Night Thoughts," alluding to this tenet of the Newtonian philosophy, asks—

Fig. 2.



" Who rounded in his palm those spacious orbs?
Who bowl'd them flaming through the dark profound?"
Night IX.

Let us now consider the effect of the inclination of the earth's axis to the plane of its orbit. In fig. 1, we have supposed the sun to be at the focus F', while the earth is at the point A in mid-winter. Now, at this point, you would see from your supposed elevated position, that the northern half of the earth's axis is inclined to the major axis A B at an angle of 113 degrees 28 minutes, the supplement of its angle of inclination to the plane of the orbit; so that the North Pole, with the space on the earth's surface around it to a considerable extent, is prevented from receiving the rays of the sun, and consequently the heat of those rays; while the South Pole, with the space around it to the same extent, is made to receive these rays and to enjoy their heat. Hence, while it is winter in the northern or arctic regions of the earth, it is summer in the southern or antarctic regions. While the earth is still in this position, the rays of the sun fall more obliquely upon the illuminated portions of the northern hemisphere, than they do upon the southern hemisphere, and thus have less power to produce heat than if they fell perpendicularly; just as a person sitting at the side of a fire-place with a good fire in it, feels less heat than a person who sits exactly in the front of it. On the other hand, if you consider the earth from your elevated position, when it is at the point B in mid-summer, the reverse of all this takes place. The northern half of the earth's axis is inclined to the major axis (or line of *apsides*, as it is sometimes called; that is, the line of *junction* of the two opposite points A and B), at an angle of 66 degrees 32 minutes, which is its angle of inclination to the plane of its orbit; so that the North Pole, with the space on the earth's surface around it, above-mentioned, is made to receive the sun's rays, and consequently their heat; while the South Pole, with the similar space around it, is prevented from receiving those rays and enjoying its heat. Hence, while it is summer in the northern or arctic regions, it is winter in the southern or antarctic regions. While the earth remains in this position, the rays of the sun fall more directly upon the southern hemisphere than they do upon the southern hemisphere, and thus have more power to produce heat than if they fell obliquely, according to the illustration given above. Now, as we in this country are inhabitants of the northern hemisphere, and of that part which is within the *circle of illumination* all the year round, we experience the vicissitudes of the seasons just described as belonging to it, and we are consequently colder in winter than in summer, although the earth be actually nearer the sun in winter than in summer.

But we must explain more fully what we mean by the *circle of illumination*. It is plain that the rays of light falling from the sun upon the *opaque* or dark body of the earth in straight lines, can never illuminate more than one-half of its surface at a time; as may be seen by the very simple experiment of making the light of a candle fall upon a ball at a distance from it. Now, as the earth revolves on its axis once every 24 hours, it is evident that the illuminated half, and consequently the *circle of illumination* which is the boundary of that half, is perpetually changing, so that almost all parts of the globe receive light for several hours in succession, and that they are also enveloped in darkness for several hours in the same manner. If the axis of the earth, instead of being inclined at a certain angle to the plane of its orbit, which we shall hereafter call the *Ecliptic*, were at right angles to that plane, and preserved its parallelism, then the circle of illumination would continually extend from pole to pole, and all places on the earth's surface would enjoy light for 12 hours in succession, and would be enveloped in darkness for exactly the same period the whole year round. On the other hand, if the axis of the earth were coincident with the plane, and preserved its parallelism, this would happen only twice a year; and each hemisphere would at *opposite* periods be in total darkness for a whole day, while the variations between these extremes would be both inconvenient and injurious. In the former case the seasons would be all the same, that is, there would be perpetual sameness of season all the year round; in the latter case, the seasons instead of four would be innumerable, that is, there would be perpetual change. Here, then, creative wisdom shines unexpectedly forth. The inclination of the earth's axis is such as to produce the four seasons in a remarkable manner, and to permit sufficient time for the earth to bring her fruits to perfection, as well to let her lie fallow for a period that she may renew her fruitfulness. In fig. 1, when the earth is supposed to be at the point C, she is at her mean distance from the sun at the *vernal equinox*, which is the *first* time of the year when day and night are equal, which happens on or about the 21st of March. Now, at this point the inclination of the earth's axis to the minor axis of the ellipse is a right angle, and as the focus F', in the case of the earth, nearly coincides with the centre O, the rays of light proceeding from the sun nearly in the straight line O C, fall upon that axis nearly perpendicularly, and illuminate the globe from pole to pole, so that the *circle of illumination* passes through the poles, and the days and nights are equal all over the globe, each consisting of 12 hours, while the earth is in this position. In the opposite position at D, the earth is again at her mean distance from the sun, at the *autumnal equinox*, which is the *second* time of the year when day and night are equal, which happens on or about the 22nd of September. At this point the circumstances of the globe and the *circle of illumination* are exactly the same as we have just described. At these four points, A, C, B, and D, in the orbit of the earth, are found the middle points of the four seasons of the year, viz., at A, Mid-winter; at C, Mid-spring; at B, Mid-summer; and at D, Mid-autumn. At the point A, or Mid-winter, which is on or about the 21st of December, we have the shortest day in the northern hemisphere and the longest day in the southern hemisphere; and at the point B, or Mid-summer, which is on or about the 22nd of June, we have the longest day in the northern hemisphere and the shortest in the southern hemisphere.

" Thus, in primeval prophecy fulfilled:
While earth continues, and the ground is tilled;
Spring time shall come, when seeds put in the soil
Shall yield in harvest full reward for toil;
Heat follow cold, and fructify the ground,
Winter and summer in alternate round;
And night and day in close succession rise,
While each is regulated by the skies.
Supreme o'er all, at first, Jehovah stood,
And, with creative voice, pronounced it good."

LESSONS IN FRENCH.—No. XXVI.

By Professor Louis Fasquelle, LL.D.

Section LIV.

The past anterior and the pluperfect (§ 122, 123).

1. The past anterior is formed from the past definite of the auxiliary and the past participle of the verb: J'eus parlé, *I had spoken*; je fus venu, *I had come*.

2. The past anterior expresses generally a momentary action, which took place before another action. The latter immediately follows the former, and often depends upon it. The action expressed by this tense is not a customary one. The past anterior is often preceded by à peine, *scarcely*; dès que, aussitôt que, *as soon as*; quand, lorsque, *when* [§ 122. § 123 (3)].

Dès que j'eus fini ma tâche je m'en allai.	*As soon as I had finished my task I went away.*

3. This tense partakes of the nature of the past definite.

4. The pluperfect is composed of the imperfect of the auxiliary, and the past participle of the verb: j'avais parlé, *I had spoken*; j'étais venu, *I had come*.

5. To this tense might be applied nearly all the rules on the use of the imperfect. The action which it expresses, or the situation which it depicts, is frequently a customary one, or one often repeated:—

Dès que j'avais fini ma tâche je m'en allais.	*As soon as my task was finished I used to go away.*

Résumé of Examples.

Aviez-vous eu soin de vos effets ?	*Had you taken care of your things?*
J'en avais eu soin.	*I had taken care of them.*
N'aviez-vous pas eu besoin de moi ?	*Had you not wanted me?*
J'avais eu besoin de vous et de votre frère.	*I had wanted you and your brother.*
N'aviez-vous pas eu l'intention de me parler ?	*Had you not intended to speak to me?*
Dès que vous eûtes fini votre lettre, ne la portâtes-vous pas à la poste?	*As soon as you had finished your letter did you not carry it to the post-office?*
Dès que vous aviez fini vos lettres, ne les portiez-vous pas à la poste?	*As soon as your letters were finished, did you not take them to the post-office?*
Dès que vous fûtes arrivé, ne commençâtes-vous pas à écrire?	*As soon as you had arrived, did you not commence writing?*
Dès que vous étiez arrivé, ne commenciez-vous pas à écrire?	*As soon as you used to arrive, did you not commence writing?*

Exercise 107.

Arrêt-er, 1. *to stop.*	Égar-er, 1. *to mislay.*	Perd-re, 1. *to lose.*
Bal, m. *ball.*	Invit-er, 1. *to invite.*	Remont-er, 1. *to wind up.*
Bourse, f. *purse.*	Se lev-er, ref. *to rise.*	
Se coucher, 1. ref. *to go to bed.*	Malade, *sick.*	Retrouv-er, 1. *to find again.*
Dangereusement, *dangerously.*	Musicien, m. *musician.*	Sort-ir, 2. ir. *to go out.*
Dîner, m. *dinner.*	Oubli-er, 1. *to forget.*	Spectacle, m. *play.*
	Part-ir, 2. *to set out.*	

1. Ne saviez-vous pas où le musicien était allé? 2. Je savais qu'il était allé à Paris. 3. Ne vous avait-on pas dit que votre frère est mort? 4. On m'avais dit qu'il était dangereusement malade. 5. Ne vous couchiez-vous pas ordinairement, dès que vous aviez fini vos leçons? 6. Dès que je les avais finies, j'allais au spectacle. 7. Dès que vous eûtes fini vos leçons, que fîtes-vous hier au soir? 8. Aussitôt que je les eus finies, j'allai au bal. 9. Cette petite fille n'avait-elle pas envie de dormir? 10. Elle avait plus envie de dormir que d'étudier. 11. Qu'aviez-vous fait de (*with*) votre livre quand je vous le demandai. 12. Je l'avais égaré. 13. Je l'avais oublié dans le jardin. 14. Pourquoi votre montre était-elle arrêtée? 15. Parce que j'avais oublié de la remonter. 16. L'horloger ne l'avait-il pas remontée? 17. Il avait oublié de la faire. 18. N'aviez-vous pas perdu votre bourse? 19. Je l'avais perdue, mais je l'ai retrouvée. 20. Votre cousin était-il parti? 21. Il n'était pas encore parti. 22. Était-il sorti? 23. Il était sorti avec ma mère. 24. Où était-il allé? 25. Il était allé chez mon frère, qui l'avait invité à dîner.

Exercise 108.

1. Had you not intended to speak to my brother? 2. I had intended to speak to him, but he was gone. 3. Did your sister go to bed last evening as soon as she had read (*to*) her book? 4. She went to bed as soon as she had read it. 5. Were you told that your sister was sick? 6. I was told that she had been dangerously sick. 7. Did you know what you had done with your pen? 8. I knew that I had mislaid it. 9. How many of your books have you mislaid? 10. I had mislaid five, but my brother has found them. 11. Where had you left them? 12. I had left them in the garden. 13. Was your brother's watch stopped? 14. It was stopped. 15. Why was it stopped? 15. He had forgotten to wind it up. 17. Had he not lost his key? (*clef*, f.) 18. He had not lost it. 19. Was the dyer gone? 20. He was not yet gone, he intended to leave at five. 21. Had you spoken to him when I came yesterday? 22. I had spoken to him. 23. Had you told him that my sister is here? 24. I had told him. 25. Is he still here? 26. No, Sir, he is gone, he went this morning at six.

Section LV.

1. We have given [Sect. 4, R. 4, and § 76 (4)] a rule for the place of the noun, subject or nominative of an interrogative sentence. To avoid confusing the student, we have hitherto refrained from introducing another construction which is often used by the French instead of that given in the rule. When a sentence commences with où, *where*; que, *what*; quel, *which*; combien, *how much, how many*; and quand, *when*; the noun may be placed immediately after the verb. This construction is similar to that of the English interrogative sentence when the verb has no auxiliary [§ 76 (5)]:—

Où sont nos amis et nos parents ?	*Where are our friends and relations?*
Qu'écrit votre correspondant ?	*What writes your correspondent?*

2. When there are in a French sentence two regimens of equal length, the direct should precede the indirect [§ 76 (7)].

Avez-vous donné les jouets à l'enfant ?	*Have you given the child the playthings?*
Avez-vous donné cette lettre à l'homme ?	*Have you given the man that letter?*

3. The régime indirect precedes the direct, when the latter is followed by a relative pronoun, or by other words qualifying it, and rendering it much longer than the indirect [§ 76 (8)]. The indirect regimen should also precede the direct, when the sentence would otherwise be equivocal [§ 76 (9)]:—

Avez-vous donné à l'enfant, les jouets que vous lui aviez promis?	*Have you given the child the playthings which you had promised him?*

Résumé of Examples.

Quel âge a cette demoiselle ?	*How old is that young lady?*
Que veulent dire ces messieurs ?	*What do those gentlemen mean?*
Où sont allés messieurs vos frères ?	*Where are your brothers gone?*
Combien d'enfants a ce monsieur ?	*How many children has that gentleman?*
Avez-vous payé cet argent au marchand ?	*Have you paid the merchant that money?*
J'ai payé mon habit au tailleur.	*I paid the tailor for my coat.*
N'aviez-vous pas demandé cela à l'enfant ?	*Had you not asked the child for that?*

Exercise 109.

Accompagn-er, 1. *to accompany.*	Chaîne, f. *chain.*	Dernier, e, *last.*
Aîné, e, *eldest.*	Chapeau, m. *hat, bonnet.*	Près, *near, nearly.*
Associé, m. *partner.*	Cinquante, f. *fifty.*	Rend-re, 4. *to return.*
Aubergiste, m. *landlord.*	Clef, f. *key.*	Serrurier, m. *locksmith.*
Bouteille, f. *bottle.*	Commis, m. *clerk.*	Serviette, f. *napkin.*

1. Où étaient vos parents l'année dernière? 2. Ils étaient en Angleterre. 3. Où sont restés les messieurs qui vous accompagnaient ce matin? 4. Ils sont restés chez leurs associés. 5. Que lisaient vos amies lorsque vous les avez quittées? 6. Elles lisaient les nouvelles qu'elles venaient de recevoir. 7. Que dit monsieur votre père? 8. Il ne dit rien. 9. Quel âge a ce monsieur? 10. Il a près de cinquante ans. 11. Quel âge ont vos enfants? 12. L'aîné a dix ans, et le plus jeune a six ans. 13. Avez-vous demandé votre chaîne d'or à ce monsieur? 14. Je la lui ai demandée. 15. Avez-vous rendu au commis, l'argent qu'il vous avait prêté? 16. Je le lui ai rendu. 17. Aviez-vous envie d'envoyer vos clefs au serrurier? 18. J'avais envie de les lui envoyer, car elles sont cassées. 19. Valait-il la peine d'envoyer ces bouteilles à l'aubergiste? 20. Il valait la peine de les lui envoyer, car il n'en avait pas. 21. Avez-

vous demandé des serviettes à votre père? 22. Je n'ai pas voulu lui en demander.

EXERCISE 110.

1. What was the locksmith saying to you? 2. He was saying that he has brought my key. 3. How many letters have you carried to the post-office? 4. I have carried seven, three for you, and four for my father. 5. Where is the gentleman who has brought that letter? 6. He lives at my father's, do you wish to speak to him? 7. I wished to send him a letter which I brought from England. 8. Have you returned to that man the money which he had lent you? 9. I have returned it to him. 10. Had you a wish to send your brother the key of your room? 11. I had a wish to send it to him. 12. Was it worth the while to give your brother that book? 13. It was worth the while to give it to him, for (*car*) he wanted it. 14. Was it worth the while to send these bottles to the druggist (*apothicaire*)? 15. It was worth the while to send them to him. 16. Where is the landlord? 17. He is in England. 18. How many children has the locksmith? 19. He has ten. 20. How many books has the physician? 21. He has five hundred volumes. 22. Have you given the gentleman that letter? 23. I have forgotten to give it to him.

LESSONS IN GEOLOGY.—No. XV.

By THOMAS W. JENKYN, D.D., F.G.S., &c.

CHAPTER I.

ON THE ACTION OF VOLCANOES ON THE EARTH'S CRUST.

SECTION X.

ON VOLCANIC DYKES.

AMONG the phenomena which give great interest to the pursuits of the geologist, there are few more remarkable and striking than the rocks which are penetrated by other rocks. Such complex appearances, at once, raise the two questions, first, whence and how came the penetrating rocks? and secondly, what was the previous condition of the older rock when it was thus penetrated?

The rock which penetrates another is called, in geology, a "dyke." It means, generally, an injection of volcanic materials, such as basalt or modern lava, into fissures which already existed in the interior of the older rock.

This fact excites the inquiry, how came the older rocks to be fissured? It is probable that some of the oldest igneous rocks may have been cracked, or fissured, while they were in the process of cooling, or subsequently by the violence of earthquake power. In the case of the sedimentary rocks, they may have been thus fissured, either by earthquake convulsions or by the force of the rising lava penetrating between the interstices which divide the beds. Such insinuating lava acts in two ways: it acts mechanically in forcing its way onward in the line of the stratification; and it acts chemically by wearing away the upper surface of one bed, and the lower surface of the other, and thus produce more space for its acclivity.

The annexed diagram, fig. 33 represents the action of rising lava, in a melted state, upon stratified rocks. It is clear that the propelling power below, will strive to overcome the pressure of the incumbent strata, and when it has produced a fissure, it will wear away the resistance of the two sides of the crack. This resistance is always less at the interstices of the strata than elsewhere. It will, therefore, enter some of them like a wedge, whose mechanical power is increased by its chemical action.

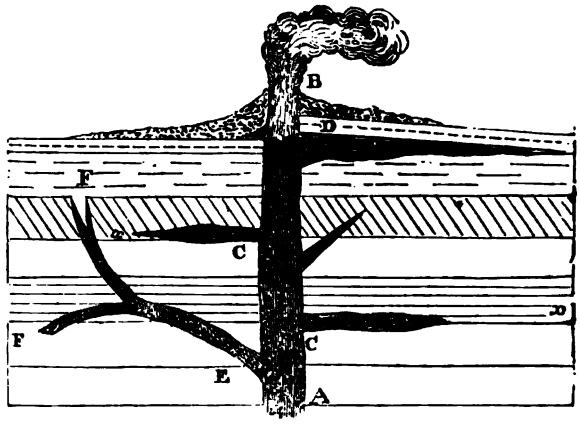
In this figure, A B represents a column of liquid lava fissuring a sedimentary rock up to the surface. Early in its rise it produced the fissure E F. At C the column made an injection between two beds, and made its way, according to its force, in the direction of C *x*, and separated the strata at D, as the pressure of that bed was less than the lower one, the column having introduced the wedge, elevated and filled the space which it had opened.

In some instances, among the most ancient rocks, the injected rock is formed much of the same lithological character with the rock which has been penetrated; but in the majority of cases, the injected rock is different from the penetrated one.

When cliffs or sections enable the geologist to trace these dykes downward, they generally bring him to a large mass of the same rock, from which, when in a melted state, they have risen and branched out, either into the fissures already existing in the rock, or into courses which they form for themselves among the strata. In both cases they become smaller and smaller, till they completely thin out and cease.

In the primitive rocks, such as granite, hornblende-slate, &c. the injected matter unites chemically to each side of the

Fig. 33.

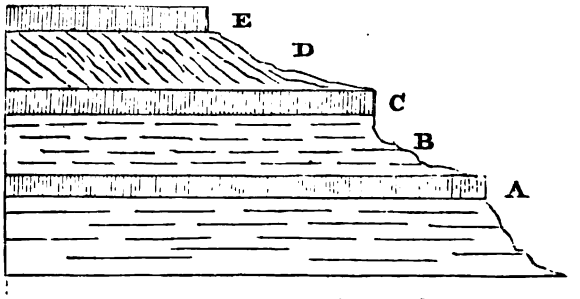


A column of liquid lava traversing horizontal strata.

fissured rock so completely, as to have all the appearance of having been produced, at one and the same time, as the penetrated rock itself. This is not the case with veins or dykes of trap, for they have very little adhesion to the sides of the fissures which they fill. They are generally formed of looser texture on the sides, and of more crystalline hardness in the middle.

I had now better explain to you what is meant by "trap." Trap is not a name for any one rock, but it designates a family of rocks, a family born of volcanoes. To this family belong basalt, greenstone, porphyry, and amygdaloid; and each of these has cousins and relations, every one of them being by birth a "trap." The trap family came by this name through a fancy of the Swedish geologist BERGMANN. In his examination of the geology of northern and western Germany, he found many rocks of peculiar mineral composition, and, for the most part, without stratification in themselves. These rocks appeared in great tabular masses, and extended their beds so unequally, as to form a succession of great terraces or steps on the side of the hills. As a flight of steps is called in Swedish "trappa," Bergmann gave this name to this species of rocks, and hence the word "trap." Fig. 34 represents their step-like appearance in certain countries.

Fig. 34.



The step-like appearance of trap rocks.

To understand this terraced aspect, or step-like appearance of trap rocks, in some parts of northern Europe, you must call to recollection the principles of your last lesson on submarine volcanoes.

Imagine a volcanic eruption to take place under the bed of

the ocean. The rocks below having been fissured up to the sea bottom, the liquid lava would rise to the top of the fissure, and flow out around the rims of the vent in all directions, like a wide-spreading sheet. The melted lava would soon, under the pressure and the cool temperature of the waters of the sea, cool down and become consolidated into a hard rock, like A. If the submarine volcano rest for an age or two, the hardened bed of the outstretching lava would become covered by a sedimentary rock, like B. You can imagine that these processes would be repeated two or three times, which would account for the repetition of trap rocks and sedimentary beds C D E.

In the course of time and ages, all these beds were upheaved by a power from below, and were raised to an elevation at which the currents and the waves of the sea could act upon them, while they were in the process of rising. The denuding action of the ocean would wear them away to their present configuration.

BERGMANN, and other German geologists, had seen these trap rocks only in a horizontal position. The progress of geological inquiry in other countries has shown that these rocks do not always present themselves in tabular masses as represented above; and that, consequently, "trap," as signifying step-like, is not uniformly a proper name for them. They sometimes appear as shapeless masses, and irregular cones, which form chains of small hills on the surface of the earth. These aspects of them have been already presented to your attention in figs. 6 and 7 in your third lesson.

There is another appearance of trap very common in volcanic regions. The trap appears like a wall of rock, intermediate between two sides of dislocated strata, and interrupting the continuity of the beds, as represented in the vertical column A B of fig. 33. It is when they are thus found that trap rocks are most aptly called "dykes," whether they be vertical or lateral as at E F of the same diagram.

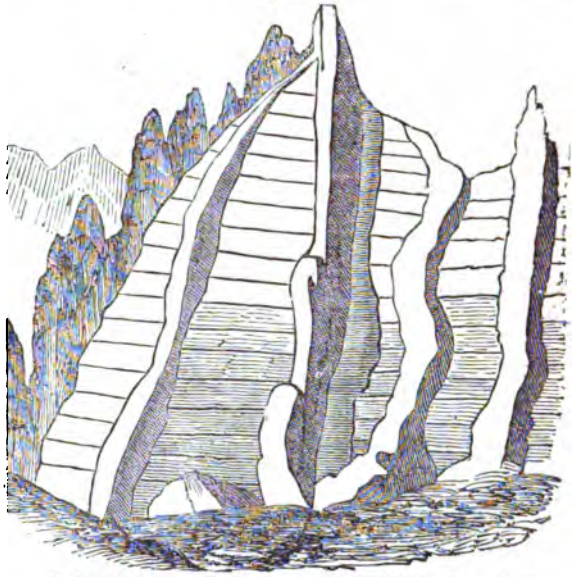
The spaces, which these trap rocks occupy and fill, were previously empty fissures which had been produced by earthquakes. It is well known that, during earthquakes, the ground is frequently fissured and rent asunder by a violent force from below upwards. Sometimes these fissures, in the surface, have much the appearance of cracks in a pane of glass when struck by a stone in the centre. The fissures strike out in every direction from a central point, and thinning towards their extremities. If melted lava were, either to rise in the upward direction of the power which forced the surface into fissures, or were it to overflow from a vent opened in the neighbourhood, it is manifest that such chasms would be filled up with trap dykes.

In the year 1669, a remarkable phenomenon took place in Mount Etna, which furnishes a clear illustration of the geological doctrines about the fissuring of mountains, and the subsequent filling up of those fissures by volcanic matter in a melted state. Near this volcano, is a large plain called St. Lio. At the commencement of the earthquake convulsions of this year, a fissure, six feet wide, and of unknown depth, opened in this plain with a tremendous crash, and ran in a somewhat curved direction up to within a mile of the very summit of Etna. This awful fissure was twelve miles in length, from north to south. Along this whole length it sent up a most vivid light. After this, five other fissures of considerable length opened one after another, but all parallel to the line of the first chasm. As each opened, it emitted smoke, and gave out bellowing sounds which were heard forty miles off.

These phenomena explain the formation of those continuous dykes of porphyry, a rock belonging to the trap family, which are seen to traverse the older lavas of Etna. The light which was emitted from the long and deep chasm in the plain of St. Lio, indicated that the entire fissure, up to a certain height, was filled with incandescent or burning lava. When the melted matter which filled this chasm would cool, it must become a solid wall, or hardened dyke, intersecting the older rocks of the mountain.

Try to reason out these facts. Suppose a rock, which has been thus fissured, and afterwards filled up with trap that has cooled into a hard wall or dyke, to become eventually upheaved, and brought under the influence of atmospheric agencies, such as air, rain, frost, and heat. These agents would wear away the ashy and the softer materials of the penetrated rock, and would leave the harder trap, that could better resist them, unaffected. The result would be that the trap dykes would have much the appearance of vertical walls carried on into the very heart of the rock. These facts are

Fig. 35.



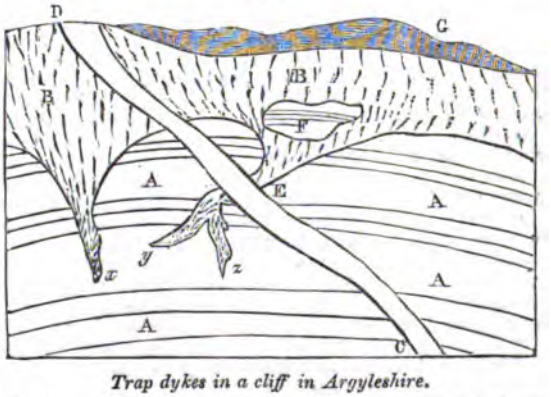
Dykes of trap at the base of a cliff in Val del Bove, Etna.

strikingly illustrated in a cliff in Mount Etna, at a place called Val del Bove. The diagram, fig. 35, represents these vertical dykes as they project out of the face of the cliff.

Some of the dykes in fig. 35 are composed of a volcanic rock called trachyte, and others of what are called blue basalt, both of them of trap character. The walls or dykes vary considerably in breadth. Some of them are only two feet in thickness, while others are twenty feet and more. They all project out of the softer cliff as faintly represented in the diagram. These dykes are for the most part vertical; others run in small curves. As they are of harder materials than the sand and the scoriæ of the cliff, they waste away under atmospheric influences much less rapidly than the rock which they penetrate.

It is impossible to recount all the variations which occur in the aspect of trap rocks. In some districts, sections of the

Fig. 36.



Trap dykes in a cliff in Argyleshire.

rocks show that these dykes run in a curved or tortuous course, and cut, not only through beds of volcanic tuff and sand, but also through earlier dykes of hardened lava. In such cases the action, or what I may almost call the *play*, of these trap dykes appears grotesque and amusing. You have observed that the fissures, already existing in the rock, send off

sometimes different branches, or divide into several fissures of equal dimensions; we find, accordingly, that trap dykes ramify, divide, and bifurcate, after the same wild fashion.

At a place called Ardnamuchan, in Argyleshire, there is a sea cliff which presents an instance of this play of the trap. Here an immense mass of trap has been propelled upward through strata of limestone till it reached the surface. There it spread itself along the face of the limestone, and sent down dykes which terminate downwards. It seems, that after the whole rock had for some time been settled in this state, there occurred another eruption of trap from another volcanic focus, which, in a diagonal direction, cut through both the stratified limestone and the earlier dyke and mass of the trap. See fig. 36.

In fig. 36, A is a stratified rock of limestone; B a mass of trap rock which has flowed over it, and sent dykes downwards in the direction of *x y z*; C D is a trap dyke which has fissured and cut through the limestone and the former dyke at E as well as through the mass B, to the surface; F is a large detached block of the stratified limestone included in the midst of the dyke; G is alluvial soil that afterwards covered the surface.

LESSONS IN GERMAN.—No. XVI.

Section XXIX.

We, da, hin, &c., besides being compounded one with another (Sect. XXVIII.) are also united with prepositions; thus producing a separate class of adverbs. Ex.: Wovon sprechen Sie? Of what (whereof) are you speaking? Ich spreche von meinen Büchern; wollen Sie eins davon haben? I am speaking of my books; will you have one of them? (one thereof?) Ich bin auf dem Hause; kommen Sie herauf! I am on the house; come up! Ich kann nicht hinauf gehen; kommen Sie herab! I can not go up; you come down!

Hinab, hinauf, hinaus, herab, &c., when used with nouns, are translated by prepositions; and the adverb, unlike its English equivalent, is placed *after* the noun. Ex.: Ich gehe den Berg hinauf; I go *up* the mountain. Kommen Sie den Berg herab; come *down* the mountain.

I. The verb kommen, frequently answers to our "*get*:" Ex.: Wie ist er in diesen Garten gekommen? How did he "*get*" into this garden? Er weiß nicht wie er heraus kommen soll; he does not know how to "*get*" out. Ich komme mit diesem Manne sehr gut fort; I "*get*" along with this man very well.

Exercise 31.

Cajü'te, *f.* cabin;	Herü'berkommen, to come over;	Hügel, *m.* hill, hillock;
Caser'ne, *f.* barrack;	Herun'tereilen, to hasten down;	Kreuzweg, *m.* crossway;
Dampfboot, *n.* steamboat;	Herun'terkommen, to come down;	Lauf, *m.* course, current;
Dieb, *m.* thief;	Hinab'gehen, to go down;	Nachtwache, *f.* watch;
Eisenbahn, *f.* rail-road;	Hinab'springen, to leap down;	Reh, *n.* roe;
Erschreck'en, to terrify;	Hinauf'laufen, to run up;	Schiffsbrücke, *f.* bridge of boats;
Felsen, *m.* rock;	Hinaus'gehen, to go out;	Schweizer, *m.* Swiss;
Geräusch, *n.* roaring;	Hinaus'kommen, to come out;	Straße, *f.* street;
Hase, *m.* hare;	Hinein'gehen, to go in;	Strom, *m.* stream;
Herab'stürzen, to precipitate;	Hinü'berfahren, to pass over;	Stunde, *f.* hour;
Herauf'kommen, to come up;	Hinü'berkommen, to go over;	Thüre or Thür, *f.* door;
Heraus'kommen, to come out;	Hinü'berschauen, to look over;	Treppe, *f.* stair;
Heraus'stürzen, to spring out;	Hinun'tergehen, to go down;	Treten, to tread, step;
Herein'kommen, to come in;		Ueber, over, beyond;
Herein'stürmen, to rush in;		Va'terland, *n.* native-country;
Herü'berfahren, to come over (in a vehicle);		Während, during, while
		Wenn, if;
		Wieder, again;
		Zwi'schendeck, *n.* deck, (between-deck).

Sie sehen hinab' in das wilde Meer.	You look down into the wild sea.
Da gießt wiend'licher Regen herab'.	There pours down interminable rain.
Die Knaben eilten den Berg hinauf'.	The boys hastened up the mountain
Der Bergmann steigt herauf' aus der Tiefe des Schachtes.	The miner comes up out of the depth of the shaft.
Petrus ging hinaus' und weinte bit'terlich.	Peter went out and wept bitterly.
Und hinein' mit bedächtigem Schritt ein Löwe tritt.	And thither (therein) with considerate step a lion strides.
Er wirft sich in die brau'sende Fluth.	He throws himself into the roaring flood.
Der Richter rief den Bauer herein'.	The judge called the peasant in
Das Leben des Menschen schwankt, wie ein Nachen, hinüber und herü'ber.	The life of man like a skiff, fluctuates hither and thither.
Der Dachdecker fiel vom Hause herun'ter.	The tiler fell down from the house.

1. Haben Sie meinen Freund gesehen? 2. Ja, er ist die Straße hinabgegangen. 3. Wollen Sie in die Cajüte hineingehen? 4. Nein, ich gehe in das Zwischendeck hinunter. 5. Fahren Sie heute mit (§ 112. 7.) dem Dampfboote nach Mainz hinüber? 6. Ja, und diesen Abend werde ich mit der Eisenbahn über die neue Schiffsbrücke wieder herüber kommen. 7. Hinab, hinauf geht unser Lauf. 8. Das Reh sprang den Berg hinab, während der Hase den Hügel hinauflief. 9. Die Soldaten stürzten aus der Caserne heraus, als der Feind in die Stadt hineinstürmte. 10. Als die Nachtwache in das Haus trat, eilte der erschrockene Dieb die Treppe herunter. 11. Ich kann nicht aus den Kreuzwegen dieses Gartens hinauskommen. 12. Wissen Sie nicht, wie dieser Vogel hereingekommen ist? 13. Ja, aber er weiß nicht, wo er wieder hinauskommen kann. 14. Der junge Schweizer schaute hinüber nach den blauen Bergen seines Vaterlandes. 15. Kommen Sie heute nicht herunter? 16. Ja, wenn der Oheim heraufkommt, werde ich hinabgehen. 17. Haben Sie diesen Mann sehen gehen? 18. Ja, er kam die Thüre herein, als ich hinausging. 19. Der Freund fuhr in einer Stunde den Fluß hinüber und herüber. 20. Der Strom stürzt mit großem Geräusch den Felsen herab.

1. The son hastened down to receive his father. 2. His speech lasted over two hours. 3. The roe sprang out from his hiding place. 4. Will you go over to Frankfort to-day by the steamboat? 5. No, I shall go over by the railroad and return by the steamboat. 6. Do not go beyond the crossway. 7. I saw your friend come in as your uncle went out. 8. These men who go over that bridge are in danger of their lives. 9. Will you go out to-day with your friends? 10. From this hill we can look over our country. 11. How did the thief get into your house? 12. Edward precipitated himself from the rock. 13. I shall pass your house this morning and shall come in, without you asking me to do so.

Section XXX.

When a sentence does not *begin* with its proper subject of nominative, or with some connective particle, the verb is commonly introduced *before* the subject. Ex.: Da geht Ihr Freund; There goes your friend. Hier steht sein Bruder; here stands his brother.

In compound tenses the *subject* comes between the auxiliary and the main verb. Ex.: Zu lange schon hast Du geschlummert; too long already hast thou slumbered. Jetzt muß ich gehen; now I must go. Heute kann er nicht lesen, und morgen will er nicht; he can not read to-day, and to-morrow he will not.

I. Fahren is both transitive and intransitive; when transitive it is conjugated with haben (§ 71. I.) and signifies to *convey* in a vehicle; to drive. Ex.: Der Kutscher hat mich schnell gefahren; the coachman has driven me rapidly. Der Kahnführer hat mich schnell gefahren; the boatman has rowed me rapidly. When intransitive it is conjugated with sein (§ 71. I.) and signifies to *ride* in a vehicle. Ex.: Ich bin gefahren; I have ridden (in a carriage, boat or other vehicle).

II. Reiten is also used transitively and intransitively and signifies to ride, as on horseback. Ex.: Der Araber reitet das Pferd und das Kameel; the Arabian rides the horse and the camel. Ich habe ein schnelles Pferd geritten; I have ridden a fleet horse. When used intransitively (§ 71. I.) it is conjugated with sein. Ex.: Er ist sehr schnell geritten; he has ridden (on horseback) very rapidly.

Exercise 62.

Fahren, to drive, ride (in a vehicle);	Holz'hauer, m. wood-cutter.	Ordentlich, orderly;	
Frankfurt, n.	Frank-furt;	Kalt, cold;	Reiten, to ride, (on horseback);
Früh, early;	Leben, to live;	Reitpferd, n. saddle-horse;	
Gesund', healthy;	Mäßig, temperate,		
Holz, n. wood; timber;	temperately;	Schlachten, to butcher;	
	Metzger, m. butcher;	Suchen, to seek.	

Da blühet eine Rose, und hier fällt eine ab.	There are rose blossoms, and here one falls off.
Hier steht der Jüngling, und da der Greis.	Here stands the youth, and there the aged man.
Morgen verläßt das neue Dampfboot den Hafen.	To-morrow the new steamboat leaves the harbour.
Es langes schon hast du gesäumt die verlor'ne Zeit einzuholen.	Too long already hast thou delayed to redeem the lost time.
Jetzt muß ich meinen Brief schließen.	I must now close my letter.
Heute kann er nicht froh sein, und morgen nicht lachen. Sprichwort.	To-day he cannot be joyful, and to-morrow not laugh. Adage.

1. Will der alte Soldat heute in den Wald gehen? 2. Er will hingehen, aber heute kann er nicht, denn er hat viel zu thun. 3. Der Landmann ißt auf dem Markt gegangen, um Fleisch zu holen. 4. Um gesund zu bleiben, muß man ordentlich und mäßig leben. 5. Der Holzhauer ist in den Wald gegangen, um Holz zu schneiden. 6. Der Metzger geht von einem Dorfe zum andern, um Ochsen zu suchen. 7. Er geht aus einem Dorfe in das andere, kann aber keinen Ochsen finden. 8. Was will er mit den Ochsen? 9. Er will sie schlachten; wir müssen ja Fleisch haben. 10. Der Bauer hat zwei Pferde, welche der Bauer kaufen will. 11. Ich gehe in die Stadt, um einen Hut oder eine Mütze zu kaufen. 12. Er hat Bücher zu lesen und eine Aufgabe zu schreiben. 13. Wo will der Freund Ihres Bruders hingehen? 14 Er will nirgends hingehen, er will bei seinem Ofen bleiben. 15. Wollen Sie auf den hohen Berg gehen. 16. Ich will dahin gehen, aber nicht heute. 17. Können Sie morgen auf das Land gehen? 18. Ich kann dahin gehen, aber ich will nicht. 19. Wann will Ihr Vater seine Pferde wieder haben? 20. Er muß sie morgen früh haben, weil er morgen Abend nach Frankfurt fahren will. 21. Warum will er nicht dahin reiten? 22. Weil er kein gutes Reitpferd hat, und das Wetter sehr kalt ist.

I. It is too cold for him to-day to go over to Frankfort. 2. There runs the hare over the hill. 3. There drives your brother. 4. The confectioner is gone to the bakehouse in order to bake bread. 5. The butcher goes to market in order to buy sheep. 6. Your coachman has driven me rapidly here. 7. Do you see that man upon that horse which we saw yesterday. 8. The soldiers ride on beautiful horses. 9. They say one rides in those carriages comfortably. 10. We have ridden in your coach to pay our visits. 11. Tread not beyond the law! 12. The new steamboat passes down the river to day for the first time.

LESSONS IN ENGLISH.—No. XVII.

By John R. Beard, D.D.

A summary of these prefixes arranged according to the sources whence they are derived, is presented in the following tables:

1.—Prefixes from the Greek.

1. A, *not*	15. Hept, *seven*	29. Ortho, *straight*
2. Amb, *about*	16. Hetero, *another's*	30. Pan, *all*
3. Ana, *up*	17. Hex, *six*	31. Para, *by the side of*
4. Anti, *opposite*	18. Hier, *sacred*	32. Pent, *five*
5. Apo, *from*	19. Holo, *whole*	33. Peri, *around*
6. Arch (k), *first*	20. Hyper, *above*	34. Phil, *fond of*
7. Auto, *himself*	21. Hypo, *beneath*	35. Phys, *natural*
8. Cata, *down*	22. Melan, *black*	36. Pleos, *full*
9. Deca, *ten*	23. Meta, *after*	37. Poly, *many*
10. Dia, *through*	24. Meter, *mother*	38. Proto, *first*
11. En, *in*	25. Miero, *small*	39. Pseudo, *false*
12. Epi, *upon*	26. Mono, *alone*	40. Syn, *with*
13. Eu, *well*	27. Neo, *new*	41. Tetr, *four*
14. Hemi, *half*	28. Olig, *few*	

2.—Prefixes, from the Latin.

1. A, *from*	21. Magn, *great*	41. Quadr, *four*
2. Ad, *to*	22. Mal, *bad*	42. Quinque, *five*
3. Ante, *before*	23. Mille, *a thousand*	43. Re, *back*
4. Bene, *well*	24. Mod, *limit*	44. Rect, *right, straight*
5. Bi, *twice*	25. Mobil, *soft*	
6. Cent, *hundred*	26. Mori, *death*	45. Retro, *backwards*
7. Circum, *around*	27. Multi, *many*	46. Se, *apart*
8. Cis, *on this side*	28. Non, *not*	47. Semi, *demi*
9. Co, *with*	29. Ob, *towards*	48. Sept, *seven*
10. Contra, *against*	30. Octo, *eight*	49. Sex, *six*
11. De, *downwards*	31. Omni, *all*	50. Soli, *alone*
12. Demi, *half*	32. Par, *part*	51. Sub, *under*
13. Dis, *apart, not*	33. Per, *through*	52. Super, *over*
14. E, *out of*	34. Pleni, *full*	53. Trans, *across*
15. Equi, *equal*	35. Post, *after*	54. Tri, *three*
16. Extra, *beyond*	36. Pre, *before*	55. Ultra, *beyond*
17. In, *in, into*	37. Preter, *against*	56. Uni, *one*
18. In, *not*	38. Pro, *forward*	57. Vice, *in place of*
19. Inter, *between*	39. Pusill, *little*	58. Viri, *alive*
20. Intra, *within*	40. Putri, *rotten*	

3.—Prefixes from the Saxon.

1. A, *in, on*	6. For, *the reverse*	11. Out, *not in*
2. Be, *intensive*	7. Fore, *in advance*	12. Step, *bereavement*
3. By, *instrumental*	8. Mid, *half-way*	13. Un, *not*
4. Down, *descent*	9. Mis, *failure*	14. Under, *beneath*
5. Ever, *always*	10. Over, *above*	15. Up, *upwards*

In this summary of prefixes in English, there are 41 prefixes of Greek origin, 58 of Latin origin, and 15 of Saxon origin, making in all 114 prefixes.

This statement presents some curious facts in the way of deductions. Out of 114 prefixes in English, only fifteen belong to the language of our nurseries. How largely indebted then must the English be to the Greek and the Latin; and how necessary to every student of English is some acquaintance with these languages. Let it be observed, that it is not merely that in English there are ninety-nine prefixes derived from the Greek and the Latin; but these prefixes enter into combination, and form very many words, the exact meaning of which can be known by those only who are acquainted with their component parts. Truly ours is a composite language. It is also a rich language, and has great flexibility, owing to the diverse sources whence its vocabulary comes. How poor comparatively would the language have been, but for the treasures it has derived from the classical tongues.

Since so many of our prefixes are of foreign origin, our compound words must also be to a large extent of foreign origin. Consequently monosyllables may in general be regarded as Saxon.

If we look at these prefixes in the state in which they appear in their originals, we find them for the most part to be prepositions or adverbs; as in a, ana, apo, bene, e, ex, extra, &c. Some, however, are adjectives, as melan, hex, magn. Again, some are nouns, as arche (kē), mort (mors).

In these facts we may learn something as to the origin of prefixes, and of particles generally. Appropriately is the term particle applied, for these words are little or broken parts of nouns or verbs, which once existed as nouns and verbs in the languages with which they are now connected as particles.

I have given above the Greek, the Latin and the Saxon, as the sources whence our prefixes are derived. The French might have been added; but the French is not an original source; words derived by us from the French may in general be traced back to the Latin as their parent.

A little attention may lead the student to suspect that there is some genealogical connexion between the three sources of our prefixes. By comparing particles together, he might be led to trace a resemblance between *dia* and *dis*; *hemi* and *demi*; *hex* and *six*; *hept* and *seven*; *holo* and *whole*; *in* and *in*; *en* and *in*; *non* and *not*, &c. In reality such a genealogical connexion does exist. The Greek, the Latin, and the Saxon (or Teutonic) are sister languages, being branches from the one stem called by linguists, the *Indo-Germanic* or *Indo-European* stem, which comprises the Sanscrit, or the old sacred tongue of Hindostan, the Celtic, or parent of the Gaelic, the Erse, the Latin, the Welsh, the native Irish; and the Teutonic, the parent of the Greek, the German, the Dutch and the Saxon-English. This family of languages then extends, you see, with some exceptions, from the banks of the Ganges to the Western shores of Ireland. It extends also from the North Cape to the Straits of Gibraltar.

The epithet *Indo-Germanic* is in origin prior to the epithet *Indo-European*. Indo-Germanic was intended to include two classes of languages, namely the Sanscrit (*Indo*), and the Germanic (*Teutonic* or *Saxon*), but when it had been ascertained that the Celtic was a kindred tongue, a more comprehensive epithet was required, and Indo-European was formed. But Indo-European errs somewhat in excess, since some dialects spoken in Europe are not of Indian, Celtic or Teutonic origin. That the English, as well as the Greek and Latin, is connected with the Sanscrit, may be seen by comparing together these numerals in the different tongues.

Sanscrit.	*Greek.*	*German.*	*English.*	*Latin.*	*Erse.*	*Welsh.*
1. eka	hen	ein	one	unus	aen	un
2. dwi	duo	zwei	two	duo	da	dau
3. tri	treis	drei	three	tres	tri	tri
4. chatur	tettar	vier	four	quatuor	keathair	pedwar
5. panchan	pente	fünf	five	quinque	knig	pump
6. shash	hex	sechs	six	sex	se	chwech
7. saptan	hepta	sieben	seven	septem	secht	saith
8. ashtan	okto	acht	eight	octo	ocht	wyth
9. navan	enneka	neun	nine	novem	noi	naw
10. dasan	deka	zehn	ten	decem	deich	deg

To you there may not seem the close resemblance among these words, severally, which is obvious to the student who is aware of the changes which letters undergo in allied tongues, from laws and influences peculiar to each separate language; but surely there is enough in the tabular view just given to illustrate what I state as a fact; namely, that the languages, of which specimens appear above, are kindred languages. Look, for instance, at the forms through which the numeral *three* passes, thus: tri, treis, drei, three, tres, tri, tri.

From these statements you will see that words which are found in the Sanscrit, the Greek, and the Latin; or, in the Sanscrit, the Saxon, and the Erse, may be designated Indo-European, inasmuch as they exist in the three great branches of that stalk, I mean in the Sanscrit, the Celtic, and the Teutonic.

Of these three,—namely, the Sanscrit, the Celtic, and the Teutonic, the first may be considered as the most ancient tongue; the second stands next in age, and the third is the youngest.

You have been led to regard monosyllables as to a large extent of Saxon origin. But many words, commonly considered Saxon, are rather Indo-European, being found in Sanscrit, in Greek, and in Latin, or in one of these besides the modern English. Such words as know, lick, break, yoke, sit, are the common property of the Sanscrit, the Latin, the Greek, the German, and the English.

Had I space to exhibit the proofs of the relationship of these languages, I should dwell on the similarity which prevails in the modifications of number, person, case, tense, &c., which they severally undergo; but I can, in addition, do nothing more than set down in different tongues the variations of a few words of universal prevalence, which indicate a common origin.

English.	*Sanscrit.*	*Greek.*	*Latin.*	*Teutonic.*	*Celtic.*
Father	pitri (pader)	pater	pater	vater	athair
Mother	matri	meter	mater	mutter	mathair
Son	sunu			sunu	
Daughter	duhitri	thugater		dauhtar	dear
Brother	bhratri	phrator	frater	brothar	brathair
Sister	swarsi		soror	swistar	siur
Man	manu		homo	mann	
Woman	vamani		femina		femen
Eye	akshi	okko	oculus	augo	
Nose	nasa		naso	nase	
Tooth	danta	odont	dent	thuntu	dend
Sun	heli	helio	sol	saull	haul
Moon	masa	men	mensi	mena	mios
Water	uda	udat	unda	vato	dour
Day	dyu	dio	diu	dag	dia
Sea	mira		mari	marei	muir
Light	loch (*to see*)	leuko	luc	licht	lhwg

Exercises for Parsing.

It is September. Hark! somebody is letting off a gun. They are shooting the poor birds. Here is a bird dropped down just at your feet. It is all bloody. Poor thing! How it flutters. Its wing is broken. It cannot fly any further. It is going to die. What bird is it? It is a partridge. Are you not sorry, Charles? It was alive a little while ago. Bring the ladder. Set it against the tree. Now bring a basket. We must gather apples. No, you cannot go up the ladder. You must have a little basket and pick up apples under the tree. Shake the tree. Down they come.

A WHALE CHACE

We pulled in the direction in which she was "heading," where the rest of the boats already were; before we got up to them, she had made her appearance at the surface; a second boat had got fast to her, and just in time, as she was seen to be "loose" from the first. She did not take out much line from this boat, but remained away a considerably longer time than usual, greatly to our astonishment, until we found that she was "blowing" in some holes in the floe, a good distance from the edge of it. One of the harpooners immediately proceeded over the ice with a hand-harpoon, trailing the end of the line with him, assisted by part of his crew, and from the edge of the hole drove his weapon into the body of the poor whale; whilst some of the others following plied the bleeding wretch with their long lances, so that she was soon obliged to betake herself again to the open water outside the floe. Here more of her enemies were waiting, for one boat was immediately upon her, and a gun-harpoon was at once driven almost out of sight into her huge side, which was already bristling with weapons. Our boat was on her very back as she dived with an unwieldy roll, which sent it surging gunwale under, taking the line whistling out for a score of fathoms, until the harpooner, knowing she was pretty well exhausted, stopped her way, by taking three or four turns round the "boltard." But every few seconds she would make a start, drawing the boat almost head under, until the line was permitted to run out again, which, as it did so, made a grinding, burring noise, eating deep into the hard lignum vitæ of the boltard, enveloping the harpooner in smoke, and causing the most distinct smell of burning, which was only prevented from actually taking place by the line-manager throwing water constantly on it.

Again she appeared at the surface, but far exhausted; still she made a strong fight for it, lashing about with her tail and fins in fury whenever she seemed to have regained breath. It was no very pleasant sight to see her tail quivering high up in the air, within but a short distance of us, and coming down on the water with a loud, sharp crack, like the report of a dozen rifles, and which, had it alighted on any of our boats, had power sufficient to have converted their timbers into something very like lucifer matches. A few more lances soon settled her; and ere long, she was rolling on her back. The usual cheers of triumph were given, and we had time to breathe and shake ourselves, for it may be believed we had not escaped the showers of spray which the defunct had sent about so liberally. The water far around us was dyed with blood, and covered with a thick pellicle of oil, upon which the Mollys were as busy as they could be, whilst the edges of the ice, as far as we could see, were deeply crimsoned; and a hummock, on the edge of the floe, beside which the final struggle had taken place, was, from the summit downward, streaked with the black blood which the last few blasts of the dying monster had sent over it.—*Goodsir's Arctic Voyage.*

LESSONS IN LATIN.—No. XXV.

By John R. Beard, D.D.

DEPONENT VERBS.

I have already explained to you the meaning of the term deponent in the phrase Deponent Verbs. Deponent verbs are passive in form, but active in signification. I have already informed you that there are deponent verbs in each of the four conjugations. Under the guidance of this information you might possibly find your course sufficiently plain. But I know that learners often have a good deal of difficulty with these deponent verbs, and I shall therefore go into some detail in connexion with them.

Remember then that deponent verbs with a passive form have an active meaning. Take care that in construing you are not misled by the form. Take care not to confound passive verbs with deponent verbs. The Exercises you are about to go through will assist you in these precautions, if you perform them carefully.

Taking the conjugations in the order in which they stand in the preceding Exercises, I begin with hortor, *I encourage*, of the first conjugation. Now before you go over the parts of the verb observe the meanings carefully, as presented in the following paradigm or example. Pa ticularly notice that hortatus sum means *I have encouraged*; and hortatus, *having encouraged*. These deponent verbs have properly no participles with a passive signification; accordingly hortans is *encouraging*; hortaturus, *on the point of encouraging*; and hortatus, *having* (not being) *encouraged*.

DEPONENT VERBS, FIRST CONJUGATION.

EXAMPLE.—Hortor, *I encourage.*

		Indicative	*Subjunctive.*	*Imperative.*	*Infinitive.*	*Participles.*
PRESENT.	*I encourage, &c.*	*Singular.* hortor, hortáris, hortátur *Plural.* hortámur, hortámini, hortántur	*I may encourage.* horter, hortéris, hortétur; hortémur, hortémini, horténtur	*Encourage thou, &c.* *hortáre, hortátor; hortátor; [minor hortámini, hortántor	hortari, *to encourage*	hortans *encouraging*
IMPERFECT.	*I encouraged, &c.*	*Singular.* hortábar, hortabáris, hortabátur *Plural.* hortabámur, hortabámini, hortabántur	*I might encourage.* hortarer, hortaréris, hortarétur; hortarémur, hortarémini, hortaréntur			
I. FUTURE.	*I shall encourage.*	*Singular.* hortábor, hortábĕris, hortábĭtur *Plural.* hortabĭmur, hortabímini, hortabúntur			hortatúrum esse, *to be about to encourage.*	hortatúrus *about to encourage.*
PERFECT.	*I have encouraged.*	*Singular.* hortátus sum, hortatus es, hortatus est *Plural.* hortati sumus, hortati estis, hortati sunt	*I may have encouraged.* hortatus sim, hortatus sis, hortatus sit; hortati simus, hortati sitis, hortati sint			hortátus, *having encouraged.*
PLUPERFECT.	*I had encouraged.*	*Singular.* hortatus eram, hortatus eras, hortatus erat *Plural.* hortati eramus, hortati eratis, hortati erant	*I might have encouraged.* hortatus essem, hortatus esses, hortatus esset; hortati essemus, hortati essetis, hortati essent			
II. FUTURE.	*I shall have encouraged.*	*Singular.* hortatus ero, hortatus eris, hortatus erit *Plural.* hortati erimus, hortati eritis, hortati erunt				

GERUNDS. Genitive..... hortandi, *of encouraging.* Dative. .... hortando, *to encouraging.* Accusative.. hortandum, *to encourage.* Ablative.... hortando, *by encouraging.*

SUPINES. 1. hortatum, *to encourage.* 2. hortatu, *to be encouraged.*

After this manner form (write in full, putting the English to every single part) arbĭtror 1, *I am of opinion, I account*; imĭtor 1, *I imitate*; comitor 1, *I accompany*; aspernor 1, *I despise*; dominor 1, *I rule, sway*; mercor 1, *I purchase.*

Let me remind you of the fact that the participles here, as in all other cases, undergo such changes as are necessary to put them in concord with their nouns in number, case, and gender; thus hortatus in the singular becomes hortati in the plural; and hortatus in the masculine becomes for the feminine hortata, and for the neuter hortatum. So the infinitive hortatum esse may stand thus with a masculine noun in the accusative case, but with a feminine noun in that case it must become hortatam esse.

VOCABULARY.

Admĭror 1, *I admire*; contemplor 1, *I survey*; conor 1, *I attempt*; interpretor 1, *I give the meaning of* (E.R. interpreter); consigno 1, *I consign, record* (Lat. signum); propulso 1, *I drive away*; somnium, i, n, *a dream*; pulchritudo, ĭnis, *f. beauty*; demum, adv. *then at length, then for the first time.*

EXERCISES.—LATIN-ENGLISH.

Quis non admiretur splendorem, pulchritudinemque virtutis? Dux milites hortatus est ut hostium aciem perturbare conarentur; jam hostes urbem oppugnare conati sunt, quum repente a civibus propulsati sunt; tum demum beatus eris quum aspernatus eris voluptatem; contemplamini praeclara virtutis exempla quae in historiâ consignata sunt; venio te comitatum in hortum; somnia difficilia sunt interpretatu; Socrates totius mundi se incolam et civem arbitrabatur; disce libens; quid dulcius est quam discere multa? discentem comitantur opes, comitantur honores; homo improbus aliquando cum dolore flagitia sua recordabitur.

ENGLISH-LATIN.

I have admired the beauty of the women; they encouraged the man; the king will encourage his forces to drive away the enemy; the father accounted the son wicked; who will interpret the

[redacted]

advise, exhort. These words, however, resemble each other in signification. They all agree in the root-meaning of the verb hortor; which root-meaning is, *I stir up some one to some deed, I impel, urge.* Thus agreeing, the one or the other may be employed according as the English idiom, a regard to propriety, a regard to sound, or as your own taste may suggest; but observe that whatever word you prefer, it must, at least, in your literal translations, agree in its essential import with the Latin. A representative must resemble that which it represents.

VOCABULARY.

Imperium i, n, *command, government* (E. R. *imperial*); pareo 2, *I obey*; jungo 3, *I join, unite* (E. R. *junction*); iisdem de rebus, that is, de iisdem rebus, etiam. atque etiam, *again and again*; quibus, for de quibus, superior, orie, *previous, former*, sup. litt., *in any former letter*; fugio 3, *I fly from, avoid* (E. R. *fugitive*); desisto (de, *from*, and sto, *stand*) 3, *I desist, discontinue*; deficio (de and facio), *I fail, swoon*; pudendus, *shameful* (pud. goes with fugam); fuga, æ, *f. flight*; trepidus, *trembling, fearful* (E. R. *intrepidity*); equidem (ego and quidem), *I indeed*; desino 3, *I leave off, cease.*

EXERCISES.—LATIN-ENGLISH.

Sabinus suos hortatus signum dat; benefacta tua me hortantur tuo ut imperio paream; ad laudem milites hortabatur Cæsar; hortabantur eos in amicitiam jungendam; iisdem de rebus etiam atque etiam horter, quibus superioribus litteris hortatus sum; Pomperium hortari ut magnam infamiam fugiat non desistemus; hortatur eos ne animo deficiant; ego tunc pudendam trepidus hortabar fugam; equidem pacem hortari non desino.

ENGLISH-LATIN.

The master does not cease to recommend diligence; the master recommended diligence to his scholars; the master having recommended his scholars not to be idle gave kisses to all; thy wisdom exhorts me to obey thy government (command); he will advise them to join friendship (to become friends); thy father encourages thee concerning the same things (on) which I will encourage my brother; I exhort thee not to fail in courage; they have exhorted thy sister not to fail in courage; never will I advise shameful flight; he never ceases to recommend war.

KEY TO THE EXERCISES IN THE LATIN LESSONS.

By JOHN R. BEARD, D.D.

LESSONS VIII. TO XVII. *(continued.)*

Page 166, col. 2.—ENGLISH-LATIN.

Insipiens est impotens sui; pater est potens sui; potens sui est virtus; non est vitium potens sui; potensne sui est ira? natura sui est conservatrix; natura virtutis est conservatrix sui; nemo vestrum sui est potens; nostram plurimi sui sunt potentes; immemor mei est infidus amicus; fidi amici non sui sunt memores; tua memoria et desiderium mei mihi sunt gratissima; cura tui meangit; plurimi vestrum, O discipuli, diligentes sunt; mirus est amor sui.

Page 167, cols. 1, 2.—LATIN-ENGLISH.

Sallust is a very elegant writer; his books I gladly read (I am glad to read); I have a faithful friend; I am very much attached to him; the song of (thy) brother pleases me much; thou oughtest to read it; idleness (*hebetat*) makes the body grow heavy, labour strengthens (ft), avoid that, seek this; this letter moves me very much; these songs are very sweet; I do not believe that false man; the soldiers gladly obey that general; all favour that man; that precept of thine is excellent; this opinion pleases me, that displeases; this war is very cruel; this boy is industrious, that (one) sluggish; I keep in memory that excellent precept; that friend of thine is a very good man; that authority of yours is very great; I praise the diligence of that scholar, I blame the slowness of this (one), to that (one) school is very pleasant, to this (one) very troublesome.

Page 167, col. 2.—ENGLISH-LATIN.

Sallustius est scriptor elegans, Livius elegantior, et Cicero elegantissimus; eorum libros libenter lego; ejus fratres et amicus mihi sunt cari; fidum amicum habes et ei es addictissimus; fidi mei habent fidas uxores et eas valde amant; vehementer his litteris moveor; mendaci mulieri non credas; hic puer mihi placet, ille displicet; hoc poema valde est elegans, illud elegantius; hic tuus miles fortis est; hujus discipuli diligentia a me præceptore laudatur; in hac schola pleres quam in vestra sunt industrii discipuli.

Page 167, col. 2.—LATIN-ENGLISH.

Many men do not think the same on the same things (subjects) for the same day; the fool now trusts, now distrusts the same opinion; seditious soldiers withstand the commander himself; the mind moves itself; virtue is praiseworthy on its own account; often nothing is more hostile to a man than he is to himself; every animal loves itself; our country ought to be dearer to us than we ourselves; that precept of the Delphic oracle is excellent—know thyself; a liar often distrusts himself.

Page 167, col. 2.—ENGLISH-LATIN.

Hostes urbem obsident et eam expugnare tentant; hujus magni hominis factum ab omnibus scriptoribus laudatur; Cæsar et Pompeius præclari duces Romani sunt; illi fortuna amicior est quam huic; illius et hujus fortitudo mira est; rex ipse exercitûs est dux: non semper eâdem de iisdem rebus sentis; pater et filius iisdem litteris student; virtutes per se amabiles sunt; omnes se ipsos diligunt; patria tibi carior esse debet quam tute tibi; noscite vos ipsos, juvenes; mendax sæpe sibi ipsi diffidit.

Page 189, col. 1.—LATIN-ENGLISH.

The king who governs the state ought to take care of the safety of the citizens; all the citizens willingly obey a king whose government is mild and just; the citizens respect a king to (with) whom the laws are sacred; happy is the king whom all the citizens love; O king who governest our state, thou art pleased (resolved) to honour good citizens, to terrify evil-doers, to succour the wretched, and to hear the request of the good.

Page 189, col. 1.—ENGLISH-LATIN.

Reges qui civitates gubernant omnium civium salutem curare debent; boni homines libenter parent regibus quorum imperium est mite et justum; regibus quibus leges sunt sanctæ libenter parent boni cives; reges qui civibus cari sunt, sunt felices; O reges, qui civitates gubernant, colere virum bonum magnumque debetis; O Deus, colimus te cui placet miseris succurrere; hostes quibuscum confligatis patriam vestram devastant.

Page 189, col. 1.—LATIN-ENGLISH.

Who calls me? What art thou doing, my friend? Who writes this letter? What art thou thinking of? What am I doing? Why do I torture myself? What friendship is there among the ungrateful? What poem art thou reading? What man is coming? What poet is sweeter than Homer? Whose voice is sweeter than the voice of the nightingale? What sins do we most easily yield to? Whatever is dishonourable is useful; whatever then seest, runs (away) with (in the lapse of) time; however the fact is, I defend my view; whatever opinion opposes virtue is false.

Page 189, col. 1.—ENGLISH-LATIN.

Quid dicis? quis est ille homo? quæ est illa femina? quibus cum ambulat amicus tuus? quem quæris? quem librum legis? ad quem has litteras scribis? quocunque modo res sese habent, sententiam tuam laudamus.

Page 189, col. 2.—LATIN-ENGLISH.

If we fear death some terror always hangs over us; if fortune takes away his money from any one (a person) he is not on that account miserable; Greece holds a certain small space of (in) Europe; there is (inheres) in our minds as it were an augury (presage) of future ages; God dwells in every good man; justice gives his due to every one according to his dignity; the love of life is planted in every one of us.

Page 189, col. 2.—ENGLISH-LATIN.

Malis aliqui terror semper impendet; quid terroris tibi impendet? si cupiam fortunam adimis, vituperaris; parvum quendam Græciæ pactem tenent; in unoquoque malesum hominum habitat malum; unicuique merita ejus tribuit justitia; pecuniam habeat quidam.

Page 190, col. 1.—LATIN-ENGLISH.

There are as many views as there are men; that princes do wrong is as great an evil as that there arise very many imitators of princes; as many kinds of orations as there are, so many kinds of orators are found; as are the generals, so are the soldiers; as is the king, so is the flock (people); as princes are in the state, so the citizens are wont to be; a good man does not despise wretched men, of whatever kind they are; the goods of the body and of fortune, how great soever, are uncertain and perishable; all the men that live love life; all the writers there use speak of the justice of Aristides.

Page 190, col. 1.—ENGLISH-LATIN.

Quot homines tot animi; quot pueri tot puellæ; quot patres tot matres; quantus est tuus mœror tantum est meum gaudium; quales sunt parentes tales sunt liberi; qualis pastor talis grex; res quascunque sunt non contemno; ab omnibus scriptoribus, quotcunque sunt, justus prædicatur Aristides.

Page 213, col. 2.—LATIN-ENGLISH.

There is no firm friendship among the bad I hasten to death;

the Gauls dwell beyond the Rhine; we have no weapons against death; a generous man is mild toward the conquered; comets are admirable on account of their rarity and beauty; slaves obey on account of fear, the good from a regard to duty; sailing along the shore is often dangerous; no one is happy before death; on what account dost thou laugh? below the moon (lunam) all things are perishable; thou dwellest many years among barbarians; the kingdom of Pluto is placed under the earth; the government of nations is in the power of kings; fish die out of water; the thing happened contrary to expectation; the camel bears hatred to horses; painted garments are mentioned with (in) Homer; many animals congregate and fight against other animals; the hippopotamus feeds on the corn-fields around the Nile.

Page 213, col. 2.—ENGLISH-LATIN.

Inter malos nulla est firma societas; contra mortem nulla habet homo arma; ultra mortem est vita; ad Rhenum properamus; ante domum sunt amici; apud me sunt filii mei; apud te suntne filii vestri? mitis erga victos est rex; post mortem boni sunt felices; quid est infra terram? Deus est super omnia et per omnia; infra nubes habitant homines; penes me mei sunt liberi; apud Ciceronem sunt multa pulchra dicta; rus propter te amo; intra muros sunt milites.

Page 214, col. 1.—LATIN-ENGLISH.

Poison is for (acts as) a remedy sometimes; an infant has no power without another's aid; eagles build on trees; the cuckoo lays in the nests of other birds; by old age our senses grow dull; some men are born with teeth; Xerxes fled from Greece (paucissimis) with very few soldiers; Metellus leads elephants in triumph; the traveller sings in presence of the robber; the stars move from the east to the west; Britain was discovered by the Phenicians; bees can not exist without a sovereign; it is sweet to die for one's country.

(To be continued.)

ANSWERS TO CORRESPONDENTS.

S. S. (Dewsbury): 1 Thessalonians, iv. 11, 12. 1 Timothy, v. 8.—A SUBSCRIBER, &c. (Leeds): We do not know.—RALPH (Shelf): We recommend Young's Introduction to Algebra, or Thomson's, in preference to those he mentions.—ISAK (Leicester): Very well, go on.—YOUNGSTER (Dartmouth): The square of 81 cells containing the nine digits is a regular puzzler; with many excellent correspondents, we doubt if it can be done as required.—H. ROBINSON and W. RICKARD (Sheerness); J. GUTHRIE, sen. (Kelso); J. N. (Chapel-en-le-Frith); WILLIAM WILLIS (Camden-town); JOHN PAUL; W. E. D. (Watling-st.); A. M. WHITE (Wood-st); A LEARNER (Greenock); G. DALE (Bermondsey); C. W. F. (London); J. P. Y. (Devonport); M. GRANT (Rathfriland); R. F. (Holytown); CHAS. MULDOON (Tyrone); LEWIS W. H. (Walsall); LOUIS BAILEY; ENTOMOLOGICUS (Hackney); RUSTY (Chatham); E. O. S. (Cork); DISCIPULUS (Newbury); GEORGE DACRES (Porthmouth); W. ROBINSON (Creswell); DAWSON (Knaresborough); R. JOPE (Horncastle); M. A. (Colchester); S. FEATHERSTONE (Newport); THOS. SMITH (Pendleton); CARLOW (Manchester); IRWELL; A WELL WISHER; S. HARPER (Exeter); S. J. WHITEHEAD and J. BROOK (Paddock); W. A. W. (Cantab); F. S. PURSEY (Kennington); A. M'CAY; THOS. HALLAM (Manchester); BROCARAM (Leeds); HELUO LIBRORUM (Glasgow); P. P. P. (Stockport); and J. G. THORNLEY (Ballyclare); W. J. MURRAY (Ramsgate); A PUPIL TEACHER (Greenwich); THOR (Cheltenham); F. MARKS; J. C. D. (Marlborough); W. T. COOPER (Reading); J. J. NEWTON (Bridgewater); Received.—ONE THAT WISHES, &c. (Bloomsbury): A box 6 ft. 7¾ in. long, 3 ft. 1¾ in. broad, and 4 ft. 9½ in. deep, contains 100 cubic feet and about ½ of a foot more; for the length is 79¼ or $\frac{21}{4}\frac{9}{2}$; the breadth 37¾ or $1\frac{41}{4}$; and the depth 57½ or $1\frac{1}{2}\frac{A}{}$. Whence, $\frac{319\times151\times115}{4\times4\times2\times1728}=\frac{5539435}{55296}=100\frac{2884}{3456}$ or 100 ⅚ nearly.—CÆSAR (Walworth) is mistaken.—E. ASHTON (High Wycombe); T. T. H.; MOLESTUS PUER (Liverpool); W. K.; H. S. (Tottenham): Quite right.—M. W. C.: Very well for a first attempt; but there are some errors in spelling, and in fact: *Saul* was *not* the wife of *Abraham!!* Did you mean *Sal?*—J. H. Ju. (Edinr.): Liebig has written on Chemistry in relation to Agriculture.—S. H. J. R. (Paisley); F. STERN (Chelsea): Right.—WILLIAM WALLWORTH (Newcastle): The last edition of "Keith on the Globes" is the best.—TENTAMUS proposes the following question:—"If an irresistible body, set in motion, comes in contact with an immoveable body; what will be the consequence?—F. L. W——N (Sutton): Wrong.—A SELF INSTRUCTOR: Your theoretical knowledge is excellent; try a little practice; and read our Lessons in Geometry, No. V., p. 172—174, No. VI., p. 204—206, and No. VII., p. 228—229.—A. W.: You *take* the horse, but the horse *carries* you.—X. Y. Z. (Bayswater): We recommend patience; all will be explained in due time.—A NEW CORRESPONDENT (Lambeth): Wrong.—APOLLO: Go on, and prosper; Keys will be given.—W. D. (Liverpool) should read the Propositions in Euclid carefully till he understands them; then laying the book aside, write out the same according to the best of his judgment and recollection; if, on comparing them with the book, he finds they are the same precisely in meaning, though differently worded, he has accomplished all that is required.—D. J. SNOWIS (Bayswater): There are some short and popular notices of Lord Brougham in various publications and biographical notices of eminent persons.—ENQUIRER (Manchester): The sentence proposed,—viz., "The wages of sin is death," requires more explanation, in order to parse it correctly, than has yet been given in the Lessons in English. You will soon, however, be able to do it, from the lessons that are to come.—YOUNG ENQUIRER (St. Neots): If a circular surface be under an inch in diameter, its area will of course be under a *square* inch in surface. Suppose it were $\frac{9}{8}$ or $\frac{9}{10}$ of an inch in diameter; then multiplying the square of $\frac{9}{8}$ or $\frac{9}{10}$ which is $\frac{81}{64}$ or $\frac{81}{100}$ by ·7854, the area of a circle whose diameter is unity, we have $\frac{9\times\cdot7854}{64}$ or $\frac{36\times\cdot7854}{256}$ equal to ·1104+ or nearly ⅛ of a square inch.—H. C. A.: With our Euclid and Arithmetic, and a little of Thomson's Algebra, or Young's, till our own comes out, along with the pages of the EDUCATOR, he may soon be able to pass the government examination.—E. R. (London): *Certainly*, the Latin lessons will be completed, and he who shall have mastered them shall have acquired a good elementary knowledge of the language, which will enable him to prosecute his future studies with ease and pleasure.—VIRGIL (Maldstone): *Curro* is neuter; he is mistaken about *curro*; but he is right about *i*, it should be *ĭ*.—HENRY (Swaffham): We cannot tell.—W. B. (Glasgow) proposes this problem: "If a snail crawls up a wall 20 feet high, going up 5 feet every day, and slipping back 4 feet every night, how many days will it take to reach the top of the wall?" T. BROWN (Manchester): When history is recommenced, it will include that of all nations.—A SCHOOLMASTER is unnecessarily grieved about multiplying money by money; it is stated in the rule of three that in working the question, the *multiplier* and *divisor* must be considered as *abstract numbers*, or merely the terms of a ratio; what more does he want?—J. U. P. (Strand): Try Troughton and Simms, Fleet-street, for the best "slide rules."—R. S. (Glasgow): Nothing that is *mutable* or *changeable* can be ETERNAL; matter possesses the property of *mutability* or *changeableness*, therefore it is NOT ETERNAL. God alone possesses the property of *immutability* or *unchangeableness*, therefore HE IS ETERNAL. The Hebrew name of God, i.e., JEHOVAH, signifies THE ETERNAL, viz., *he who was, and is, and is to come*, he who is *from everlasting to everlasting*. In the French translation of the Bible, this name, L'ETERNEL, is beautifully and appropriately used throughout the Old Testament, instead of the term LE SEIGNEUR or LORD. God claims this *immutability* as his distinguishing prerogative, in opposition to matter and to all created existences, whether of matter or mind. "I am the Lord (JEHOVAH, the ETERNAL), I CHANGE NOT." (Malachi iii. 6.)—ENGLISH SCHOLAR (Dundee): *Vocal* comes from *vox*, which signifies both the *voice* that utters, and the *word* uttered. Try Mathematics till you have finished the English. The fund is at rest at present.—ADITUS (Rothbury): We are now in the nineteenth century.—JOANNA G.: Try French.

W. COCHRANE (Glasgow): See vol. I., p. 112, col. 2, line 20.—S. H. J. R: We have seen the question often, but you remark with great propriety, that it is not fitted for our columns.—J. M. C. (Bray); W. T. COOPER (Reading): We shall explain the nature and use of the Mathematical Instruments, as soon as we can get opportunity.—H. LUXMORE (Beerferris): Candidly, we think he should study *all* Dr. Beard's Lessons on English, before he ever thinks of opening Shakespeare. Then, as to Shakespeare being a good work for young men, we say *decidedly not*; we speak from actual experience, and we would recommend, as far before it, the Proverbs of Solomon, and the three Epistles of John.—A. G. (London); Artificial Memory is a subject which might be admitted into the POPULAR EDUCATOR if there were any practical use in it, which we very much doubt; at the same time, it might form a subject of *amusement* as a relief from graver studies. Dr. Grey's *Memoria Technica*, is the original work, from which almost all others have borrowed.

LITERARY NOTICES.

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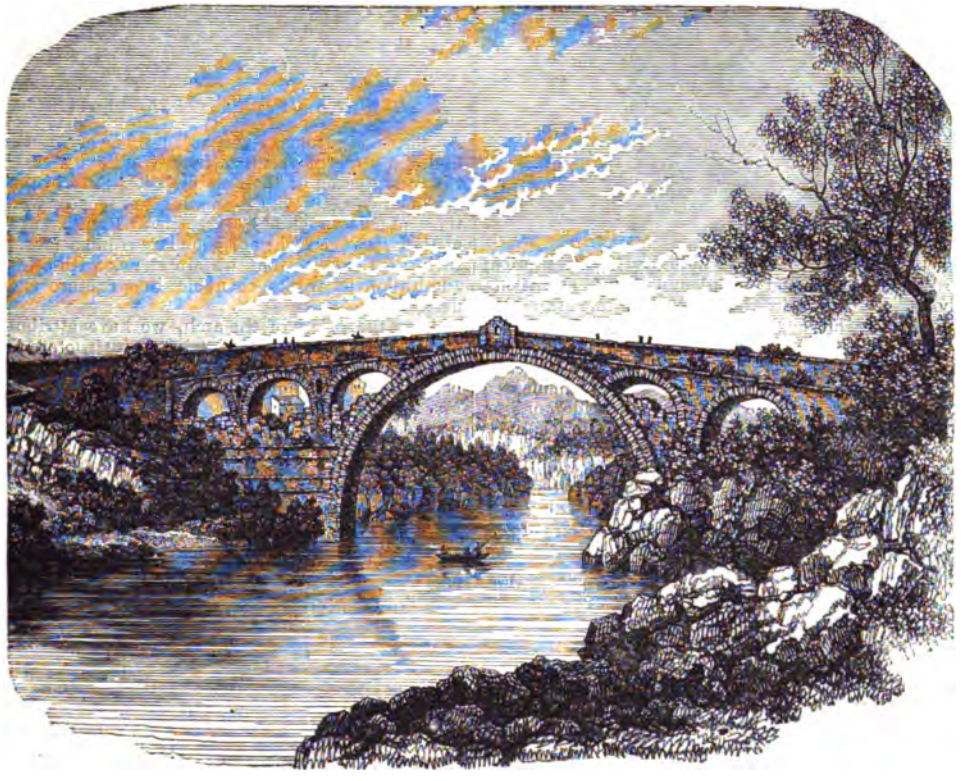
LESSONS IN ARCHITECTURE.—No. VII.

ARCHITRAVES, ARCHES, AND VAULTED ROOFS.

In ancient times, an *order*, the principal element of architecture, was connected with the adjacent buildings, which it was employed to ornament and to distinguish, by the architraves or horizontal pieces which constituted one of the important parts of its combination. Down to the period of the Greek architecture, we find no example of any deviation from this great principle of primitive construction. All the ancient edifices of Assyria and Babylonia, as well as of Egypt, Nubia, Abyssinia, and India, invariably show the mode of connecting one column with another, in horizontal lines, by means of a single piece, or solid *plate-bande*, as it may be fitly denominated. The Greeks, who worked out the ideas of the nations which preceded them in civilisation, and reduced them to system, as we have shown in former lessons, adopted the same principle of construction. Their edifices in Asia Minor, in Italy, in Sicily, as well as in Greece itself, are all rigorously constructed upon this principle, as may be seen in the Parthenon, at Athens, fig. 13, p. 337, vol. I. The Etruscans first carried the arts into Italy, and were the instructors of the Romans even before the Greeks. This ingenious people constructed the first Roman edifices, and built their arches and vaults as they still exist in the Cloaca Maxima, and the Mamertine Prison, which may be considered as the foundation of a style of architecture peculiarly Roman. Before the period of the Etruscans, the Pelasgians had attempted to construct arches; but they went no farther than the pointed arch, the difficulty of centering an arch having completely arrested their progress. In fact, their pointed arches, formed by successive courses of horizontal stones, could only be considered as the two abutments of a semicircular arch approaching each other. This fact is established by an examination of the gate of Arpino, the buildings of Alba Fucensis, of Tyrins, and of the Treasury of Atreus at Mycenæ. The Romans, on the other hand, after the example of the Etruscans, entered fully into the construction of the semicircular arch; and this new principle led to the grandest results. By this means, they were enabled to use materials which were of a moderate size, and easy to raise to great heights; and to construct immense vaults, which agreed with the arch in their circular form.

Fig. 21.



ROMAN BRIDGE OF CEMET (PYRENEES ORIENTALES), FRANCE.

The period of Roman invention is one of the most brilliant in the history of art. Of the many edifices with which the Romans covered their provinces, there still remains a sufficient number to prove the excellence of their architectural system,

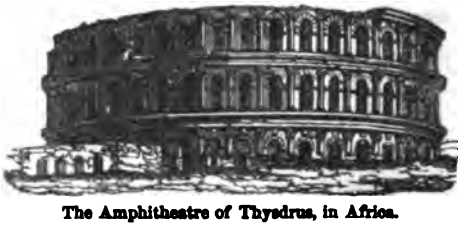
and the perfection to which they brought the science and skill of the practical builder. Arches and vaults raised by them of rough stone and bricks, and even of rubble, preserve their primitive solidity to this day. Their temples were constructed like those of the Greeks, on the principle of the architrave; but the remains of their aqueducts (see fig. 22), their baths, those edifices so imposing from their great extent, their triumphal arches, their circusses, and their theatres, show us how extensively the Romans employed the arch and the *vault* in their edifices. But of all their remarkable edifices, the amphitheatres were those in which the multiplied and varied use of these

Fig. 22.

Roman Aqueduct.

most frequently occur, those immense buildings in the elliptical form, with rows of seats placed round and round, and rising gradually above one another, in which the spectators assembled to witness their barbarous spectacles. The style of architecture employed in these buildings was of a vigorous and substantial character adapted to its use. Two or three stories of immense arcades or rows of arches, divided by piers ornamented with columns or pilasters, admitted light into the corridors or long passages, which surrounded the edifice. Other galleries, more or less numerous, and parallel to the preceding, were constructed below the seats. From floors, on a level with these galleries, or by numerous flights of steps, they were admitted to the seats by entrances so arranged as to prevent crowding and confusion. Four open passages disposed along the axes of the soles or projecting ornaments in stone, fitted so as to receive vertical rods, upon which was spread a velarium or large curtain, covering the seats and the arena, in order to defend the spectators from the heat of the sun. Thus we see how the long corridors, the numerous flights of steps, the cells for animals, and the aqueducts required, arches and vaults, of all dimensions and of all forms, as straight, skew, &c. These edifices are unquestionably such as do the greatest honour to the architectural and constructive genius of the Romans. Many of them still remain, and some are in such a high state of preservation as to enable us to examine their minutest details. The finest example is the famous Amphitheatre of Flavian at Rome, which was capable of containing more than 100,000 spectators; those of Pola in Istria, of Nîmes and Arles in France, and of Thysdrus in Africa (for the latter see fig. 23).

Fig. 23.

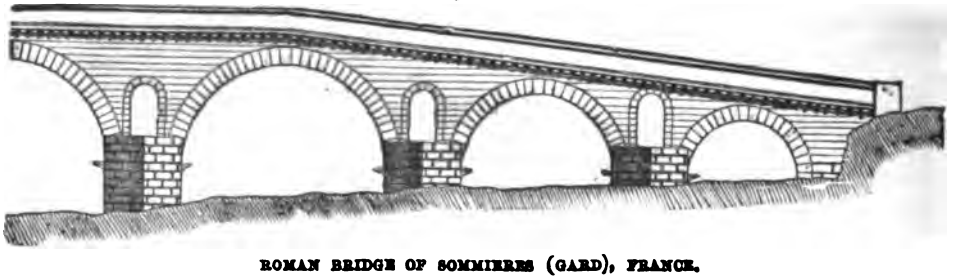


The Amphitheatre of Thysdrus, in Africa.

Although the Romans displayed their greatest science in the building of amphitheatres, they exhibited their greatest art in the construction of their public baths; for in these the building of arches and vaults was most extensively employed. In those of Diocletian and Caracalla at Rome, and that of Julian at Paris, we see arches of such large dimensions, and vaults of such great extent, that we are struck with astonishment and admiration at works so noble in structure and so bold in design.

As to the origin of the arch, we have attributed it to the Romans, or rather to their original instructors the Etruscans. But it must be mentioned that brick arches are said to have been found buried in the tombs of Thebes in Egypt; and that Mr. Hoskins describes one eight feet six inches in span, which was regularly formed. Among the ruins of Meroë, the ancient capital of Ethiopia, he found a semicircular arch of stone covering a portico, and at Gibel el Berkel a pointed arch, which was over the entrance to a pyramid. Under these circumstances, it appears remarkable that the use of the arch in building should not have passed from Ethiopia, or from Thebes

Fig. 24.



ROMAN BRIDGE OF SOMMIERES (GARD), FRANCE.

building, which, as we have said, was in the form of an ellipse, gave admittance to the arena from without; round the arena were placed the cells which contained the animals. Behind these cells were constructed also corridors or long passages communicating with every part of the building, and placed under the first row of arches, or the first rew of seats for the spectators.

The rain-water was carried off by water-courses and drains which ran into an aqueduct passing under the arena; while other aqueducts were employed to inundate it when nautical entertainments were brought before the spectators. At the top of the building and all round it outside, were placed con-

itself, into the ordinary architecture of Egypt. As neither the latter country nor Greece adopted the arch in their constructions, the merit of introducing it into general architecture must still remain with the Romans; for although Pericles adorned the city of Athens with splendid edifices, it was left for the Romans to construct a stone arch over the small river Cephisus, upon the most frequented road to that city. It appears that the construction of the arch was also known to the Chinese long before it made its appearance in Europe; it covers the gateways in their great wall; it is seen in the construction of their sepulchral monuments; and it was employed in the construction of their bridges. Kircher in his account

of China, speaks of some three and four miles long, and of an arch of the incredible span of six hundred feet!

There are numerous specimens of Roman architecture in France, the ancient Gaul, which, by their stability and the excellence of their construction, have long survived the era of their architects. One of the finest of these, is the bridge over the Vidourle, at Sommieres, in the department of the Gard. It is composed of seventeen arches, of which nine have been encroached upon by the town, and are sunk under the principal street, so that the water now flows under eight arches only. Every pier is hollowed out into a small arch, in order to increase the water-way during floods. Fig. 24 is an elevation of part of this bridge, which is supposed to have been built in the reign of Tiberius Cæsar!

The bridge of Ceret, over the Tech, in the department of the *Eastern Pyrenees*, represented in fig. 21, is a remarkable specimen of the age in which it was supposed to be built, which ascends to the time of the Visigoths, and is still within the domain of ancient Roman history. The middle arch is about 154 feet, and the abutments are relieved by arches which contribute to the elegance and beauty of the whole.

LESSONS IN FRENCH.—No. XXVII.

By Professor Louis Fasquelle, LL.D.

Section LVI.

1. The French avoid placing the verb at the end of such sentences as the following, when the nominative is a noun;—

Dites-moi où demeure M. H.	*Tell me where Mr. H. lives.*
Je ne sais où est mon père.	*I do not know where my father is.*
Savez-vous où est George?	*Do you know where George is?*

2. In speaking of a state, condition, or action, commenced in the past, but still continuing, the French use the present of the indicative. The past is commonly used in English in similar cases:—

Combien de temps y a-t-il qu'il est ici?	*How long has he been here?*
Il y a deux heures qu'il écrit.	*He has been writing these two hours.*
Il y a un mois qu'il demeure à Paris.	*He has lived in Paris one month.*
Il y a deux ans qu'il est mort.	*He has been dead these two years.*

3. When, however, the state no longer continues, the past may be used in French, in the same manner as it is used in English:—

Combien de temps avez-vous demeuré à L.?	*How long did you live in L.?*
Combien de mois avez-vous appris l'allemand?	*How many months did you learn German?*
Il y un mois que je ne l'ai vu.	*I have not seen him this month.*

4. Combien y a-t-il.....Combien de milles y a-t-il.....Quelle distance y a-t-il? answer to the English expressions *How far .....How many miles is it.....What is the distance?*

Combien y a-t-il de Paris à Londres?	*How far is it from Paris to London?*

Résumé of Examples.

Combien de temps y a-t-il que vous avez cette maison?	*How long have you had that house?*
Il y a deux ans que nous l'avons.	*We have had it these two years.*
Combien de temps avez-vous eu cette maison?	*How long did you have that house?*
Nous l'avions dix ans.	*We had it ten years.*
Combien de temps y a-t-il que votre frère apprend le grec?	*How long has your brother been learning Greek?*
Il y a six ans qu'il apprend.	*He has been learning it six years.*
Quelle distance y a-t-il de Calais à Boulogne?	*How far is it from Calais to Boulogne?*
Il y a huit lieues de Calais à Boulogne.	*It is eight leagues from Calais to Boulogne.*

Exercise 111.

Affiche, *f. bill.*	Demi, e, *half.*	Morceau, m. *piece.*
An, m. année, *f. year.*	Fatigué, e, *tired.*	Né, *from* naître, *v. to be born.*
Attend-re, *v. to expect, to wait for.*	Imprimeur, m. *printer.*	Verger, m. *orchard.*
Compagnie, *f. company.*	Lieue, *f. league.*	Vienne, *Vienna.*
Copenhague, *Copenhagen.*	Maintenant, *now.*	
	Mois, m. *month.*	

1. Combien de temps y a-t-il que M. L. demeure à Paris? 2. Il y a dix ans qu'il y demeure. 3. N'a-t-il pas demeuré à Lyon? 4. Il y a demeuré autrefois. 5. Pouvez-vous me dire où est le fils du capitaine. 6. Il y a un an qu'il est en Angleterre. 7. Savez-vous où demeure M. B.? 8. Il demeurait autrefois à Rouen; je ne sais pas où il demeure maintenant. 9. Y a-t-il longtemps que vous êtes ici? 10. Il y a plus de deux mois que nous sommes ici. 11. Combien de temps y a-t-il que vous avez ce verger? 12. Il y un an que nous l'avons. 13. Savez-vous combien il y a de Paris à Vienne? 14. Il y a trois cent six lieues de Paris à Vienne et deux cents lieues de Vienne à Copenhague. 15. Y a-t-il longtemps que la compagnie est venue? 16. Il y a plus de deux heures qu'elle est ici. 17. Y a-t-il longtemps que vous avez lu cette affiche. 18. Il y a plus de trois heures que je l'ai lue. 19. N'y a-t-il pas plus d'une demi-heure que votre sœur lit? 20. Il y a si longtemps qu'elle lit, qu'elle en est fatiguée. 21. Y a-t-il longtemps que vous attendez ce morceau de musique. 22. Il y a plus d'un an que je l'attends.

Exercise 112.

1. Do you not know where my father lives? 2. I know where he lives, but I have no time to go to his house to-day. 3. How long has the physician lived in Paris? 4. He has lived there ten years. 5. How long did he live in England? 6. He lived in England six years and a half. 7. Can you tell me where the locksmith lives? 8. He lives at my brother's. 9. Have you been waiting long for this book? 10. I have been waiting for it more than a year. 11. How long has your son been learning Greek? 12. He has been learning it these two years. 13. How long has your brother had this orchard? 14. He has had it more than six months. 15. How far is it from Paris to Lyons? 16. It is one hundred and sixteen leagues from Paris to Lyons. 17. Is it farther (*plus loin*) from Lyons to Geneva than from Lyons to Turin? 18. It is farther from Lyons to Turin than from Lyons to Geneva. 19. How long did your father live in Germany? 20. He lived in Germany two years, and in England six months. 21. How long did you live in Rome? 22. We lived there more than a year. 23. Have you been learning German more than one year? 24. I have been learning it more than four years.

Section LVII.

1. Changer [1. *see* § 49 (1)], used in the sense of *to change, to leave one thing for another*, is followed by the preposition *de*: changer d'habit, de chapeau, etc., *to put on another coat, hat,* &c.; changer d'avis, *to change one's mind*; changer de maison, *to move, to change houses*; changer de place, changer de pays, changer de climat, *to go to another place, country, climate*; changer de nom, *to change one's name*. The student will perceive that the noun following *changer*, is not preceded by a possessive adjective, like the noun of the English sentence:—

Voulez-vous changer d'habit?	*Will you change your coat?*
Ce monsieur a changé de nom.	*That gentleman has changed his name.*

2. Changer contre, means *to exchange for*; changer pour, *to change for, to get change for*:—

Voulez-vous changer votre chapeau contre le mien?	*Will you exchange your hat for mine?*
Changez ce billet pour de l'argent.	*Change that bill for silver.*

3. Tarder means *to tarry, to be long in coming*. Tarder, used unipersonally, and preceded by an indirect object, means *to long, to wish for*:—

Votre sœur tarde bien à venir.	*Your sister is very long coming*
Il me tarde de la voir.	*I long to see her.*

Résumé of Examples.

N'avez-vous pas changé d'appartement?	*Have you not taken another apartment?*
Nous avons changé de maison.	*We have changed houses.*
Votre frère a changé de conduite.	*Your brother has changed his conduct.*
Contre quoi avez-vous changé votre cheval?	*For what have you exchanged your horse?*
J'ai besoin de monnaie, pouvez-vous me changer cette pièce de vingt francs?	*I want change, can you change me this twenty franc piece?*
Ce garçon a beaucoup tardé.	*That boy tarried very much.*
Il nous tardait d'arriver.	*We longed to arrive.*
Il leur tardait de revoir leurs amis.	*They longed to see their friends again.*
Il me tarde de revoir la France.	*I long to see France again.*

Exercise 113.

Air, m. *air.*	Jeune, *young.*	Pays, m. *country.*
Avis, m. *mind, meaning.*	Maître, m. *master.*	Rentrer, 1. *to come in again.*
Blanc, che, *white.*	Manteau, m. *cloak.*	Vie, f. *life, conduct.*
Combat, m. *combat.*	Monnaie, f. *change.*	Visage, m. *countenance, face.*
Conduite, f. *conduct.*	Mouillé, e, *wet.*	
Gris, e, *gray.*	Parceque, *because.*	
Guinée, f. *guinea.*	Passé, e, *past, last.*	

1. Cet homme n'a-t-il pas changé de vie? 2. Il a changé de conduite. 3. Cette grand maison n'a-t-elle pas changé de maître. 4. Elle a changé de maître, le capitaine G. vient de l'acheter. 5. Vous êtes mouillé, pourquoi ne changez-vous pas de manteau? 6. Parceque je n'en ai pas d'autre. 7. Votre cousine ne change-t-elle pas souvent d'avis? 8. Elle en change bien souvent. 9. Pendant le combat, ce jeune soldat n'a-t-il pas changé de visage? 10. Il n'a point changé de visage. 11. Ce malade ne devrait-il pas changer d'air? 12. Le médecin lui recommande de changer de pays. 13. Où est votre cheval gris? 14. Je ne l'ai plus, je l'ai changé contre un blanc. 15. Avec qui l'avez vous changé? 16. Je l'ai changé avec le jeune homme qui demeurait ici le mois passé. 17. Le marchand peut-il me changer cette pièce de quarante francs? 18. Il ne saurait (*cannot*) vous la changer, il n'a pas de monnaie. 19. Avez vous la monnaie d'une guinée (*change for a guinea*). 20. Combien de schellings, y a-t-il dans une guinée? 21. Il y en a vingt-et-un. 22. Votre petit garçon ne tarde-t-il pas à rentrer? 23. Il tarde beaucoup. 24. Ne vous tarde-t-il pas d'aller en Italie? 25. Il me tarde d'y aller.

Exercise 114.

1. Why do you not change your coat? 2. For a very good reason (*raison*, f.), because I have no other. 3. Has your father changed houses? 4. No, Sir, but we intend to do so (*de la faire*) to-morrow. 5. Has that child changed his conduct? 6. He has changed his conduct, he is very good now (*maintenant*). 7. Was not your brother afraid, did not his countenance change? 8. His countenance changed, but he was not afraid. 9. Have you not changed rooms (*chambre*, f.)? 10. I have not changed rooms, my room is very good. 11. Do you not long to be in France? 12. I long to be there. 13. Does not your mother tarry too long? 14. She is very long in coming. 15. Have you changed the forty franc piece? 16. I have not changed it yet. 17. Why have you not changed it? 18. Because your father has no change. 19. Have you the change for a guinea? 20. No, Sir, I have only twelve shillings. 21. How many cents are there in a dollar? 22. There are one hundred. 23. With whom have you exchanged your horse? 24. I have exchanged it with my brother. 25. I have exchanged it for a white one.

LESSONS IN ARITHMETIC.—No. XVII.

PROPERTIES OF NUMBERS.

The *progress* as well as the *pleasure* of the student in arithmetic, depend very much upon the *accuracy* of his *knowledge* of the terms which are employed in mathematical reasoning. Particular pains should therefore be taken to understand their true import.

It has been observed, that an integer signifies a *whole* number.

Whole numbers or integers are divided into *prime* and *composite* numbers.

A *composite* number, we have seen, is one which may be produced by multiplying two or more numbers together. Thus, 4, 10, 15, are composite numbers.

A *prime* number is one which *cannot* be produced by multiplying any two or more other numbers together; or which *cannot* be exactly divided by any *whole* number, except a *unit* and *itself*. Thus, 1, 2, 3, 5, 7, 11, 13, &c., are prime numbers.

One number is said to be *prime to another*, when a *unit* is the only number by which both can be divided without a remainder.

The learner must be careful not to confound numbers which are *prime to each other* with *prime* numbers; for numbers that are [illegible] each other, may themselves be *composite* numbers. Thus [illegible] prime to each other, while they are composite numbers. [illegible]ber of prime numbers is unlimited. A method of [illegible] is given below.

An *even* number is one which can be divided by 2 without a remainder. Thus, 4, 6, 8, 10, are even numbers.

An *odd* number is one which cannot be divided by 2, without a remainder. Thus, 1, 3, 5, 7, 9, 15, are odd numbers.

All even numbers except 2, are *composite* numbers; an odd number is sometimes a *composite*, and sometimes a *prime* number.

One number is a *measure* of another, when the former is *contained* in the latter any number of times without a remainder. Thus, 3 is a measure of 15; 7 is a measure of 28, &c.

One number is a *multiple* of another, when the former can be *divided* by the latter without a remainder. Thus, 6 is a multiple of 3; 20 is a multiple of 5, &c.

A *multiple* is therefore a *composite* number, and the number thus contained in it is always one of its factors.

The *aliquot parts* of a number, are the parts by which it can be *measured* or *divided* without a remainder. Thus, 5 and 7 are the aliquot parts of 35.

The *reciprocal* of a number is the quotient arising from dividing a *unit* by that number. Thus, the reciprocal of 2 is $\frac{1}{2}$; the reciprocal of 3 is $\frac{1}{3}$; that of $\frac{2}{4}$ is $\frac{4}{2}$, &c.

The *difference* between a given number and 10, 100, 1000, &c., that is, between the given number and a unit of the next *higher order*, is called the Arithmetical Complement *of that number*. Thus, 3 is the complement of 7; 15 is the complement of 85.

The arithmetical complement of a number consisting of *one* integral figure, either with or without decimals, is found by *subtracting* the number from 10. If there are *two* integral figures, they are subtracted from 100; if *three*, from 1000, &c.

A *perfect* number is one which is equal to the *sum* of all its *aliquot* parts. Thus, 6=1+2+3, the sum of its aliquot parts, and is a perfect number.

All the numbers known, to which this property really belongs, are the following:—6; 28; 496; 8,128; 33,550,336; 8,589,869,056; 137,438,691,328; and 2,305,843,008,139,952,128. All perfect numbers terminate with 6, or 28.

By the term *properties* of numbers, is meant those relations or proportions which they possess from their nature and construction. Some of the more prominent and useful are the following:—

1. The sum of any *two* or *more even* numbers, is an even number.

2. The difference of any *two even* numbers, is an even number.

3. The sum or difference of *two odd* numbers, is *even*; but the sum of *three* odd numbers, is *odd*.

4. The sum of any *even* number of odd numbers, is even; but the sum of any *odd* number of odd numbers, is odd.

5. The sum, or difference, of an *even* and an *odd* number, is an odd number.

6. The product of an *even* and an *odd* number, or of *two even* numbers, is even.

7. If an even number be divisible by an odd number, the *quotient* is an even number.

8. The product of any number of factors, is *even*, if any one of them be even.

9. An odd number cannot be *divided* by an even number without a remainder.

10. The product of any *two* or *more odd* numbers, is an odd number.

11. If an odd number divides an even number, it will also divide the *half* of it.

12. If an even number be divisible by an odd number, it will also be divisible by *double* that number.

13. Any number that *measures* two others, must likewise measure their *sum*, their *difference*, and their *product*.

14. A number that *measures* another, must also measure its *multiple*, or its *product* by any *whole* number.

15. Any number expressed by the decimal notation, divided by 9, will leave the *same remainder*, as the sum of its figures or digits divided by 9.

For Example.—Take any number, as 6357; now separating it into its several parts, it becomes 6000+300+50+7. But 6000=6×1000=6×(999+1)=6×999+6. In like manner 300=3×99+3, and 50=5×9+5. Hence 6357=6×999+3×99+5×9+6+3+5+7; and 6357÷9=(6×999+3×99+5×9+6+3+5+7)÷9. But 6×999+3×99+5×9 is evidently divisible by 9: therefore if 6357 be divided by 9, it will leave the same remainder as 6+3+5+7÷9. The same will be found true of any other number whatever.

This property of the number 9 affords an ingenious method of proving each of the fundamental rules. The same property belongs to the number 3; for, 3 is a measure of 9, and will therefore be contained an exact number of times in any number of 9s. But it belongs to no other digit.

The preceding is not a *necessary* but an *incidental* property of the number 9. It arises from the *law* of *increase* in the decimal notation. If the *radix* of the system were 8, it would belong to 7; if the radix were 12, it would belong to 11; and universally, it belongs to the number that is *one* less than the *radix* of the system of notation.

16. If the number 9 is multiplied by any *single* figure or digit, the *sum* of the figures composing the product, will make 9. Thus, $9\times4=36$, and $3+6=9$.

17. If we take any two numbers whatever; then *one* of them, or their *sum*, or their *difference*, is divisible by 3. Thus, take 11 and 17; though neither of the numbers themselves, nor their sum, is divisible by 3, yet their difference is, for it is 6.

18. Any number divided by 11, will leave the *same remainder*, as the sum of its *alternate* digits in the *even* places reckoning from the right, taken from the sum of its alternate digits in the *odd* places, increased by 11 if necessary.

Take any number, as 38405603, and mark the alternate figures, thus $\dot{3}8\dot{4}0\dot{5}6\dot{0}3$. Now the sum of those marked, viz., $8+0+6+3=17$. The sum of the others, viz., $3+4+5+0=12$. And $17-12=5$, the remainder sought. That is, 38403603 divided by 11, will leave 5 remainder. Again, take $5\dot{8}4\dot{7}\dot{3}6\dot{2}$, the sum of the marked figures is 14; the sum of those not marked is 21. Now, 21 taken from 25 ($=14+11$), leaves 4, the remainder sought.

Every *composite number* may be resolved into *prime factors*. For, since a composite number is produced by multiplying two or more factors together, it may evidently be resolved into those factors; and if these factors themselves are *composite*, they also may be resolved into *other* factors, and thus the analysis may be continued, until all the factors are *prime* numbers.

20. The *least* divisor of every number is a *prime* number. For, every whole number is either *prime* or *composite*: but a composite number, we have just seen, can be resolved into prime factors; consequently, the *least* divisor of every number must be a *prime* number.

21. Every *prime* number except 2, if increased or diminished by 1, is divisible by 4.

22. Every *prime* number except 2 and 3, if increased or diminished by 1, is divisible by 6.

23. Every *prime* number, except 2 and 5, is contained without a remainder, in the numbers expressed in the common notation by as many 9s as there are units, less one, in the prime number itself. Thus, 3 is a measure of 99; 7 of 999,999; and 13 of 999,999,999,999.

24. Every *prime* number, except 2, 3, and 5, is a measure of the number expressed in the common notation, by as many 1s as there are units, less one, in the prime number. Thus, 7 is a measure of 111,111; and 13 of 111,111,111,111.

25. All *prime* numbers except 2 are *odd*; and consequently terminate with an odd digit.

It must not be inferred from this that all *odd* numbers are *prime*. It is plain that any number terminating with 5, can be divided by 5 without a remainder.

26. All *prime* numbers, therefore, except 2 and 5, must terminate with 1, 3, 7, or 9; all other numbers are *composite*.

To find the *prime* numbers in any series of numbers. Rule:

Write in their proper order all the odd numbers contained in the series. Then reckoning from 3, place a point over every third number in the series; reckoning from 5, place a point over every fifth number; reckoning from 7, place a point over every seventh number, and so on. The numbers remaining without points, together with the number 2, are the primes required.

Take the series of numbers up to 40, thus, 1, 3, 5, 7, $\dot{9}$, 11, 13, $\dot{1}\dot{5}$, 17, 19, $\dot{2}\dot{1}$, 23, $2\dot{5}$, $2\dot{7}$, 29, 31, $\dot{3}\dot{3}$, $3\dot{5}$, 37, $3\dot{9}$; then including the number 2, the primes are 1, 2, 3, 5, 7, 11, 13, &c.

This method of excluding the numbers which are not prime from a series, was invented by Eratosthenes, and is therefore called *Eratosthenes' Sieve.*

DIFFERENT SCALES OF NOTATION.

A number expressed in the *decimal* notation, may be changed into *any required scale* of notation by the following rule:—

Divide the given number by the radix of the required scale continually, till the quotient is less than the radix; then annex to the last quotient the several remainders in a retrograde order, placing ciphers where there is no remainder, and the result will be the number in the scale required.

EXAMPLE 1.—Express 429 in the quinary scale of notation.

Explanation. By dividing the given number by 5, it is evidently distributed into 85 parts, each of which is equal to 5, with 4 remainder. Dividing again by 5, these parts are distributed into 17 other parts, each of which is equal to 5 times 5, and the remainder is nothing. Dividing by 5 the third time, the parts last found are again distributed into 3 other parts, each of which is equal to 5 times 5 into 5, with 2 remainder. Thus, the given number is resolved into $3\times5\times5\times5+2\times5\times45+0\times5+4$, or 3204, which is the answer required.

Operation.

5)429
5) 85—4
5) 17—0
3—2

Ans. 3204

EXERCISES.

1. Change 7854 from the decimal to the binary scale. *Ans.* 1111010101110.
2. Change 7854 from the decimal to the ternary scale. *Ans.* 101202220.
3. Change 7854 from the decimal to the quaternary scale. *Ans.* 1322232.
4. Change 7854 from the decimal to the quinary scale. *Ans.* 222404.
5. Change 7854 from the decimal to the senary scale. *Ans.* 100210.
6. Change 7854 from the decimal to the octary scale. *Ans.* 17256.
7. Change 7854 from the decimal to the nonary scale. *Ans.* 11686.
8. Change 7854 from the decimal to the duodecimal scale. *Ans.* 4666.
9. Change 35261 from the decimal to the quaternary scale.
10. Change 643175 from the decimal to the octary scale.
11. Change 175683 from the decimal to the septenary scale.
12. Change 534610 from the decimal to the octary scale.
13. Change 841568 from the decimal to the nonary scale.
14. Change 592835 from the decimal to the duodecimal scale.

Since every scale requires as many characters as there are units in the radix, we will denote 10 by *t*, and 11 by *e*. *Ans.* 2470 *te*.

To change a number expressed in *any given scale* of notation, to the *decimal* scale. Rule:

Multiply the left-hand figure by the given radix, and to the product add the next figure; then multiply this sum by the radix again, and to this product add the next figure; thus continue the operation till all the figures in the given number have been employed, and the last product will be the number in the decimal scale.

EXAMPLE.—Change 3204 from the quinary to the decimal scale.

Explanation. Multiplying the left-hand figure by 5, the given radix, evidently reduces it to the next lower order; for in the quinary scale, 5 in an *inferior* order make one in the next superior order. For the same reason, multiplying this sum by 5 again, reduces it to the next lower order, &c.

Operation.

3204
5
17
5
85
5
429 *Ans.*

This and the preceding operations are the same in principle, as reducing compound numbers from one denomination to another.

15. Change 1322232 from the quaternary to the decimal scale. *Ans.* 7854.
16. Change 2546571 from the octary to the decimal scale.
17. Change 34120521 from the senary of the decimal scale.
18. Change 145620314 from the septenary to the decimal scale.
19. Change 834107621 from the nonary to the decimal scale.
20. Change 403130021 from the quinary to the decimal slale.
21. Change 704400316 from the octary to the decimal scale.
22. Change 903124106 from the duodecimal to the decimal scale

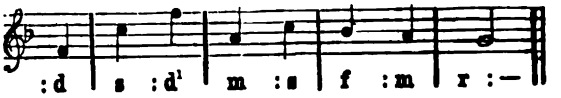
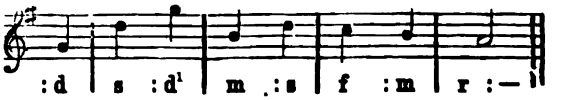
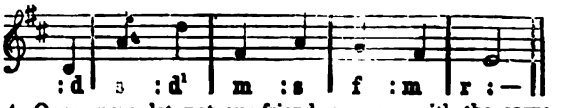
LESSONS IN MUSIC.—No. X.

By JOHN CURWEN.

1. IN pursuance of the plan of the last lesson, while our pupils are continuing their practice and study of the three chief notes of the scale, we shall "revise" and enlarge our previous lessons in reference to those points which are capable of being misunderstood, or need to be more fully explained. We must ask the patience of those pupils who have put themselves into our hands, with all good faith, content to learn one thing at a time, for we have to teach many who cannot understand us, because they have misunderstood music before. *Docility*—that quality so absolutely necessary to the student of any arranged course of lessons, which develops truth step by step—leads from the known to the unknown, from the easy to the difficult, is too often forgotten; and, as Dr. Marx says, to punish him for neglect of docility, the student looses all certainty of success. The "MOVEABLE DOH," on account of the common misapprehension of the first foundations of musical truth, and the false teachings which are abroad, is a great difficulty with some of our pupils. One of them "proceeded very pleasantly as far as the fourth Exercise, in which the key-note (or DOH) is G. But that he could not understand." He says, "In the previous Exercises the notes DOH, ME, SOH, are placed respectively below the line and in the first and second spaces, but in the exercise I have mentioned, I find DOH on the second line. Why should there be that change in the position of the note? And how is it to be sounded?" The last question is clearly answered in the note to Exercise V.,—"Take a *middle* sound of your voice for the key-note or DOH." In the previous Exercises a *low* sound had been taken for DOH. In the first case *any* middle sound, and in the second *any* low sound would have answered the purpose. The reason of the change of DOH's position on the staff, is, that the staff aims to represent to us heighth and lowness of absolute *pitch*, as well as *key-relationship*,—and, as the foundation note of key-relationship, which we call DOH, had before been a *low* sound of the voice, and at the bottom of the "ladder of pitch,"—now, that this governor of key-relationship (DOH) is to be at a *middle* pitch of voice, it is necessary that it should be placed higher on the staff.

2. Another correspondent states his difficulty thus:—"The key-note of one piece not being always the same [in pitch] as that of another, we are not able to recognise, with the solfa syllables, the *same* sounds [in pitch] which we sing to them in other pieces. What I would ask, then, is, whether we are always to sing the same sounds [in pitch] to each syllable, or merely to guess the sound of the syllable by its position in relation to that immediately preceding?" Decidedly, you are *not* to sing the solfa syllables to the same pitch-sounds in one tune which they had in a previous tune, unless the key-note (DOH) is at the same pitch in both. For we use the syllables to represent, to mind and ear, the key-relationship of notes. And we use the well-known letters c^1, B, A, G, F, E, D, to represent their absolute *pitch*. We hope presently to show that this practice of ours is both the oldest and the best. But do not let our friends suppose that upon *any* of the common plans of solfa-ing they can associate a *distinct idea* of pitch with each place on the staff. Take for instance, the first place below the staff. That place may be filled by any one of three perfectly distinct sounds, by D, by D sharp, or by D flat. Now you may call these three sounds by the same name, RAY for instance, but they are three most distinguishable sounds still. M. Fetis, ...e well-known French writer on music, very truly observes, ...nat, "a sound cannot be altered or substituted for another without ceasing to exist: DO sharp is no longer DO. It is a mere error so to call it, and it is one of those errors which have tended to render music obscure." Your syllable RAY, then, cannot possibly represent a *distinct* idea of pitch. It can only stand for an indistinct, or, at best, a three-fold idea! Hence the indecision of voice, common among those who pursue the fixed method of solfa-ing.

3. Neither let our friends imagine, that, even if they *could* establish in their minds a fixed association of absolute pitch with each place on the staff, that, in learning to sing at sight, it is the attainment chiefly to be sought. For, undoubtedly, we *learn to recognise* a note by the effect which it produces on the mind,—and, as was amply proved in our sixth lesson,—the effect of a note on the mind arises not, except in a small degree, from its pitch, but chiefly from its key-relationship. We agree with the learned man and skilful teacher Dr. Bryce, of Belfast, in saying, "It is by no means intended to say that the power of distinguishing the absolute pitch of each note in the standard scale [not including the flats and sharps] with some approach to accuracy is unattainable; nor, that, when attained, it is useless. But it ought not to be the first thing attempted: first, because it is not essential either to the perception of melody and harmony, or to their execution; and, secondly, because it will be acquired with far greater ease after the mind has learned to feel the *relation of the notes* of the scale to one another, whatever the *absolute pitch* of the individual notes may be." * * * "It is this *relation* of the notes to one another *which constitutes music*. The [pitch] notes F, c^1, f^1, A, c^1, B flat, A, G, form melody, not because *they are* [the pitch notes] F, c^1, A, &c., but because they are respectively the 1st, 5th, 8th, 3rd, 5th, 4th, 3rd, 2nd, of a particular scale. The proof of this is, that the very same melody is produced by *any* other notes which stand *in the same relation*, as for example, by G, D, g^1, B, D, C, B, A, or, by D, A, d^1, F sharp, A, G, F sharp, E, which are the 1st, 5th, 8th, 3rd, 5th, 4th, 3rd, 2nd, in their respective scales,—and by no notes whatever that stand in a different relation." Some of our readers will understand these remarks better when they see this same phrase (essentially the same, though placed at different heights in pitch) in the old notation. They will perceive that the solfa syllables, which, having taken their pitch from the key-note, represent thenceforth only *relationship* of sound, remain the same in all three cases. And why should they not? for the *tune* is essentially the same!

KEY F.

KEY G.

KEY D.

4. Once more, let not our friends suppose, with the correspondent last named, that it is necessary to "*guess*" at the sound of the notes, because DOH is placed wherever the key-note is. If your DOH were fixed, and were nothing but another name for the pitch-note C, as in the French method of solfa-ing, then, indeed, you would have to "guess" at the sound of the notes. For instance, when you saw RAY, you would have to "guess" which of the three RAYS (above named) it was. But if, on the English plan of solfa-ing, you make DOH the key-note, then RAY is *always* at one and the same *interval* from DOH, and always produces a corresponding mental effect. And, as it is *by* this relative position and mental effect that notes are most easily recognised and most correctly sung, you will soon learn to *know* and to *strike* the right sound with a *decision* and *accuracy* perfectly unattainable on the other plan, and without any "guessing" at all. As Mr. Lowell Mason says, "Ours would be more properly called the *immoveable* DOH," for it is immoveably fixed as the key-note. The other DOH is at all parts of the scale by turns.

5. We are anxious to carry the perfect satisfaction of our pupils along with us, and must therefore step aside a moment longer to prove to them, once for all, that the method of solfaing with "the moveable DOH"—especially as distinguished from the French method imported by Dr. Shuttleworth and Mr. Hullah—is the *oldest*, is supported by the best *authority*, and is in itself the *best* for educational purposes. It seems generally admitted that Guido Aretino, the monk of Arezzo, who, in the eleventh century, invented both the staff and the use of the solfa syllables, applied the syllable UT (for which DOH has since been substituted) to the key-note. See the Musical

Histories of Dr. Barney and Sir J. Hawkins. Morley, the first English writer on music, adopts the same principle of measuring interval from the key-note. See his "Introduction to Practical Music," published A.D. 1597. We have an old English black-letter Bible, dated A.D. 1629, with Sternhold and Hopkins' Metrical Psalms appended. Here we find the tunes printed over the psalms, and the initial letters of the solfa syllables, as then used, printed on the staff close to the head of the notes. And, notwithstanding the curious perplexity which arises from the want of the seventh syllable SI (which we call TE, to distinguish its initial letter from SOH), it is perfectly clear that the syllables *move* with the key note. The following advertisement "to the Reader," is prefixed to the book. "Thou shalt vnderstand (Gentle Reader) that I haue (for the helpe of those that are desirous to learne to sing) caused a new print of note to bee made, with letters to bee ioyned to euery note: Whereby thou maist know, how to call euery note by his right name, so that with a very little diligence (as thou art taught, in the introduction printed heretofore in the psalms) thou maist the more easily, by the viewing of these letters, come to the knowledge of perfect *solfaying:* whereby thou mayest sing the psalms the more speedily and easily. The letters be these, V for VT, R for RE, M for MY, F for FA, S for SOL, L for LAH. Thus when you see any letter ioyned by the note, you may easily call him by his right name." This old book, circulated and used with the Bible itself throughout the kingdom more than 200 years ago, contains, in fact, a "Tonic Solfa Notation!" The perplexity above mentioned led to the common use throughout England of what was called the Tetrachordal System, in which the notes of the scale are thus named: Fa, Sol, La, Fa, Sol, La, Mi, Fa. We saw this recently in a well-known old book by Tansur. Here the syllable FA is used for the key-note, and also for the note next in importance, the fifth,—of course *moving* with them. "Look well to your FAS, my boy," is the instruction which many an old sight-singer, now living, received from his father or teacher. This, also, is a tonic (or key-note) method of solfa-ing. The far-famed French writer Rousseau gives strong and most satisfactory reasons for the "moveable UT or DOH." See his "Dictionary of Music," vol. ii. p. 223.

The admired glee writer, Webb, whose name is second to none in the department of popular vocal music, in his solfeggio exercises and instructions in singing, adopts, as a matter of course, the "moveable DOH;" Dr. Crotch, a great musical authority, used the same method in his "Elements of Composition," published A.D. 1812; and Mr. W. Forde, author of one of the most popular English works on the "Art of Singing at Sight" (published by Cocks and Co.), follows their example. The Rev. D. E. Ford, Mr. Turner, and Dr. Bryce, in their admirable and popular elementary works, do the same. If other authorities are required, we would gladly leave our appeal with such men as Mr. Graham, of Edinburgh, the learned author of the article "Music" in the last edition of the "Encyclopædia Britannica;" Mr. Hogarth, distinguished as a musical critic and writer on musical history; Dr. Gauntlett and Mr. Charles Childe Spencer, well known as composers of church music; Colonel Thompson, the profound writer on musical acoustics; Mr. Hickson, the father of English school music; and Mr. Lowell Mason, the eminent American composer and teacher. Ask *any* one, who can really sing at sight, how he came to do so, and he will tell you: "By measuring interval from the key note, and keeping the key note in the eye throughout the tune." Such a person will at once acknowledge the importance of having a *distinct name* (DOH) for that key note, and of naming all the other notes by their relation to it.

6. Our space compels us to refer, for a full discussion of this question in its educational point of view, to the Preface to "Grammar of Vocal Music" (Ward and Co.). The following quotation from Mr. Hickson will set forth the point of leading importance. "In teaching the art of sight singing, an art rarely taught by Italian professors, whose fashionable pupils only sing to the harp or pianoforte, there is but one mode of using the solfeggio syllables in which they can be of the slightest use; that is, by adhering to the rule laid down by Rousseau, and followed by many of the best of our English choral teachers, of identifying them, *not with the fixed sounds expressed by the letters, but with the intervals of the diatonic scale,* 'DOH' *in every key* representing the key note 'RE,' the second of the scale, &c. We have already shown that the art of reading music at sight depends upon the ability to recognise at a glance the intervals of the scale, in whatever key they may be written; that is to say, to distinguish at once, not which is A or B, but which is the key note, which is the 3rd, 5th, 7th, &c. It will, therefore, at once be seen that Forde, by adopting Rousseau's rule for using the solfeggio syllables, as names for the intervals, converts them into a most profitable exercise, an exercise which compels the pupil to study the intervals in every bar he sings, and to give up guessing. * * Great confusion and perplexity are introduced by the opposite method. We have pointed out the different properties of the fourth and the seventh, the one tending *downwards* and the other *upwards*; yet, although [the pitch note] F may sometimes be the fourth and at other times the seventh, according to the key, and although F in the key of C differs half a tone from F in the key of G, it is always, we are told, to be called FA!"

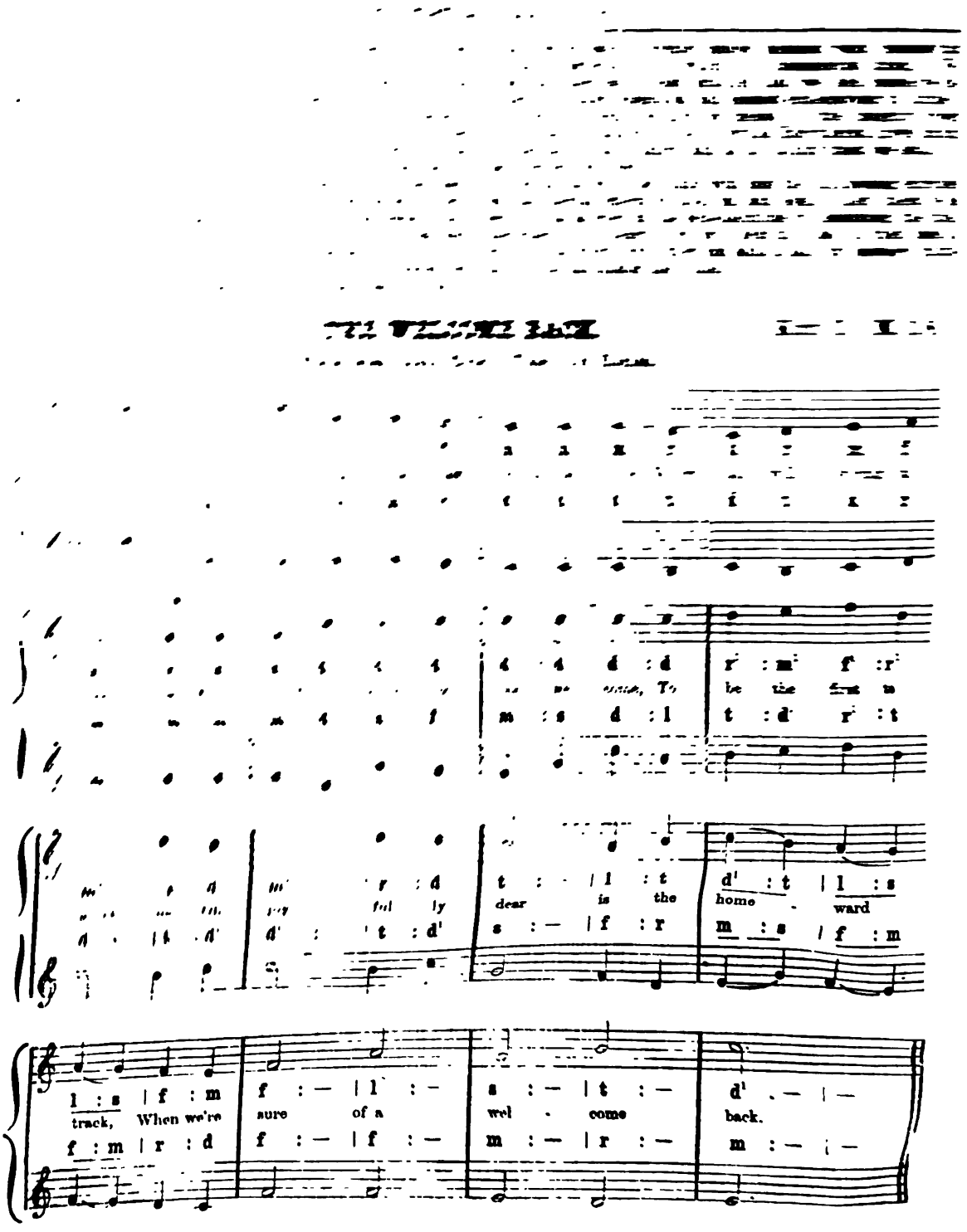
Two notes OPPOSED *to one another in mental effect, and* DIFFERING *in pitch, yet called by the* SAME *name, and this in connexion with a system that prides itself on its educational* "METHOD."

Fa
Fourth of the Scale.

Fa
Seventh of the Scale.

"We think it must be obvious," continues Mr. Hickson, "that the solfeggio syllables, thus employed, tend to *mislead* the pupil rather than to assist him in learning the art of sight singing. It is using words, as a lawyer would say, in the sense of a *suggestio falsi*." Perhaps the most marked practical advantage of the tonic (or key note) method of solfa-ing is that it establishes in the ear of the pupil a complete association of interval and syllable. So that the syllables become not only an unchanging *language* of interval, useful in connexion with the whole study of music, however far it may be carried, but also a *guide* and *prompter* in the art of striking interval with accuracy and certainty. Thus, if the syllables ME, FAH are *frequently* sung to a "semitone" (or tonule) the mind soon learns to associate that interval with those syllables, so that the very attempt to pronounce the syllables shall call up into the mind the interval to which they have so often been sung. In this way our syllables become invaluable aids and interpreters. We continually hear from singers in various parts of the country such expressions as this: "When I come to any very knotty passage, or one with difficult transitions in the choral 'part' I have to sing, I invariably, now, translate it into the solfa language, and *then* it is impossible not to sing it correctly." But, on the other, the fixed plan, a pupil is, with great painstaking, through half his course (for full thirty lessons in one book) *made to associate* ME, FAH with a "*semitone*," and then is made to spend most of the other half of his course in learning to *alter* that association and sing ME, FAH, in the new keys to a *whole tone!* First work hard to do a thing, and then work hard to undo it! What a clever and admirably arranged educational method it is! How well worthy the patronage of a great government! How keen sighted and able governments always are in such matters!! Truly, without any boasting, Mr. Cassell's system of national education may claim to know and provide *what the people want* many times better than this.

7. We take this opportunity of giving our reason for accompanying the established notation with a constant interpreter, in the new notation placed between the staves. The truth is that the old notation, being used, perhaps chiefly, in connexion with instruments, sets forth the *pitch* of a note (the thing the ordinary instrumentalist wants) in a most clear, distinct, and pictorial manner, but leaves *key-relationship* (that which the vocalist requires to be the first and most obvious thing to meet the eye, and which is by far the most important thing in the science of music itself) but dimly expressed. Hence the vast variety of solfa systems, figure systems, tetrachordal systems, &c., which have sprung up, every good teacher feeling the necessity of marking the key-note and the notes related to it more visibly. The most successful modern methods of sight singing have adopted a similar plan. Thus, the Rev. J. J. Waite, who has taught some thousands of English people how to sing, has done so by means of an interpreting notation of figures placed



2. When the world hath spent its frowns and wrath
And care been sorely pressing,
'Tis sweet to leave our roving path,
And find a fireside blessing.
Oh! joyfully dear, &c.

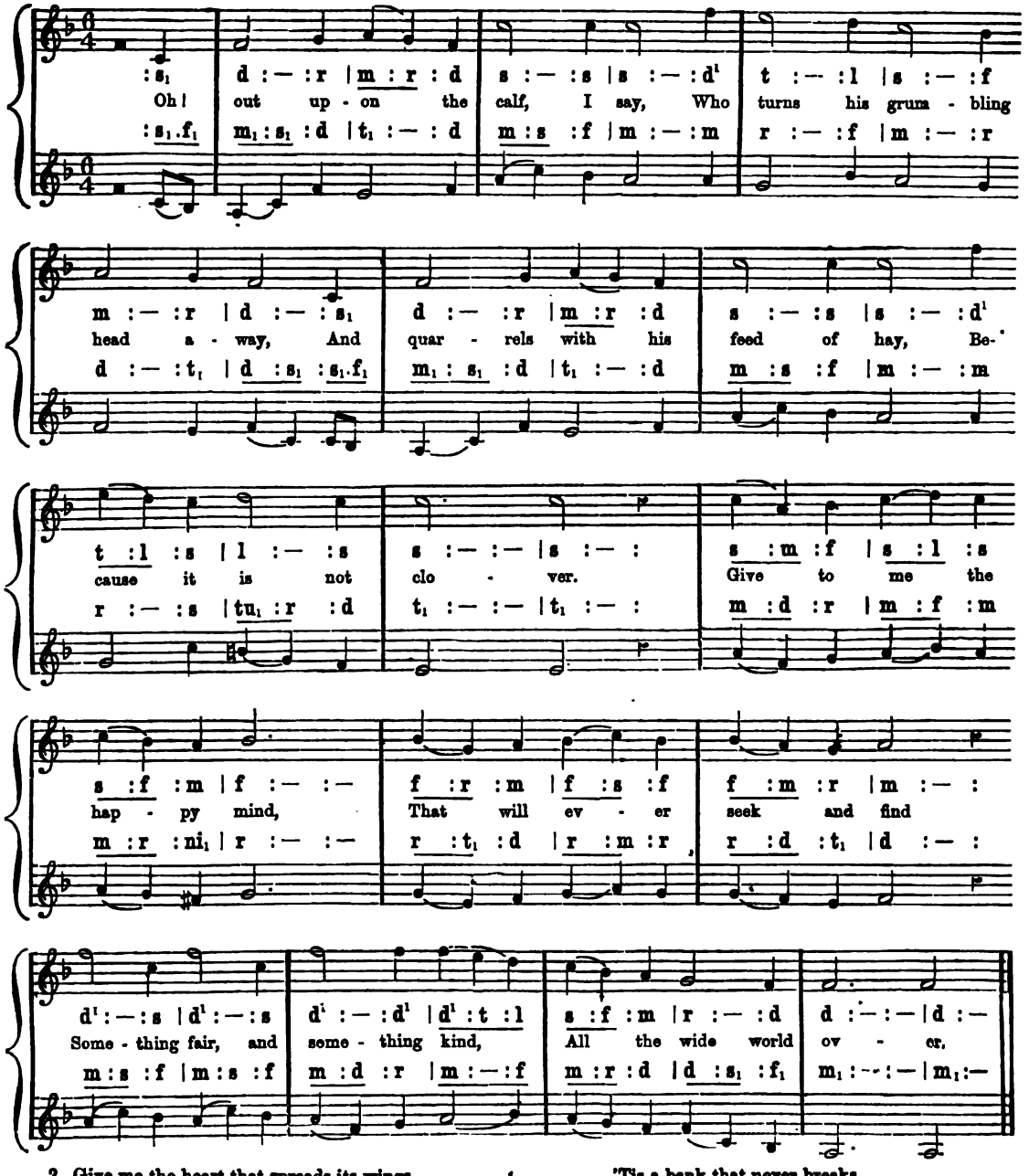
3. What do we reck on a dreary way,
Though lonely and benighted,
If we know there are lips to chide our stay,
And eyes that beam love-lighted.
Oh! joyfully dear, &c.

Notes.—Eliza Cook is truly one of the people's poets. Her songs are fragrant of home and of true heart's love. When once this simple tune is learnt, it should be sung very quickly and lightly, and yet with a perfect and distinct enunciation of the words. &c

every motion of lips, tongue, and teeth by which the words are produced be very decided and sharp. We should sing so as to make ourselves understood by a listener. Try the experiment. If our pupil is wise he will still continue to neglect the staff, and confine his attention to the solfa syllables *and to the modulator*.

EXERCISE 22. **THE HAPPY MIND.** KEY F. M. 160.

(Words from ELIZA COOK. Tune, Old English.)


: s1 | d : — : r | m : r : d | s : — : s | s : — : d1 | t : — : l | s : — : f
Oh! out up - on the calf, I say, Who turns his gruma - bling
: s1.f1 | m1 : s1 : d | t1 : — : d | m : s : f | m : — : m | r : — : f | m : — : r
m : — : r | d : — : s1 | d : — : r | m : r : d | s : — : s | s : — : d1
head a - way, And quar - rels with his feed of hay, Be-
d : — : t1 | d : s1 : s1.f1 | m1 : s1 : d | t1 : — : d | m : s : f | m : — : m
t : l : s | l : — : s | s : — : — | s : — : | s : m : f | s : l : s
cause it is not clo - ver. Give to me the
r : — : s | tu1 : r : d | t1 : — : — | t1 : — : | m : d : r | m : f : m
s : f : m | f : — : — | f : r : m | f : s : f | f : m : r | m : — :
hap - py mind, That will ev - er seek and find
m : r : ni1 | r : — : — | r : t1 : d | r : m : r | r : d : t1 | d : — :
d1 : — : s | d1 : — : s | d1 : — : d1 | d1 : t : l | s : f : m | r : — : d | d : — : — | d : —
Some - thing fair, and some - thing kind, All the wide world ov - er.
m : s : f | m : s : f | m : d : r | m : — : f | m : r : d | d : s1 : f1 | m1 : — : — | m1 : —

2. Give me the heart that spreads its wings
Like the free bird that soars and sings,
And sees the bright side of all things
From Behring's Straits to Dover.

'Tis a bank that never breaks,
'Tis a store thief never takes,
'TIS A ROCK THAT NEVER SHAKES,
ALL THE WIDE WORLD OVER.

NOTE.—It is to the *melody* of these tunes that we call special attention at present. We are obliged to introduce into the "second" or accompanying part some notes which have not yet been explained in our course of lessons. In this Exercise we have the phrase : s | tu1 : r : d | t. Let the pupil sing it as though the SOH were called DOH (though retaining the same sound), and the phrase ran : d | t1 : s1 : f | m. There also occurs the note NI. This note is as much lower than RAY as TE is lower than DOH. Sing it then as a sort of "leading note" to RAY.

LESSONS IN LATIN.—No. XXVI.

By JOHN R. BEARD, D.D.

DEPONENT VERBS.

I NOW present to you a view of a deponent verb of the second conjugation; and for this purpose take vereor, *I fear*.

Like vereor, form mereor 2 (méreri, meritus sum), *I earn, gain by my deserts*; misereor 2 (miseréri, misertus sum), *I pity* (E. R. *commiserate*), takes a genitive; tueor 2 (tueri, tuitus sum), *I watch, guard*; fateor 2 (fatéri, fassus sum), *I confess, admit*.

DEPONENT VERBS, SECOND CONJUGATION.

EXAMPLE.—Vereor, *I fear*.

Chief parts, vereor, veréri, veritus sum.

		Indicative.	*Subjunctive.*	*Imperative.*	*Infinitive.*	*Participle.*
PRESENT.	*I fear, &c.* — *Singular.*	vereor veréris verētur	*I may fear, &c.* verear vereáris vereátur	*Fear thou, &c.* verére, verétor verétor	veréri, *to fear*	verens, *fearing*
	Plural.	verémur verémini veréntur	vereámur vereámini vereántur	[nor verémini, verémi- veréntor		
IMPERFECT.	*I feared, &c.* — *Singular.*	verébar verebáris verebátur	*I might fear.* verérer vererēris vererétur			
	Plural.	verebámur verebámini verebántur	vererémur vererémini vererentur			
I. FUTURE.	*I shall fear, &c.* — *Singular.*	verébor verébĕris verébitur			veritúrum esse, *to be about to fear*	veritúrus, *about to fear*
	Plural.	verébimur verebímini verebúntur				
PERFECT.	*I have feared, &c.* — *Singular.*	veritus sum veritus es veritus est	*I may have feared.* veritus sim veritus sis véritus sit		veritum esse, *to have feared*	veritus, *having feared*
	Plural.	veriti sumus veriti estis veriti sunt	veriti simus veriti sitis veriti sint			
PLUPERFECT.	*I had feared, &c.* — *Singular.*	veritus eram veritus eras veritus erat	*I might have feared.* veritus essem veritus esses veritus esset			
	Plural.	veriti eramus veriti eratis veriti erant	veriti essemus veriti essetis veriti essent			
II. FUTURE.	*I shall have feared, &c.* — *Singular.*	veritus ero veritus eris veritus erit				
	Plural.	veriti erimus veriti eritis veriti erunt				

GERUNDS.

Genitive....	verendi, *of fearing*
Dative	verendo, *to fearing*
Accusative..	verendum, *to fear*
Ablative ..	verendo, *in fearing*

SUPINES.

1. veritum, *to fear*
2. veritu, *to be afraid*

VOCABULARY.

Confiteor 2, confessus sum, *I admit, confess* (E. R. *confession*); profiteor 2, professus sum, *I profess, promise* (E. R. *profession*); medeor 2 (no perfect), *I heal*, with the dative; that is, the object of this verb must be in the dative case; intueor 2, *I look on, contemplate* (E. R. *intuition*); mereor const. (construed) with de, as de aliquâ re; reor 2 (reri, ratus sum), *I am of opinion, think*; impetro 1, *I obtain*; imploro 1, *I entreat* (E. R. *implore*; ploro, *I weep*); informo 1, *I instruct*; nego 1, *I deny*; trado, tradere, tradidi, traditum, 3, *I hand down, I give up* (E. R. *tradition*); malitia, ae, f. *badness, baseness, malice*; venia, ae, f. *pardon, leave, permission*; exemplar, áris, n. *a pattern, model*; cunctus, a, um, *all unitedly*, in opposition to omnis, which is, *all severally*; inanis, e, *empty* (E. R. *inanity*); cito, *quickly*; liberaliter, *freely*; nondum, *not as yet*; penitus, *thoroughly*; denuo (de novo), *anew, again, lately*; detrăho 3, *I take away*; inopia, ae f. *want*· praesidium, i. n. *protection, support, assistance*.

Observe that the conjunction quum requires its verb to be in the subjunctive mood, when it denotes a *cause* or *reason*, and is rendered by since, or although; quum is then said to have a *causal* force.

EXERCISES.—LATIN-ENGLISH.

Vix peccatum tuum fassus eras, quum pater tui misertus est; jam te errasse confessus eras, quum denuo negâsti; nondum vestrum auxilium imploraveramus, quum jam id nobis professi estis; vix inopiam nostram fassi eramus, quum liberalissime vestrum praesidium nobis polliciti estis; magna vis est philosophiae quum medetur animis, et inanes sollicitudines detrahit; artes magnum nobis praebent praesidium, quum se ipsae per se tuentur singulae; praeclare de patriâ mirentur praeceptores, quum juventatem bonarum litterarum studiis informant; quum philosophia animis medeturei totos nos penitusque, tradere debemus; omnes miserebantur vestri, quum non propter malitiam sed propter fortunam in miseriis essetis; quum milites periculâ vererentur, non audebant cum hostibus confligere; avarus, quum sit divitissimus, non fatebitur se satis habere; miserere nostri; medemini, O cives, inopiae nostrae; suum quisque tuetor filium; nemo, cunctam intuens terram, de divinâ providentiâ dubitabit; cives, hostes urbem oppugnaturos rati, eos acriter propulsare studuerunt; venio meum praesidium tibi polliciturus; adolescentis officium est majores natu vereri; omnibus modis vos inopiae civium mederi debetis; quis nescit te praeclare de republicâ meritum esse? spero te mei miserturum esse.

ENGLISH-LATIN.

They confessed their sins; they will confess their sins; will they have confessed their sins? he will not confess his sins; my sister has confessed her sins; the young men deny that they will confess their sins (acc. case and infinit. fut.; drop the *that;* "deny that they will" is equal to *say they will not*, that is refuse); religion heals men's minds; true religion only can heal men's minds; religion has always healed the minds of the pious; pity me, O my father; O God, pity us; O God, pity all men; let every husband guard his wife; the young men, thinking the soldiers about to attack their homes, slew themselves in fear (being afraid); the arts severally protect artists (artificers); do the arts protect each other? the arts have protected, do protect (present tense), and will protect artists; look at the heaven, and thou wilt fear God; contemplating virtue, men become wise; he has served the republic well (deserved well of the republic, de republicâ); the queen will serve the republic well; the soldiers served their country well; I am not able to serve my home well; he contemplates a model of virtue; he confesses his sins, and obtains pardon; they have confessed their sins, and obtained pardon; since you have confessed your sins, you will obtain pardon.

Vereor denotes the reverence which arises from a sense of one's own infirmity, as compared with the high attributes of the object who calls forth the sentiment. Vereor, accordingly, is the root of *reverence*. Vereri denotes the feeling of children towards a parent. But when the sentiment of self-abasement rises into a fear of some evil from a superior power, or an oppressive consciousness of superior power over you, then the sentiment is expressed by metuo.

CONSTRUCTION OF VERBS.

Accusative of object; with ne; ne non; non and ne; with ut; infinitive as an object.

NOTE.—Vereor ne is used of things you do not desire.

Vereor ut is used of things you do desire.

Accusative of object:—"Metuebant eum servi, verebantur liberi."—*Cicero.*

Lit. Trans.:—*Feared him slaves, reverenced children.*

Id. Trans.:—*His slaves feared, his children reverenced him.*

With ne:—

"Vereor ne quasi praecipientis esse videatur oratio mea."—*Cicero.*

Lit. Trans.:—*I fear lest as if of one enjoining to be may appear speech my.*

Id. Trans.:—*I fear lest my speech may appear like the speech of a master.*

With ne non:—

"Veritus ne hostium impetum sustinére non posset."—*Caesar.*

Lit. Trans.:—*Fearing lest of the enemies the attack to endure not could.*

Id. Trans.:—*Fearing he should not be able to endure the attack of the enemy.*

With non ne:—

"Non vereor ne ascuperi tuam gratiam videar."—*Cicero.*

Lit. Trans.:—*I do not fear lest to court thy favour I may appear.*

Id. Trans.:—*I do not fear of appearing to court thy favour.*

With ut:—

"Illa duo vereor ut tibi passim concedere."—*Cicero.*

Lit. Trans.:—*These two things I fear that to thee I may be able to concede*

Id. Trans.:—*I fear I cannot concede these two things to thee.*

Infinitive as an object:—

"Hei mihi! vereor dicere."—*Terence.*

Lit. Trans.:—*Alas to me! I fear to say.*

Id. Trans.:—*Alas! I fear to say.*

VOCABULARY.

Veteranus, i, m, *a veteran soldier*; ne ipsi quidem, *not even they themselves*; introeo 4, *I enter*; incedo 3, *I walk, walk abroad*; excido (ex and caedo), *I cut off* or *down*; cognosco 3, *I know*; intelligo 3, *I understand*; recedo 3, *I return*; redditae sunt, *have been delivered*; incipio 3, *I begin* (E. R. *incipient*); expleo 2, *I fill up, satisfy* (E. R. *explētive*); valeo 2, *I am strong, I avail, prevail* (E. R. *valid*).

EXERCISES.—LATIN-ENGLISH.

Quid? veteranos non veremur? nam timeri se ne ipsi quidem volunt; veremur vos, Romani, et si ita vultis, etiam timemus; ne illa vereatur introire in alienam domum; vereor magis me amoris causâ hoc ornatu incedere; de Carthagine non ante vereri desinam, quam illam excisam esse cognovero; vereor ut Dollabella satis nobis prodesse possit; accepi tuas litteras, quibus intellexi te vereri ne superiores mihi redditae non essent; ne ejus supplicio Divitiaci animum offenderet, verebatur; vereor, si res explicare inciplam, non vitam ejus enarrare, sed historiam videar scribere; non vereor ne scribendo te expleam; non vereor nequid timide, nequid stulte facias; non vereor ne meae vitae modestia parum valitura sit contra falsos rumores.

ENGLISH-LATIN.

They venerate their parents, and fear the king; tyrants are feared; they will fear tyrants; I shall fear my parents; I do not fear that I shall fill (satisfy) you with words; you fear to enter the enemy's camp; I fear that I read without profit; they fear for (de) their country, lest it be destroyed; I fear my mother will come, why do you fear that your mother will come? Because I am acting (I act) against her commands; they fear that their uncle is dead; I fear that the wrath of God will fall on this city; thy life will prevail against calumny; do not fear that thy life will not prevail against the calumny of bad men; thou fearest that I am unable to do thee good; fear not that I shall do any foolish thing (Latin, anything foolishly); my brother does not fear that I shall do any foolish thing.

N.B.—It is very difficult to give in English an exact counterpart of some Latin forms. You will constantly have to make some little allowance for difference of idiom, though the sound scholar only can judge in particular instances whether a latitude is allowable or not.

In the preceding English-Latin Exercise I have written, "I do not fear that I *shall* satisfy you with words." Here and in other parts of the exercise the future "shall" and "will" are used in the English when the subjunctive present is required in the Latin. The subjunctive present could not be used in the English with a proper regard to idiom; nor could the future indicative be employed in the Latin. You have here one of those diversities of idiom with which you must become well acquainted, if you wish to be master of the Latin language. Similar diversities would be found between any two other languages that you might compare together.

LESSONS IN PHYSIOLOGY.—No. XI.

MAN.

You have had the principal facts of this interesting branch of study brought out and set before you. We have seen that physiology includes those conditions, phenomena, and laws of life, which are common to the human body in a state of health, or the whole science of healthy function. We have learned that all animal substance springs from a germ; that this germ is a minute particle which cannot be seen without a microscope of high power, and may vary in size from a minuteness which cannot be measured to the one ten-thousandth part of an inch. We have found that bone is an animal substance; that bone has its origin in a substance called cartilage, or species of gristle—that this cartilage is composed entirely of little cells, and that these cartilage-cells become consolidated and take on the consistence and the hardness of bone. We have discovered that the purpose of bone is purely mechanical; that the bones

serve as points of attachment to the muscles in the midst of which they are situated, afford protection and support to the softer textures—form inflexible levers on which the muscles may act, and give motion to the different parts of the body;—that if the muscles need a lever with which to act, this lever would be useless without the agency of muscles to work it;—that muscle, like bone, is derived from a germ, that the germ grows into a cell, and from the cell there come fine filaments or threads, and that out of these thread-like fibres, with their appropriate blood-vessels, comes the substance of the largest and strongest muscle;—that the muscles have the power of contracting or shortening themselves on the application of any external stimulus;—that the muscles divide themselves into two classes, THE VOLUNTARY, or those which are under the influence and government of the will, and THE INVOLUNTARY, or those over which the will has no power, such as the heart, stomach, and intestines;—that the health and nourishment of the muscles and of every other portion of the body are dependent on the flow of pure blood;—that for the circulation of this precious fluid, the most beautiful provision has been made in the heart, the arteries, the veins, and the lungs;—that the left ventricle of the heart is in immediate communication with a large artery called the AORTA, which, subdividing in its course, terminates in myriads and myriads of minute ramifications closely interwoven with the texture of every living part;—that in the extremities of these arteries the veins have their origin;—that these veins convey back the blood to the right ventricle of the heart, in which arises THE PULMONARY ARTERY, whose office it is to carry the blood to the lungs or organs of respiration, whence it comes into contact with the oxygen of the air, and is then conveyed back to the heart for renewed circulation.

We have found that the blood contains all the elements which enter into the composition of the human frame, and, therefore, in a chemical point of view, the blood represents the whole body in a liquid state;—that while the blood furnishes the materials of nutrition to every part of the body, itself sustains a positive loss;—that to make up this loss we need both food and air;—that our food passes through that mysterious process of digestion which fits it to become mixed with the lymph, and to get into the venous system;—that all which is then needful is that the venous blood come into contact with the oxygen of the air in the lungs, to be transformed into arterial blood, and again sent through the system with all its vital and life-giving property;—that to insure good blood we should have wholesome food and pure air;—that healthy breathing essentially consists of an interchange of oxygen and carbonic acid, and this interchange takes place between the blood as it passes into the lungs and the surrounding external atmosphere;—that carbonic acid is given out by the blood, while the oxygen enters by the air which we breathe;—that the lungs or organs of respiration are made up of countless little air-cells by which a pint of air is introduced into the lungs at each respiration;—that in taking a very deep, full breath we may completely fill the lungs, but in letting our breath go back we can never empty them; that what we give back is not more than one-fifth of what we retain;—that to insure the air in the remoter cells being renewed, there comes into play the law of mutual diffusion, according to which the interchange of oxygen and carbonic acid between the air and the blood in the lungs is effected;—that as the atmosphere which surrounds us, and which we are constantly inhaling, is the grand purifier and regenerator of the blood, so the state of the blood conditions, and determines all the functions of the body whether in health or disease.

This teaches us that physical education—by which we mean bodily exercise and recreation—is as needful as mental training. Such exercise tends very much to stimulate the mind to still higher activity. It developes the frame, it contributes to health, it frees the body from many impurities, and thus better fits it for the loftier efforts of intellect. Nature invites us into her green and open fields, and there unfolds her brightly illumined page for us to read and learn. On this subject the following remarks are not more interesting than true.

"The fact is, that the physical education of youth is almost entirely neglected: whereas *that* ought to take precedence of the mind. Instead of confining a child, as is too often the case, to his primer and his spelling-book, let an intelligent tutor accompany him into the fields, and encourage him to ask questions about everything that comes in his way. For instance:—when he hears the lark "singing at heaven's gate,' let him be taught the habits of the bird; and so on with the rest of the feathered tribe. When he sees a fish darting through the silvery stream, explain to him by what means it swims, and how it is sustained. And in this way, let every object in creation that attracts the attention of the child be explained to him. If this method be pursued, he will get more general information in a twelvemonth than other boys will in a dozen years. It matters not if he is wholly unacquainted with the alphabet until he is six or seven years old. A child who has had the advantage of as much bodily exercise as possible, in spacious gardens or fields until he has reached his seventh year, even if he should not then know a single letter, will soon overtake those who have had their heads crammed with book information at an earlier period; and not only overtake them, but outstrip them. And why? Because his mind is in a healthy state as well as his body.

"All judicious instructors of youth are well aware that it will not do to exert the mind too much. What, for instance, does Humel say, whose "Pianoforte School" is one of the ablest productions that ever came under the notice of a musician? He intimates that a pupil of delicate organisation, and possessing a fine ear, must not be confined to the instrument more than four hours a-day. More work than that will cloud his faculties. But a master, when he has rougher materials to deal with, may keep a boy at his task for six hours a-day.

"Who, that has ever given the matter a thought, can imagine for a moment that the delicate and marvellous mind of Shakspeare would have been developed in the way that it has been, if it had, at an early age, been crammed with Latin, Greek, and Algebra? Such studies would have been an effectual damper. Instead of poking his eyes into books, Shakspeare, when a boy, took his lessons from the earth and sky, and from human nature in every phase in which it presented itself. Here we discover common sense at the outset of his career: and this common sense pervades everything that he ever wrote."*

Every parent and teacher should be careful not to tax the time and the application of the child beyond his strength. It is not what he *can* do. For who will determine the boundary-line of intellectual power? The question, rather, is—What ought he to do consistently with that physical nature which prefers an imperative claim to rest, and recreation, and amusement? To deny the play-ground, with its many games, and sports, and leaps, and loud-rising laugh, is to retard the progress of the mind. For the free play, and full out-coming of the intellect, there must be a sound and healthy body. The true idea of education, is, the bringing out and properly training all the powers and faculties of the child, both of body and of mind. Much precious time is literally wasted in cramming the memory with words and phrases, which bar the admission of thought, and render application irksome. A mere effort of memory is not the attainment of knowledge; and words, instead of ideas and of facts, make up but a poor capital with which the future man is to carry on the intercourse and the pursuits of life.

> "The value of a thought cannot be told;
> But it is clearly worth a thousand lives
> Like many men's."

There are thousands who pass their lives without thought, and leave the world without bequeathing to posterity even the likeness of a single idea.

> ——————— "One great thought—one deed
> Of good, ere night, would make life longer seem
> Than if each year might number a thousand days,
> Spent as is this by nations of mankind.
> We live in deeds, not years;—in thoughts, not breaths;—
> In feelings, not in figures on a dial.
> We should count time by heart-throbs. He most lives
> Who thinks most—feels the noblest—acts the best."

The philosophy of life is to live well. But no man can live well whose mind is not replenished with pure thought and

* These enlightened remarks come from the pen of "An Englishman," who has closely followed us in our Lessons in Physiology, no less than in the other branches of knowledge embraced in the plan of the POPULAR EDUCATOR, and who, from his varied intelligence and sound discrimination, is entitled to be heard and welcomed as a co-adjutor in the great work to which we are devoted.

corresponding feeling. "A great spirit, and a busy heart," will ever move towards some mightier end which is worthy of life, and which will crown and glorify it for ever.

The design of education is to teach, and teaching is not an accumulation of words, but the communication of ideas; and ideas are to be gathered, like ripe fruit from a well-laden tree, from every object by which we are here surrounded. This world is but a larger school-room, in which we may receive the lessons of true wisdom. Books are but the feeble echo of nature's great teacher; and while books perish, creation lives. Nor can it be questioned that such things as trees and flowers, the mountains and the rivers, the seas, and lakes, and stars, have all an inner life, with which the spirit of man may commune, and hold deeper fellowship. Every leaf that flutters in the breeze is a page written by the finger of God, and revealing the secrets of his wisdom. The study of nature is a thousand times more important than the study of books. And in the education of childhood and of youth we must have recourse to objects and pictorial representations. But every object is a volume. Every picture is the outward expression of a hidden truth. If it be a Zoological fact "that birds woo flowers," it is no less true that children love the green fields, and the blue sky, and the dark-rolling ocean. It is a mistake to confine these little happy souls within the walls of a badly ventilated room for so many hours every day, and to demand of them a certain amount of mental application. Nor is it calling things by their right names to say that a boarding-school procession is the same thing as recreation and exercise. There is not a more melancholy sight under the bright smiling sky. Why should our boys and girls be drawn up in rank and file, and marched in slow and measured pace through streets and lanes, instead of being sent into the open field to gather flowers or chase the butterfly. There is education in climbing a hill or in playing cricket, as really as in being seated at a desk with a slate and a copy-book, a grammar and a speaker. Mental application will always correspond with bodily exercise, and every hour that is spent in recreation may be crowned with the most positive good. "According to the present system of education, intellectual cultivation, and school tasks are pushed so far as to impair health and injure the constitution; and after ten months of this unwholesome discipline the vigour of mind and readiness of application are so much diminished, that the school is regarded with loathing, and the vacation is longed for with all the ardour of an exile panting for his home. If a young person, *in this unnatural situation*, be sent into the country to enjoy exercise and play in the open air for two months without opening a book, there cannot be a doubt that he will return better disposed for his lessons, and more able to keep pace with his companions, than if he had continued to receive daily instruction at school during all that time. This result, however, will follow, simply because his health, which had been impaired by confinement and over-tasking, will now be restored by country air, idleness, and exercise; and his brain will have regained its lost tone, and be able to manifest the mental faculties with greater vigour."

GLOSSARY OF TERMS USED IN THESE LESSONS.

Term.	*Derived from.*	*Signification.*
CAR'TILAGE	Latin cartilago	gristle
GEL'ATINE	„ gelo	to congeal
VER'TEBRAE	„ verto	to turn as a joint
LIG'AMENT	„ ligo	to bind or tie
SYN'OVIA	Greek syn oon	the nature of egg
FI'BRE	Latin fibra	a fibre or string
FIL'AMENT	„ filum	a thread
CAPIL'LARIES	„ capillus	a hair
AU'RICLE	„ auris	the ear
VEN'TRICLE	„ ventriculus	the belly, stomach
AOR'TA	Greek aortē	the great artery
PUL'MONARY	Latin pulmo	the lungs
RES'PIRATION	„ respiro	to take a breath
VE'NA CAVA	„ vena cava	the great liver vein
COR'ONARY	„ corona	a crown
AR'TERY	Greek artēria	the windpipe, artery
TEN'DON	Latin tendo	to stretch or extend
OR'IFICE	„ orificium	an opening
SECRE'TION	„ secretio	a separating
LAC'TEALS	„ lacteus	milky
LYM'PHATICS	„ lymphaticus	liquid, watery
ALBU'MEN	„ albus	the white [of an egg]
FIB'RINE	„ fibra	filamentary
PHA'RYNX	Greek pharynx	the throat
LAR'YNX	„ larynx	top of windpipe
Œ'SOPHAGUS	„ oisophagos	the gullet
GAS'TRIC	„ gastēr	the belly
CHYME	„ chymos	juice or sap
THORA'CIC	„ thorax	breast or chest
CHYLE	„ chyles	juice or moisture
COAG'ULATE	Latin coagulo	to thicken or curdle
DI'APHRAGM	Greek diaphragma	separation or division
EXCRE'TORY	Latin excerno	to evacuate
DIAPHORETICS	Greek diaphoreō	to throw off

LESSONS IN GERMAN.—No. XVII.

SECTION XXXI.

COMPARISON OF ADJECTIVES.

German adjectives are compared by suffixing to the simple form of the *positive*, er for the *comparative*, and eſt for the *superlative*; thus *positive* mild, (mild) *comparative* mild-er, (milder) *superlative* mild-eſt, (mildest), see § 1. 2. 3. 4. 5.

I. When the positive ends in el, en or er, the e of this termination is, in the comparative, omitted: as, edel (noble), edler* (nobler). Note, that adjectives of this class add, for the *superlative*, ſt only; thus, edel, edler, edelſt. Adjectives when compared, are commonly contracted when euphony admits.

Adjectives in the comparative and superlative, are subject to the same inflections as when in the positive degree (§ 37. 1.)

INFLECTION OF THE ADJECTIVE IN THE COMPARATIVE AFTER THE OLD DECLENSION.

	Masc.	*Fem.*	*Neut.*	*Plural for all genders.*
N.	Schöneter,	ſchöneter,	ſchöneres,	ſchönere, finer;
G.	Schöneres, (§ 35.)	ſchöneter,	ſchöneres,	ſchönerer, of the finer;
D.	Schönerem,	ſchöneter,	ſchönerem,	ſchöneren, to the finer;
A.	Schöneren,	ſchönere,	ſchöneres,	ſchönere, finer.

INFLECTION AFTER THE NEW DECLENSION

	Masc.	*Fem.*	*Neut.*
N.	Der ſchönere,	die ſchönere,	das ſchönere, the finer;
G.	Des ſchöneren,	der ſchöneren,	des ſchöneren, of the finer;
D.	Dem ſchöneren,	der ſchöneren,	dem ſchöneren, to the finer;
A.	Den ſchöneren,	die ſchönere,	das ſchönere, the finer.

Plural for all genders.

N. Die ſchöneren, the finer;
G. Der ſchöneren, of the finer;
D. Den ſchöneren, to the finer;
A. Die ſchöneren, the finer.

II. Superlatives of the Old Declension are used only in address. Ex.: Liebſter Bruder; dearest brother. Theuerſte Mutter! dearest mother. Liebſte Freunde; dearest friends, &c. (§ 37. 2.)

INFLECTION OF THE SUPERLATIVE AFTER THE NEW DECLENSION.

	Masc.	*Fem.*	*Neut.*
N.	Der ſchönſte,	die ſchönſte,	das ſchönſte, the finest;
G.	Des ſchönſten,	der ſchönſten,	des ſchönſten, of the finest;
D.	Dem ſchönſten,	der ſchönſten,	dem ſchönſten, to the finest;
A.	Den ſchönſten,	die ſchönſte,	das ſchönſte, the finest.

* The disposition to contract two concurrent syllables finds a parallel in almost every language. Thus in English, we have *entrance* for *enterance*; *wondrous* for *wonderous*, &c. So hoped, prayed, &c., words containing each two syllables, are pronounced as though consisting of but *one*. This is a serious difficulty in the way of foreigners learning our language, but one which in the German, by a conformity of orthography to pronounciation, is entirely avoided.

Plural for all genders.

N. Die ſchönſten, the finest;
G. Der ſchönſten, of the finest;
D. Den ſchönſten, to the finest;
A. Die ſchönſten, the finest.

III. The Old form of the superlative is rarely used; the article (as in English) always preceding it. Ex.: Mein Hut iſt der ſchönſte; my hat is *the* finest. Instead of the regular form, the dative of the New Declension, preceded by the particle am, is often used; as, mein Hut iſt am ſchönſten. (See § 38. 1., &c.)

The adverb mehr, like its English equivalent (more) is likewise employed in the comparison of adjectives. Ex.: Sie iſt mehr liebenswürdig als ſchön; she is more amiable than beautiful. (See § 42. 1., &c.)

IV. Adjectives, of all degrees of comparison, may in the simple and absolute form, be employed as *adverbs;* but when the superlative is so used, the form produced by the union of am with the dative, is adopted. Ex. Er ſchreibt ſchön; he writes beautifully. Er lieſt ſchneller als ich; he reads more rapidly than I. Sie lieſt am ſchnellſten; she reads the most rapidly. (§ 106.)

V. Participles, when used as adjectives, are compared in the like manner. Ex.: Gelehrt (learned), gelehrter, (more learned), gelehrteſt, (most learned): rührend, (affecting), rührender, (more affecting), rührendſt, (most affecting).

VI. Je-je or je-deſto, in phrases like the following, is answered in English by "*the* - *the*;" thus, Je mehr, je munterer; "*the*" more, "*the*" merrier. Je mehr, deſto beſſer; "*the*" more, "*the*" better. Je is sometimes *preceded*, by deſto. Ex.: Ein Werk iſt deſto nützlicher, je vollkommener es iſt; "*the*" more perfect a work is, "*the*" more useful it is.

Deſto is likewise used without je. Ex.: Er lief darauf deſto ſchneller; thereupon he ran *the* faster. Er hörte nun deſto aufmerkſamer zu; he listened now the more attentively.

VIII. The following adjectives are irregular in comparison.

Gut, good;	beſſer, better;	beſt or am beſten, best.
Hoch, high;	höher, higher;	höchſt or am höchſten, highest.
Viel, much;	mehr, more;	meiſt or am meiſten, most.

Wenig, minder, little or few; weniger, mindeſte, less or fewer; wenigſte or mindeſten, least or fewest. (See §. 39.)

Exercise 33.

Blume, *f.* flower; Buche, *f.* beech; Dick, thick, stout; Eiche, *f.* oak; Ein'flußreich, influential; Ein'förmigkeit, *f.* uniformity; Ei'telkeit, *f.* vanity; Entfernt', distant; Florenz, *n.* Florence; Fruchtbar, productive; Gebil'det, educated cultivated; Gefal'len, *m.* pleasure; Geiſt, *m.* spirit, mind; Gewöhn'lich, commonly; Jüngling, *m.* youth; Klugheit, *f.* prudence; Landluft, *f.* country air; Luft, *f* air, atmosphere; Muth, *m.* courage; Ovid', *m.* Ovid; Paris', *n.* Paris; Parma, *n.* Parma; Plaudern, to prattle; Schrift'ſteller, *m.* writer author; Sitte, *f.* manners, custom; Stamm, *m.* stock, trunk; Stern, *m.* star; Umgang, *m.* intercourse; Unrein, impure; Unwürdig, unworthy; Verän'derung, *f.* alteration, change; Verſtand', *m.* understanding; Virgil', *m.* Virgil; Wohlthat, *f.* benefit; Würdig, worthy; Zinn, *n.* tin.

Das Wetter iſt heute kälter als geſtern.	The weather is colder to-day, than yesterday.
Der edelſte Menſch iſt nicht immer der glücklichſte, und der reichſte nicht immer der weiſeſte.	The noblest man is not always the most fortunate, and the richest not always the wisest.
Der Klügſte iſt gewöhnlich am beſcheidenſten, der Dümmſte am zudringlichſten.	The wisest (man) is generally the most modest, the most stupid the most obstrusive.
Ein guter Feldherr muß mehr klug, als tapfer ſein.	A good commander-in-chief must be more prudent than valiant.
Dieſes Tuch iſt beſſer, als jenes.	This cloth is better than that.
Der Hunger iſt der beſte Koch.	(The) hunger is the best cook.
Die Tanne iſt der höchſte Baum.	The pine is the highest tree.
Weisheit iſt mehr zu ſchätzen, als Reichthum — aber am meiſten Tugend und Frömmigkeit.	Wisdom is more to be prized than riches, but virtue and devoutness the most.

1. Dieſer Jäger hat einen ſchönen Hund, meiner iſt ſchöner, und der eurige iſt der ſchönſte von allen. 2. Die Erde iſt kleiner, als die Sonne, und die Sterne ſind entfernter, als der Mond. 3. Virgil iſt ein angenehmerer Schriftſteller, als Ovid. 4. Die Stadt Canton (§ 123. 6.) iſt größer, als Paris. 5. Alexander der Große, hatte weniger Klugheit, als Muth. 6. Man findet viel mehr Kupfer, als Silber und mehr Eiſen als Zinn. 7. Dieſes Mädchen plaudert mehr, als ſie (§ 134. 2.) arbeitet. 8. Die Luft in den Städten iſt unreiner, als die Landluft. 9. Frankreich iſt nicht ſo fruchtbar, wie Deutſchland. 10. Dieſer Jüngling hat nicht ſo viel Verſtand, wie ſein Bruder, aber er hat auch nicht ſo viel Eitelkeit. 11. Die Roſe iſt eine der ſchönſten Blumen in der Welt. 12. Diejenigen ſind gewöhnlich am wenigſten ſtolz, deren Geiſt am gebildeſten iſt. 13. Die Sitten derjenigen ſind gewöhnlich einflußreich auf uns, mit denen wir Umgang haben. 14. Die Wohlthaten, deren wir würdig ſind, ſind uns angenehmer, als deren wir unwürdig ſind. 15. Derjenige iſt der reichſte, deſſen Kinder tugendhaft ſind. 16. Der Herr hat keinen Gefallen an denjenigen Menſchen, die keine Liebe zu ihren Brüdern haben. 17. Der Apfelbaum hat einen dicken Stamm, die Buche hat einen dickern Stamm, und die Eiche hat den dickſten Stamm. 18. Je mehr er hat, deſto mehr will er. 18 Florenz iſt ſchöner, als Parma.

1 The more frequent our intercourse is with nations, the more our commerce will be extended. 2. Are the palaces of the kings of England as beautiful as those of the German kings? 3. England is not so fertile as Spain or Italy. 4. It is as easy to do good as to do evil. 5. Virtue is the greatest ornament of man. 6. A sage said (used to say), that the more he reflected on the immortality of the soul, the more important it appeared to him. 7. The Rhine presents the most beautiful view. 8. The country-air was more beneficial in the recovery of this youth than the treatment of the most efficient doctor. 9. Ovid is a less agreeable writer than Virgil. 10. The spring is more variable than the autumn. 11. This view is beautiful, but from that hill it is more beautiful. 12. Augustus was not, perhaps, a greater man than Antony, but he was more fortunate than he. 13. Of all flowers the rose is the most beautiful, if the violet is not less beautiful. 14. The society of that youth is less agreeable than that of his brother. 15. Mont Blanc is a high mountain, but Chimborazo is higher, and Dawalagiri the highest.

LESSONS IN ENGLISH.—No. XVIII.

By John R. Beard, D.D.

SUFFIXES.

Words are affected in their import not only by particles set before them, but also by particles set after them. In *presumable*, you have a word, the meaning of which is affected by both a foregoing and an after-coming particle. It may be divided thus:—

PREFIX.	ROOT.	SUFFIX.
pre	sum	able
before	*take*	*capacity*

The root of the word is the Latin sumo, *I take*. By the addition of *pre*, sum becomes presume, *I take before;* that is, before positive proof. If you add *able*, then you form *presumable*, which signifies *what may be presumed*.

Having treated of prefixes, I pass on to suffixes, and shall give a list of the principal.

LIST OF ENGLISH SUFFIXES.

Abel, from the Gothic abal, *strength*, found in the Latin habilis, *fit for*, and in the Latin termination bilis; as, amabilis, *loveable*. It is found, also, in our word *ability*. In the sense of power or capacity, it occurs in many English words; as, reason*able*, dur*able*, &c. Sometimes it passes into the form *ible;* as, comprehens*ible*, vis*ible*, &c. When preceded by *v*, the *a* or *i* blends with the *v* into *u*, as in sol*uble*.

> "Where all life dies, death lives, and nature breeds,
> Perverse, all monstrous, all prodigious things,
> Abomin*able*, inutter*able*." *Milton*, "Paradise Lost."

Ade (*ado*), coming into the English through the French, the Italian, and the Spanish, gives us such words as brocad*e*, *embroidered*

silk; comr*ade* (comes, Lat. *a companion*; or from camara, Spanish, *a chamber*); scal*ade* (scala, Lat. *a ladder*; escalar, Spanish, *to climb*); brav*ado*, *a boast*, a boaster.

"What can be more strange than that we should, within two months, have won one town of importance by *scalade*, battered another, and overthrown great forces in the field?"—*Bacon.*

Age, from the Latin termination, ago, as in im*ago* (*an image*), through the Spanish *ago*, and the French *age* (as in avantage, *an advantage*): it denotes a state of being.

"That to the utmost of our ability, we ought to repair any *damage* we have done to others is self-evident."—*Beattie*, "Moral Science."

The term *average* is from the low Latin averagium (from avera (habeo, *I have*), a man's moveable property), which denoted a tax or general quit-rent, paid primarily in labour by the tenant to the lord. From *average*, and the custom it denotes, come *avercorne* and *averpenny* in old legal documents.

"Whether the small town of Birmingham alone doth not upon an *average* circulate every week, one way or other, to the value of £50,000."—*Berkeley*, "Querist."

Al from the Latin *al*, as in anim*al*, *an animal*, and animalis, *belonging to an animal*. *Al* in Latin indicates personality; thus anima is life, and anim*al* one who possesses life. *Al*, from *alis*, signifies *belonging to*.

"Mr. Monkhouse happening one day to pull a flower from a tree which grew in one of their *sepulchral* inclosures, an Indian, whose jealousy had probably been upon the watch, came suddenly behind him and struck him."—*Cook*, "First Voyage."

An, a suffix from the Latin adjective form *anus*; as humanus, *human, pertaining to a man*; from humanus comes also human-, *kind, like a man*, in which you see *an* in another form. From the termination of these Latin adjectives in the neuter plural *ana* is derived, the once favourite *ana*; as in Johnson*iana*, the things of Johnson, that is, his lighter sayings and doings, what is sometimes called *table-talk*, from the German *tisch-reden*.

Ance or *ancy*, a substantive suffix from the Latin *antia*, as in const*antia*, *constancy*; it denotes a condition; in constancy, the condition of being constant or firm. *Ance* sometimes passes into *ence*, as in condolence, the state of grieving (doleo, Lat. *I grieve*) with (con) another.

"She had so steadfast *countenance*,
So noble porte and *maintenance*." *Chaucer.*

Ant and *ent* are connected with the Latin participles in *ans* and *ens*, as amans, *loving*; docens, *teaching*, &c. Adjectives ending in *ant* sometimes come to us through the French, as in dorm*ant*, *sleeping*; the present participle of dormio, *I sleep*, being dormiens, in French dorm*ant*.

"Logicians distinguish two kinds of operations of the mind; the first kind produces no effect without the mind; the last does. The first they call *immanent* acts, the second transitive."

Ar from the Latin substantive ending in *ar*, as calcar, *a spur*; and the Latin adjective ending in *aris*, as regul*aris* (regula, Lat. *a rule*), according to rule, *regular*. The *ar* having once become a recognised termination in English, was added to words of Latin origin, as similar (similis, *like*, from simia, Lat. *an ape*; the likeness of the ape to man being such as to cause the same word to be applied to both ape and likeness; so we use *to ape*, that is, *to imitate*).

"You have heard how first they began of laymen onely, leading a straiter life from the society of other persons, who, then following the rule of S. Bennet (Benedict), were called *regulars* and votaries."—*Fox.*

Archy, a Greek termination, signifying *chief*, *government*, has been spoken of under the prefixes.

Ard (connected with the German *art*, kind manner), a substantive termination, signifies a permanent state; as, slugg*ard*, the habit of being sluggish; drunk*ard*, one whose habitual state is intoxication: a good man may be once drunk, but a good man cannot be a drunkard. The dull, in dull*ard*, is allied to the German toll, *mad*.

"But would I bee a post if I might,
To rub my browes three days and wake three nights,
And bite my nails and scratch my *dullard* head,
And curse the backward muses on my bed
About one peevish syllable." *Bishop Hall.*

Ary, from Latin adjective termination *arius*, as found in auxili-*arius* (auxilium, Lat. *aid*), *auxiliary*, *tributary*. This same *arius* gave rise to our termination in arious, as in greg*arious* (grex, Lat. *a flock*), *flocking together*.

From Latin words ending in *arius*, we have statu*ary* (ars statuaria); lapid*ary* (lapis, Lat. *a stone*), a (precious) stone-cutter; aviary, a place for keeping birds (aves, Lat. *birds*).

Aster, as in poet*aster*, which comes immediately from the French poëtastre, *a bad poet*, is found in the Italian *astro*, a termination denoting contempt. The *aster* in disaster, a calamity, has nothing to do with the suffix. Disaster seems to be from *dis* and *astron* Gr. a star), and so signifies an *ill-starred* condition.

Ate is a verbal (derived from a verb) termination, the origin of which is found in the Latin passive participle, as congreg*atus*; hence the verb to congreg*ate*.

"The *infuriate* hill forth shoots the pillar'd flame."
Thomson, "Summer."

Ated, *ted*, or *ed*, are the terminations of the passive participle in English, equivalent to the same Latin participle ending in *atus*; thus the Latin communic*atus* is in English communic*ated*. In the same way we have adapt*ed*, devolv*ed*, affix*ed*, imput*ed*, &c. Participles in *ed* become adjectives by suppressing the *d*, as desol*ated* becomes desol*ate*.

Ce is an English representative of the Latin termination in *tia*, as grat*ia*, *favour*, grace. *Cy* is sometimes used instead of *ce*,—e. g. clemen*tia*, clemency; that is, *mercy*.

In the older forms of the language words ending in *cy* were spelt *cie*. These nouns denote the abstract quality; thus prudens means *prudent*, as a *prudent* man; but prudent*ia* means prudence, in the abstract; that is, the quality is considered apart from any subject.

"But even that mightye loue of his great clemencie,
Hath given me grace at last to judge the truth from heresie."
Gascoigne.

Ch, a Saxon termination found in church, ditch, which, &c., and of old pronounced as a guttural, or at least like *k*, as in the Scotch *whilk* or *quhilk*, and the German *ch* or *ich*, as ich (*ick*), *I*; doch, *yet*; thus we have the Latin *sic*, and the English *such*; the Scotch *mickle*, and the English *much*; the Scotch *kirk*, German *kirche*, and the English *church*. Ditch or dike is a thing that men produce by digging. The words run thus, *dig*, *dike*, *ditch*. Another form of *dike* and *ditch* is *digue*.

"The people ran into so great despair that in Zeland they gave over working at their *digues*, suffering the sea to gain every tide upon the country."—*Sir W. Temple.*

'Cle or *le*, a diminutive, formed after the manner of the Latin diminutive termination *culus*, masculine, and *cula*, feminine; e. g., homun*culus*, *a little man*; a *mannikin*; *regulus* (Lat. rex, *a king*), *a little king*; mater*cula*, *a little mother*. The ending *cle* appears in partic*le*, *a little part*; pellic*le* (pellis, Lat. *skin*), *a little skin*; in musc*le* (musc*ulus*, Lat. *a little mouse*).

LITERARY NOTICES.

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THE DUKE OF WELLINGTON.—An interesting Memoir (with a Portrait and other illustrations) of this great Warrior and Statesman was commenced in the WORKING MAN'S FRIEND AND FAMILY INSTRUCTOR, for the week ending October 2. Weekly Numbers, 1d.; Monthly Parts, 5d. or 6d., according to the number of weeks in each month.

THE ILLUSTRATED EXHIBITOR ALMANACK, with upwards of Thirty beautiful Engravings, price sixpence, will be ready for delivery Nov. 1st.

ANSWERS TO CORRESPONDENTS.

EDWIN SIMMONS (York-street): His method of squaring the circle or circling the square, gives an error of one square inch in every 55.—ONE THAT'S TRYING: Try again.—S. K. (Knutsford): The "Elements of Arithmetic" are not a reprint of the Lessons in the POPULAR EDUCATOR; the other questions are undetermined.—A WORKING MAN: We are glad that our POPULAR EDUCATOR can be studied without the cane, and that he is pleased on this account.—AN OLD FRIEND (Nottingham) is mistaken as to our opinions; but we thank him for his, they are useful to us.—HIPPOLITE BONGATE (Brighouse): His answers are wrong.—J. WILLSON (Gateshead): The Romans always spoke Latin, it was their mother tongue. Our present alphabet is taken from the Latin, and it is infinitely better than the old English, which was even more hideous than the German, and that is bad enough.—T. S. CAYSER (Chudleigh): Thanks for his kind considerations and offers. A People's College in London is a grand desideratum. University College, Gower-st., has failed to attract the popular sympathies which were at first attached to it, from its founders. Thomas Campbell, the poet, who started the original idea, is dead; and Henry Brougham, who carried it into effect, became a *Lord;* that is, an *Aristocrat.* Was not this enough to injure it in the eyes of the people?—F. H. BRIGHTWELL: His solution is correct. The *Shilling Euclid* is not symbolical; it reprobates symbolism as inefficient for popular education.—ROBIN HOOD (Liverpool): The "Manual of the French Language" is 2s., and its carriage by post 6d. The pocket editions of Dr. Johnson's English Dictionary are so numerous, that it is not easy to say which is best.—A PUPIL TEACHER (Somerstown): Not as required.—VIRTUS (Lincoln): His demonstration of the 47th is good and well known; see Annotation to Prop. VIII., and Exercise 3 to Prop. XVII., Book VI., Cassell's Euclid.—Sir Isaac Newton's question has been correctly solved by J. KNOX (Fenton); DAWSON (Knaresborough); and many others.—M. C: The sum of any two obtuse angles makes an angle greater than two right angles.

MUSIC.—VORAX: We hope to satisfy his musical appetite with more frequent music articles as the long evenings come in. He has laid a good foundation if he has *thoroughly* and most *perfectly* mastered the exercises already given.—W. MARK, Music Teacher (Bristol): Thanks.—J. F. MORETON (Burnham): At the proper place in our course we shall *give our reasons* for differing from the authority he names on the question of the "chromatic semitone." The rate of movement indicated by the words "largo," "adagio," &c., must be to a great extent arbitrary. The metronome is the only sure indicator of speed.

Received, W. M. McD; E. B. JENKINSON (Bawtry); J. J. NEWTON (Bridgwater); F. MARKS (London); G. S. (Dursley); J. WHITEFORD (Ware); E. B. T.; G. SMITH (Coventry); J. ALLAN (Greenock); W. GILLESPIE (Carnock); VANDERDECKEN; C. THOMAS (St. Austell); AMATEUR (Ledbury); and SUBSCRIBER (Bingley).—TYRO (Leeds) should carefully read the demonstrations, and then endeavour to write them out from recollection. This is what is done at the University examinations.—F. J. H. (Castle Hedingham): We advise him to stick to the business to which he has been brought up, unless he be called by the church to which he belongs.—J. J. B. (Colchester), and W. H. F. (Manchester): Yes.—S. B. (Butwell): For the "water cure" apply to Dr. Gully.—W. WINTERN (Southminster): At Mr. Potter's, in the Poultry, or Mr. Wilson's, Leadenhall-street, London, you will obtain all sorts of charts. Norie's "Navigation" is reckoned the best, price 16s.—DOUGLAS: The "Library" is now published at 7d. per vol.—A MORRISTONIAN, should endeavour to acquire boldness or firmness in speaking, without impudence; Demosthenes, the famous Greek orator, had an impediment which he overcame by addressing himself to the waves of the sea.—QUAESITOR (Staines): Zymotic literally means *causing to ferment*, that is, *producing swellings.*—T. CRANSTON (Greenock): Thanks.—J. E. J.: We wonder that a person who recommends us to publish an Encyclopædia of Arts, Sciences, &c., would condescend to trouble his head with such *rank absurdity* as astrology. If there be any thing in it, *which we deny*, it can only be from the Devil.—S. B.: Marine botany; we shall see.—H. H. A. (Cornhill): A quarter of a circle requires definition.—DOCILITY: There are some mistakes; for example, you say the noun *thing* is governed by the verb *is*, and yet you say the verb is *intransitive.*—RUSTY (Chatham): See vol. I., p. 288, col. 2, line 49, and p. 304, col. 2, line 20.—T. FRAMP (Strathmiglo) and his friends will soon get enough of music.—TEMPO: Italian as soon as possible; the series of lessons in French will be found in the "French Manual," price 2s.—J. W. F.: Very well.—E. MOYNA (Monaghan): Spiers' French dictionary is among the best. Go on and prosper.—C. F. P. (Dunmanway) would oblige us by sending his address.—BUCKINGHAM: The prices of mathematical instruments vary exceedingly, according to the materials and the workmanship, so that it is impossible to state them accurately. Such as are described in the 2nd Lesson on Geometry, will vary from 30s. or two guineas to £5 or £10.

A Correspondent, at Lenny, Linlithgowshire, informs us that there is a Co-instruction Society called the "Kirkliston Mutual Improvement Society," established by several of the working men of the neighbourhood, which meets every Friday evening. There is an essay and a debate alternately, with recitations; and much good has resulted from its establishment. They are desirous of a list of good subjects for debate; not too abstruse. Perhaps some of our kind correspondents will supply them.—W. S. (Todmerden): *clique*, pronounced *cleek*, is an association of persons who *intrigue* and *cabal* for a certain purpose; and is synonimous with the plain English word *gang*, or the more polite words, *party*, and *faction.*—E. REESE (Newtown) is advised to study Dr. Beard's Lessons in English in preference to any published grammar.—BAD MEMORY (Ashton-under-Lyne): The only way to improve the memory is, to exercise it judiciously; "Where there's a will, there's a way."—P. M. T.: Learn both; rules for the use of *de* before verbs will be given.—DUBITANDUS: The Latin Lessons in the P. E. are the best that we know of, and the application of a little judgment will easily correct any typographical error.—T. PRYOR, will find his difficulties removed by consulting the Key to the Latin Lessons.—C. R. M. (Dunstable): To the questions—"What has become of the *original* writings of the prophets and apostles? In whose keeping are they?" Let him answer, "In God's keeping, by the ordinary course of his providence, and not by any special miracle." On this subject, we refer him to a tract written by the late rev. and learned Dr. J. Pye Smith, entitled "An answer to a printed paper entitled Manifesto of the Christian Evidence Society," published by the "Society for Promoting Christian Instruction," Paternoster row, price 2d.—SUBSCRIBER (Dysart): Laplace's "Mecanique Celeste," translated by Nathaniel Bowditch.—A SCHOOL-BOY (Southampton): Norie's Navigation.—HENRY VIRGO (Brighton): See "Working Man's Friend," 1st series, No. 69, p. 73.—S. C. E. (Ravenfield): His suggestions as to the mode of subtracting money, is good; it will be noticed in the Arithmetic.—ETA: The Lectures on Euclid will appear more frequently; Dr. Thomson has introduced the words "equals or the same" in the 7th axiom and some others; and though not expressed in Euclid's original axiom, they are understood and acted on by him in his demonstrations. You are quite right as to the axiom assumed in the second case of Prop. VII. You have begun in the true spirit; go on, you are sure to prosper.—J. COCHRAN (London); A BEGINNER (York): The additional Key is now given, and the rules required are in progress. Dr. Beard's "Latin made Easy," is written on a plan very similar to the Lessons in the P. E.—J. LANE (Ebury-square): We have heard no more of the box of Instruments announced by the Society of Arts; perhaps some kind correspondent will tell us.

A. W. NEANIASKI.—Send your numbers or parts for binding in cases to our office, or to Mr. Clarke, bookbinder, Bouverie-street, Fleet-street, London.—JOSEPH HARTLEY (Church Clough): Yes.—JAMES JARMAN (Llansaintfread): Right. Our "definite answer" is, that mesmerism, clairvoyance, &c., are humbug. The answer to 0÷0 is not complete. Keys will be given. The volume of the P. E. is 3s. 6d. As to cold water, drink as little as possible.—ANNE JOHNSON (Birmingham): We cannot really tell.—DEXTER (York): The *e* final in German generally forms a separate syllable, with few and small exceptions, as *die, die,* &c.—A CLERK (Weedon): Yes.—MARGARET (Preston): A young man is, *by law*, his own master at 21; at least this is the current impression.

INQUIRER AFTER TRUTH (Clerkenwell) is informed that a soul, after it has left the body, is *not material;* for one who knew all things said, "A spirit has not flesh and bones as you see me have;" therefore we cannot compare the flight of the soul to its MAKER, with the speed of light, or the velocity of gravitation. We must compare *spiritual* things with *spiritual*, and *material* things with *material*, if we are to arrive at just conclusions. Paul, in one of his epistles, says, "Absent from the body, present with the Lord." This is our hope, our delight, and our consolation; we trust it will soon be our friend's too.—W. S.; E. C. H.; E. A. M. (Devonport); J. GILBERT (Newcastle-on-Tyne) are requested to receive our thanks for their communications.—A VIGORNIAN (London): Yes.—W. B. L. (Meltham Mills) is right.—C. H. PHILIPS (Reigate): Covers are prepared for vol. I. We advise Geometry as an interchange, as well as for the reasons he assigns: his definitions of an Art and a Science are very good.—J. B. (Manchester): Yes, all actual rules should be committed to memory.—Received communications from T. F. P. O. (Camden-town); PUPIL TEACHER (Soremerton); A. FOWLER (Willsden); JOHN WOOD (Birmingham); JOHN GRAINGER (Coseley); E. NEW (Marlborough); AMOR (Carlisle); W. T. (Stamford); ISAAC BLAKE (Derby); E. B. M; AUTODIDACTOS (Ferrybridge); H. G. (Kingsbridge); R. MAGEE (Belfast); C. A. TYPO (Liverpool); W. MURPHY (Moira); X. Y. Z. (Liverpool); UNUS IN REMOTO SEPTENTRIONE (John O' Groat's House); RICHARDSON (Grays's Inn Terrace); AN UNEDUCATED MAN; W. JONES (Liverpool); J. S. W. (Ayton); L. B. YOUNG (Liverpool); A FRIEND (Cork); G. W. C. (Wigtonshire).

ANSWERS TO MATHEMATICAL CORRESPONDENTS.

J. WILSON (Manchester): See vol. I. p. 288, col. 2, line 49. Thomson's or Young's Algebra is better than Bridge's. There is a rule for *squaring a binominal*,—i.e. a quantity consisting of two terms; viz., square each term separately, and to the sum of the squares add twice the product of the terms. Hence, to square $\sqrt{\frac{1}{2}(a^2+3b^2)}-\sqrt{\frac{1}{2}(a^2-3b^2)}$, which is the same as $\frac{1}{2}\sqrt{(a^2+3b^2)}-\frac{1}{2}\sqrt{(a^2-3b^2)}$, we have $\frac{1}{2}(a^2+3b^2)$ and $\frac{1}{2}(a^2-3b^2)$ for the squares of the two terms, and $\frac{1}{4}\sqrt{(a^4-9b^4)}$ for twice their product. Therefore $\frac{1}{2}(a^2-\sqrt{(a^4-9b^4)})$ is the answer.

J. Mc D. (Edinburgh): The expression $\frac{x^{3n}}{x^n-1}-\frac{x^{2n}}{x^n+1}-\frac{1}{x^n-1}+\frac{1}{x^n+1}$ is equal to $\frac{x^{3n}-1}{x^n-1}-\frac{x^{2n}-1}{x^n+1}$; and these two fractions being brought to a common denominator, and the subtraction performed give $\frac{x^{4n}-x^{2n}-2}{x^{2n}-1}=x^{2n}+2$, by dividing the numerator by the denominator. The product $x^n \times x^n = x^{2n}$, by the rule of adding indices in multiplication.

RUGOSA: The complete series is $16\left\{\frac{1}{5}-\frac{1}{3\cdot5^3}+\frac{1}{5\cdot5^5}-\frac{1}{7\cdot5^7}+\frac{1}{9\cdot5^9}-\&c.\right\}-4\left(\frac{1}{239}-\frac{1}{3\cdot239^3}+\frac{1}{5\cdot239^5}-\frac{1}{7\cdot239^7}+\&c.\right)$ in computing which it is necessary to take the decimals of the terms within the brackets, considerably beyond the point required in the answer, in order to obtain it correctly.

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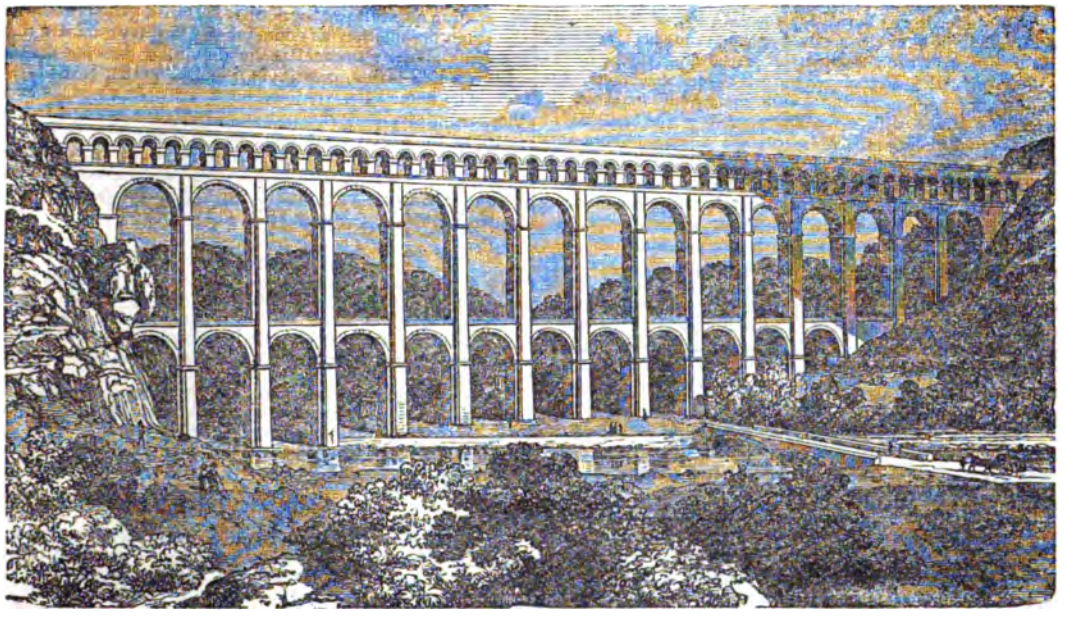
LESSONS IN ARCHITECTURE.—No. VIII.

ARCHITRAVES, ARCHES, AND VAULTED ROOFS *(continued)*.

In our last lesson we attributed the application, if not the invention, of the arch to the Romans, and showed how this ingenious people employed it in all their great and remarkable edifices. According to Frontinus, who was appointed the curator or superintendent of public works by the Emperor Nerva, Rome was supplied with water by nine great aqueducts; to these he added five more, and the number was increased by succeeding emperors to twenty altogether. The arches required in the construction of these aqueducts may be more easily conceived than described. The most remarkable of them may be here noticed. The *first* was the *Aqua Appia*, or Appian water, so called because it was constructed by the censor or magistrate Appius Claudius, in 442 A. U. C., that is in the 442nd year (Ab Urbe Condita) from the building of the city; this aqueduct commenced about seven miles from the city, made a circuit of nearly a mile, and then passing through a deep subterranean drain discharged the main body of its water into the *Campus Martius*, or field of Mars, at Rome, where the assemblies of the people were held for elections, &c. The *next* were the *Old and New Anio* aqueducts, which received these names because they brought the waters of the Anio, a tributary to the Tiber, into the city of Rome. The commencement of the older aqueduct was at the distance of 30 miles from the city, and it consisted chiefly of a winding drain which was carried through an extent of 43 miles. The commencement of the newer aqueduct was at a greater distance, and consequently on a higher level; it ran about seven miles and a half above ground, and then extended its way in a subterranean passage of about 54 miles before it reached the city. *Again* there was the *Aqua Martia*, so called because it owed its erection to Quintus Martius, which originated in a spring 33 miles distant from Rome, made a circuit of three miles, and then, forming a vault of 16 feet in diameter, ran 38 miles along a series of arcades at the elevation of 70 feet. At certain intervals of this aqueduct vents were formed for disgorging the collected air; and it was occasionally interrupted by deep cisterns in which the water was allowed to settle and deposit its sediment. This water, so carefully managed, was remarkable for its coolness and salubrity, and its clear green colour. The *Aqua Julia* and *Aqua Tepula* were brought to the city by two lower conduits belonging to the same aqueduct just described. *Fourthly* came the *Aqua Virginia*, conducted by Agrippa, who lived under the Emperor Augustus, who laboured to improve and beautify Rome, and who, according to Pliny, constructed in one year seventy pools, a hundred and five fountains, and a hundred and thirty reservoirs.

Fig. 25.



THE AQUEDUCT OF ROQUEFAVOUR, ON THE CANAL OF MARSEILLES.

This aqueduct commenced in a very copious spring, which rose in the midst of a marsh about eight miles from the city; it ran circuitously a distance of 12 miles, and in its course passed through a tunnel four-fifths of a mile long. *Lastly*, the *Aqua Claudia*, which was begun by Nero and finished by Claudius, took its rise 38 miles from Rome, forming a subterranean stream 36 miles and a quarter long, and running 10 miles and three quarters along the surface of the ground. This aqueduct was vaulted for the space of three miles, and supported on arcades for the space of seven miles, being carried along such a high level as to be able to supply all the hills of ancient Rome. It was built of hewn stone, and as Sir John Leslie remarked, to whom we are indebted for most of these particulars, it still continues to furnish the modern city of Rome with water of the best quality, a circumstance which has procured it the name of *Aqua Felice*.

It was in the reign of the Emperor Augustus, who greatly extended the aqueducts of Rome, that the practice of tunnelling was commenced; and other emperors, who followed him, carried out the same important department of engineering. The Emperor Trajan particularly exerted himself in the improvement of these aqueducts. Such works were executed in a bold and original manner; nothing could damp the skill and enterprise of the Roman architects. They drained lakes, excavated mines in the mountains, and elevated valleys by rows of accumulated arcades. The water of the aqueducts was kept cool by covering it with vaults; and they were often so spacious that, according to Procopius, they admitted of a man riding through them on horseback. The supply of water in Rome from these wonderful erections, was indeed so abundant, that Strabo says whole rivers of water flowed through the streets of Rome. Pliny justly considered these aqueducts as the wonder of the world, for their grandeur, extent, and utility; and it seems very surprising to us, when we contemplate the high pitch to which civil engineering and architecture have risen among ourselves, that we have no such splendid aqueducts to supply our modern cities, such as London, with water. According to the enumeration of Frontinus, the nine earlier aqueducts of Rome delivered every day about 173 millions of our imperial gallons; and it is supposed that, when all the aqueducts together were in operation, upwards of 310 millions of imperial gallons of water were supplied to the ancient city. Now, reckoning the population of Rome to have been one million, which it probably never exceeded, no less than 300 gallons of water were allowed for the daily use of each inhabitant. Rarely, indeed, have cities, either ancient or modern, supplied their inhabitants with such quantities? According to the calculations of Prony, the French engineer, three aqueducts, the *Aqua Felice*, *Juliana*, and *Paulina*, with some additional sources, supply modern Rome with 33 millions of imperial gallons of water in twenty-four hours. This, divided among a supposed population of 150 thousand, gives about 220 imperial gallons of water for each inhabitant, being about one-third less than that which was furnished to the inhabitants when the city was the mistress of the nations, and at the height of her ancient splendour. We believe that London is at present far more plentifully supplied with water, than even ancient Rome was, in proportion to her population, and at the period of her greatest prosperity; but we very much doubt whether the quality of the water supplied to the the former would bear comparison with that supplied to the latter. It seems to us, indeed, that unless the same method be adopted to bring water into London that was done in ancient Rome,—namely, by aqueducts to conduct it from pure sources at a great distance, and at a very considerable elevation, the great desideratum will never be obtained—a constant and sufficient supply of pure water to the metropolis.

Aqueducts constructed for the purpose of irrigation, or for the supply of towns with water, often require architectural and engineering works as difficult and as important in their construction as canals for inland navigation, or railroads for internal communication. Specimens of Roman architecture in these departments were given in our last lesson. Many are to be found in France. The aqueduct which supplies Nismes with water is of this description. Such also is the celebrated Pont du Gard, which is still in good preservation. As a specimen of modern skill, in that country, may be named the canal, which brings the waters of the Durance down from the Pont de Pertius, and conveys them to Marseilles after a passage of about 60 miles, of which nearly 11 miles are under ground. This canal or aqueduct passes across several deep valleys over splendid aqueducts, such as the Jancourelle, the Valbonette, and the Valmousse. But the most remarkable specimen of modern canal architecture, of any that now exists, is the aqueduct of Roquefavour on the same canal, represented in fig. 25. This wonderful structure is about 266 feet above the bottom of the valley; it is composed of three rows of arches, placed one above another, and is about 1,312 feet long. The beauty alone of this construction is not the most striking feature. The simplicity and elegance of the methods employed in its erection are especially worthy of admiration. We should like to see the skill of modern English architects and engineers employed in bringing the waters of some vast reservoir collected on some lofty eminence at a distance from the Metropolis. Such water, filtered previous to transmission, and carried by simple gravitation along some splendid aqueduct, would pour into London a pure river of the water of this life, and render the office of the Sanatory Commissioners almost a sinecure.

LESSONS IN FRENCH.—No. XXVIII.

By Professor Louis Fasquelle, LL.D.

Section LVIII.

1. We have given, in Section 9, rules for forming the plural of nouns, but have, in accordance with our plan of not presenting too many difficulties at once, deferred until the present Section the rules for the formation of the plural of compound nouns.

2. When a noun is composed of two substantives, or of a substantive and an adjective, both take the form of the plural: un chef-lieu, des chefs-lieux, *a chief place, chief places*; un gentilhomme, des gentilshommes, *a nobleman, noblemen* [§ 9 (1) (3)].

3. When, however, two nouns are connected by a preposition, the first only becomes plural: un chef-d'œuvre, des chefs-d'œuvre, *a master-piece, master-pieces* [§ 9 (2)].

4. In words composed of a noun and a verb, preposition or adverb, the noun only becomes plural: passe-port, passe-ports, *passport, passports* [§ 9 (6)].

5. Words composed of two verbs, or of a verb, an adverb, and a preposition, are invariable: un passe-partout, des passe-partout, *master-key, master-keys* [§ 9 (8).]

6. We have seen [Sect. 3, R. 4] that the name of the material always follows the name of the object, and that both are united by the preposition *de*. The name of the profession or occupation also follows the noun representing the individual, and the same preposition *de* connects the two: un maître d'armes, *a fencing-master*; un maître de dessin, *a drawing-master*; un marchand de farine, *a dealer in flour* [§ 76 (12), § 81 (4)].

7. The name of a vehicle, boat, mill, &c., always precedes the noun describing the power by which it is impelled, or the purpose to which it is adapted; the name of an apartment, that of the use to which it is appropriated. The connecting preposition is *à*: un moulin-à-vapeur, *a steam mill*; un bateau-à-vapeur, *a steamboat*; un moulin-à-eau, *a water-mill*; la salle-à-manger, *the dining-room* [§ 76 (13), § 81 (5)].

Résumé of Examples.

Lille et Arras sont les chefs-lieux des départements du Nord et du Pas-de-Calais.	*Lisle and Arras are the chief places of the departments of the North and of the Pas-de-Calais.*
Les chemins-de-fer et les bateaux-à vapeur sont très nombreux en Amérique.	*Railroads and steamboats are very numerous in America.*
Cette maison contient un salon, une salle-à-manger, une cuisine, et plusieurs chambres-à-coucher.	*That house contains a drawing-room, a dining-room, a kitchen, and several bed-rooms.*
Les moulins-à-vent sont plus communs en France que les moulins-à-eau ou à-vapeur.	*Windmills are more common in France than water or steam-mills.*

Exercise 115.

Armes, *f.* p. *fencing.*	Dessin, *m. drawing.*	Ordinaire, *usual.*
Bât-ir, 2. *to build.*	Engag-er, 1, *to engage.*	Roue, *f. wheel.*
Bouteille, *f. bottle.*	Faire bât-ir, 2. *to have built.*	Vapeur, *f. vapour, steam.*
Cabriolet, *m. gig.*	Se munir, 1 ref. *to provide one's self with.*	Voyag-er, 1. *to travel.*
Chat huant, *m. owl.*		Voile, *f. sail.*
Chauve-souris, *f. bat.*		Voiture, *f. carriage.*

1. Faut-il avoir un passe-port pour voyager en France? 2. Il faut en avoir un. 3. Les Anglais se munissent-ils de passe-ports pour voyager en Angleterre? 4. On n'a pas besoin de passe-port en Angleterre. 5. Aimez-vous à voyager sur les chemins-de-fer? 6. J'aime mieux voyager sur les chemins-de-fer que sur les chemins ordinaires. 7. Avez-vous apporté vos passe-partout? 8. Je n'ai point de passe-partout, je n'ai que des clefs ordinaires. 9. Votre frère est-il venu dans un bateau-à-vapeur? 10. Il est venu dans un bateau-à-voiles. 11. Avez-vous une voiture à quatre chevaux? 12. Non, Monsieur, nous n'avons qu'un cabriolet à un cheval. 13. Votre frère a-t-il bâti un moulin-à-vapeur? 14. Il a fait bâtir deux moulins, l'un à vent et l'autre à eau? 15. Votre compagnon a-t-il engagé un maître d'armes? 16. Non, Monsieur, il a déjà un maître de dessin et un maître de danse. 17. Combien de chambres-à-coucher avez vous? 18. Nous en avons deux. 19. Avez-vous une bouteille de vin? 20. Non, Monsieur, mais j'ai une bouteille-à-vin (*wine-bottle*) [§ 81]. 21. Voyez-vous les chats-huants? 22. Non, mais je vois le chauves-souris. 23. J'ai une voiture à quatre roues.

Exercise 116.

1. Is your father in England? 2. No, Sir, he is in France with my brother. 3. Have they taken passports? 4. Yes, Sir, they have taken two. 5. Is it necessary to have a passport to travel in America? 6. No, Sir, but it is necessary to have one to travel in Italy. 7. Is there a steamboat from Calais to Dover (*Douvres*)? 8. There are several. 9. Is there a railroad from Paris to Brussels (*Bruxelles*)? 10. There is one from Paris to Brussels, and one from Paris to Tours. 11. Has your brother bought a wind-mill? 12. No, Sir, but he has built a steam-mill. 13. Are there many wind-mills in America? 14. No, Sir, but there are many water and steam-mills. 15. Does your cousin learn drawing? 16. He does not learn it, he cannot find a drawing-master. 17. Is the fencing-master in the dining-room? 18. No, Sir, he is in the drawing-room. 19. Is your cousin in his bed-room? 20. No, Sir, he is out (*sorti*). 21. How many rooms are there in your house? 22. Five: a kitchen, a dining-room, a drawing-room, and two bed-rooms. 23. Are there owls here? 24. Yes, Sir, and bats too. 25. Have you seen those master-pieces? 26. Yes, Sir, I have seen them. 27. Have you sent them to the chief place of the department? 28. I have sent them there. 29. Have you a two-horse gig? 30. I have a four-horse one. 31. Has your brother a two-wheel carriage? 32. He has a two-seat carriage (*à deux sièges*).

Section LIX.

The two futures, simple and anterior (§ 124).

1. The future of every verb in the French language ends with *rai, ras, ra, rons, rez, ront.*

2. This tense, in all the regular verbs, as also in the irregular verbs not mentioned in the next lesson, may be formed from the present of the infinitive by changing the *r* of the firs and second conjugations, and the *oir* and *re* of the third and fourth, into the terminations already given and here again repeated.

3. Conjugation of the Future Simple of the Regular Verbs.

Je	chante –rai *will sing*	fini –rai *will finish*	recev –rai *will receive*	rend –rai *will render*
Tu	parle –ras *wilt speak*	chéri –ras *wilt cherish*	apercev –ras *wilt perceive*	vend –ras *wilt sell*
Il	donne –ra *shall give*	fourni –ra *will furnish*	percev –ra *will gather*	tend – ra *will tend*
Nous	cherche –rons *will seek*	puni –rons *shall punish*	concev –rons *will conceive*	entend –rons *will hear*
Vous	porte –rez *will carry*	saisi –rez *will seize*	dev –rez *will owe*	perd –rez *will lose*
Ils	aime –ront *will love*	uni –ront *will unite*	décev –ront *will deceive*	mord –ront *will bite*

4. The future anterior is merely the past participle of the verb, conjugated with the future of one of the auxiliaries, *avoir, être*:—

J'aurai fini; je me serai flatté. — *I shall have done; I shall have flattered myself.*

5. The student, when rendering English into French, should be careful to distinguish *will*, taken as an auxiliary, from the same word employed as a principal verb. In this latter case, it is always equivalent to the verb, *to wish*, or *to be willing*, and should not be rendered by the future of the verb, but by the present of *vouloir*:—

Ne voulez-vous pas lui écrire. — *Will you not (are you not willing to) write to him?*

Résumé of Examples.

Quand parlerez-vous à ce monsieur?	*When will you speak to that gentleman?*
Vous fournira-t-il des provisions?	*Will he furnish you provisions?*
Ils ne recevront pas leurs revenus.	*They will not receive their income.*
Ne vendrez-vous pas vos propriétés?	*Will you not sell your property?*
Que voulez-vous avoir?	*What do you wish to have?*
Que veut lire votre frère?	*What will your brother read?*
Apporterez-vous des pommes?	*Will you bring apples?*
Nous amènerons nos enfants.	*We will bring our children.*
Vous apporterez des légumes.	*You will bring vegetables.*

Exercise 117.

Abreuvoir, m. *watering-place.*
Appel-er, 1 [§ 49 (4)] *to call.*
Après-midi, *f. afternoon.*
Avoine, *f. oats.*
Blé, m. *wheat.*
Cachet-er, 1. [§ 49 (4)] *to seal.*
Château, m. *villa.*
Colporteur, m. *pedlar, hawker.*
Donner à manger, *to feed.*
Écurie, *f. stable.*
Foin, m. *hay.*
Gel-er, 1. [(§ 49 (5)] *to freeze.*
Men-er, 1. [§ 49 (6)] *to take, to lead.*
Se promen-er, 1. *ref.* [§ 49 (6)] *to walk or ride for pleasure.*
Récolt-er, 1. *to gather in a crop, to harvest.*
Sem-er, 1. [§ 49 (6)] *to sow.*

1. Mènerez-vous vos enfants à l'école? 2. Je les mènerai à l'école et à l'église. 3. Le jardinier apportera-t-il des légumes au marché? 4. Il y en apportera. 5. Où mènerez-vous ce cheval? 6. Je le mènerai à l'écurie. 7. Lui donnerez-vous à manger? 8. Je lui donnerai du foin et de l'avoine. 9. Lui donnerez-vous de l'eau? 10. Je le mènerai à l'abreuvoir. 11. Paierez-[§ 49 (2)] vous ce que vous devez. 12. Ne voulez-vous pas vous promener? 13. Je me promènerai cette après-midi. 14. Vous promènerez-vous à pied ou à cheval? 15. Je me promènerai à cheval et ma sœur se promènera en voiture. 16. Marcherez-vous beaucoup dans votre voyage à Paris? 17. Nous ne marcherons pas du tout. 18. N'appellerez-[§ 49 (4)] vous pas le colporteur? 19. Je ne l'appellerai pas. 20. N'achèterez-[§ 49 (5)] vous pas ce château. 21. Nous l'achèterons si nous pouvons. 22. Ne gèlera-t-il pas [§ 49 (5)] cette nuit? 23. Je ne le crois pas, il fait trop chaud. 24. Ne sèmerez-[§ 49 (6)] vous pas tout le blé que vous récolterez? 25. Je n'en sèmerai qu'une partie, je vendrai le reste. 26. Je cacheterai mes lettres et je les porterai à la poste.

Exercise 118.

1. Will not the gentleman call his children? 2. He will call his children and his sister's. 3. Will you not bring your children? 4. I cannot bring them. 5. Will you not take a ride this afternoon? 6. We will ride in a carriage to-morrow. 7. Will you not buy my father's horses? 8. I shall not buy them; I have no money. 9. Will you not call the pedlar? 10. I do not wish to call him; I do not wish to buy anything. 11. Will you pay the tailor? 12. I will pay him for my coat. 13. Will it not freeze to-morrow? 14. It will freeze to-morrow; it is very cold. 15. Will you not sow oats in this field (*champ*)? 16. I will not sow oats; I will sow wheat there. 17. Will you take your sister to school? 18. I will take her there this afternoon. 19. Will you not take your son to market? 20. I will not take him there. 21. Will not the gardener take his horse to the watering-place? 22. He will take him there. 23. Will you give oats to your horse? 24. I will give him hay. 25. Will you bring your son with you? 26. I will bring him to-morrow. 27. Will he bring his horse? 28. He will bring his horse and carriage. 29. Why do you carry that little child? 30. He is too sick to (*pour*) walk. 31. Will your brother sell his property? 32. He will only sell part of it. 33. Will not your servant carry the letter to the post-office? 34. I will seal it and give it to him. 35. Will you feed my horse? 36. I will feed him and give him some water.

LESSONS IN PENMANSHIP.—No. I.

POSITION OF THE BODY, THE HAND, AND THE PEN.

It is of the utmost importance in learning to write, to acquire a proper position of the body, as well as a proper method of holding the pen. For if once bad habits be acquired in these respects, it will be very difficult, if not impossible in many cases, to alter them afterwards. The reason of this is very evident from the constitution of man: use becomes second nature, continuance in error soon perpetuates it; and habits of body acquired without reason, are very seldom overcome by reason. There seems, indeed, to be a powerful tendency in our fleshly nature to retain first impressions, not only contrary to all reason, but in opposition to our better sense, even when we are fully convinced that we are wrong.

"He that's convinced against his will,
Is of the same opinion still."

With this preliminary caution, we hope our students will attend very carefully to our directions in endeavouring to

acquire an elegant system of Penmanship, as by this means they will surely become *Calligraphers*, or beautiful writers.

In the first place, you should sit right in front of the desk or table at which you intend to write; then, placing your left arm on the table and your left hand on the edge of the book or paper to hold it firm, if necessary, by pressure with the fingers, take the pen in the right hand, and grasp it firmly, but not too much so, between the thumb and the two fingers next to the thumb, that is, the forefinger and the midfinger, as shown in the accompanying representation of the hand with a pen in it. In this position, remember carefully that before you can draw a stroke, the point of the pen must be placed at the distance of about five-eighths or three-quarters of an inch from the tip of the midfinger, with its face or open part downwards, and not leaning to one side or other; the pen must also be placed along side of the nail of the midfinger, not on the nail itself, but on the fleshy part of the finger close by it. The upper part of the pen must likewise be raised above the knuckle of the forefinger, as seen in the figure of the hand, so that a thin paper-folder might pass a little way between this part of the pen and the knuckle. It is of essential importance to observe this part of the directions as well as the preceding, because for want of attention to these apparently trifling minutiæ, or small matters, many bad writers, or Cakographers, have arisen, and some of them even teachers who ought to know better what they are engaged in. For it stands to reason, and any one may prove it to himself by a few trials, that if the pen is allowed to fall below the knuckle, there is an instant loss of power, and of all real command over the pen.

Another direction of equal importance with any of those we have now given, is the position of the thumb; this you bend outwards from the pen so as to cause the tip or fleshy part of the point of the thumb to rest upon the pen directly opposite the first joint of the forefinger, as shown in the figure of the hand. This completes the directions for the position of the *three* fingers which hold the pen. Now let us attend to the other two fingers. One of these, the little finger, must be held so as to touch the paper on which you intend to write, just on the tip of it close by the *side* of the nail, while the hand itself is made to rest upon its heel, that is, close by the wrist, not pressing heavily, but as lightly as possible. In fact, the pressure on the tip of the little finger should be light also, so that in writing, the heel of the hand should assist the tip of the little finger, and the tip of the little finger assist the heel of the hand, by mutually bearing the weight of the hand, and acting alternately as momentary fulcrums or resting points, while the hand moves forward, making one stroke or letter after another. The other finger, next the little finger, usually called the ring finger, because ladies wear their rings upon it, is the most difficult to dispose of, but it must be done. Endeavour then to give it an elegant curvilinear form, something in the shape of part of a ring itself, so that it may lie passively between the midfinger and the little finger without interfering with their movements; it should be considerably within the little finger, and its first joint should rest very nearly upon the first joint of the little finger, in a crossing position. This completes the directions for the position of the little finger and the ring finger. Lastly, as to the position of the whole hand, you must carefully observe that while resting upon the heel of the hand and on the little finger, it must be kept upright, so that the top of the pen may point to the right ear when the hand is at the commencement of a line which you are about to write, and that as you move it along it must be kept parallel to this position throughout. It will assist you *very much* in obtaining and keeping this position of the hand to observe that the knuckle of the little finger and the knuckle or second joint of the thumb, should both be kept always as near as possible at the same distance from the paper, say about an inch and a half, while in the act of writing. It will also be of the greatest advantage if, at the commencement of a line in writing, you should have the elbow of the right hand pretty close to your right side, and as you move the hand along the line, in writing, to preserve the arm parallel to this position as well as the pen to its first position; in fact, if you do the one correctly you will necessarily do the other, unless you choose to *twist the wrist*, which would be equally painful, absurd, and unnecessary.

As to the position of the head and shoulders, stoop as little as possible; a gentle inclination of the head is all that is necessary in general, in order that you may observe earnestly and accurately the motion of the hand and the formation of the letters. In near-sighted persons a greater inclination of the head is required than in ordinary cases; but in all cases, whatsoever, this rule is absolutely essential, *to keep the chest entirely free of pressure on the table or desk at which you write*; if once you acquire a habit of leaning on the table or lolling upon it with your chest or stomach you need never expect to be a Calligrapher. We believe that many pupils have been seriously injured in their health by the practice or habit of leaning upon the chest while learning to write, and that such injury has followed them through life. What can be more absurd than to see a boy or girl sprawling on a table or desk with their arms akimbo, and their noses almost upon the paper imitating the motion of the pen? What more foolish or disagreeable than to see every stroke of the pen imitated by the mouth or the tongue, as if the writer was approaching a state of idiocy? Let every student of penmanship sit erect like a lady or gentleman while writing, and let him only stoop his head with a gentle inclination, as we said before, sufficient to enable him to see clearly what he is doing, and to produce such a specimen of *Calligraphy*, or beautiful writing, as will do credit to his care, attention, and ingenuity. Neither should you rest the body wholly upon the left arm, as some Cakographers do, for you will thereby greatly hinder the freedom of your motions in writing, and produce perhaps a fine specimen of Cakography, or bad writing, to your own annoyance and the no small amusement of your friends and correspondents. With all these directions, and we have not spared them, you will require both time and perseverance, and *constant practice*, either to learn the art of writing from the commencement, or to correct and improve the system you have already acquired. But perseverance, practice, and determination will do all that you require; and you will soon reap a rich reward for all your care, attention, and earnest application. What can be more pleasing and delightful than to sit down and with the greatest ease imaginable, pen a few lines to a friend, copy an interesting paragraph from a book or a newspaper, put a few burning thoughts into words either in prose or in verse, or record some important events in your life, which it may be absolutely necessary to remember either on your own behalf or that of relatives or children? Every man or woman, let his or her station be ever so humble, should write out his or her own will, and prevent those quarrels, disputes, and heart-burnings which fill our courts of law with cases, and our families with complete separation, lasting hatred, and everlasting dispeace. But to enlarge on the utility of the art of writing, and on the necessity of learning to write is surely needless in the present enlightened age, and especially so to the students of the Popular Educator; because it was entirely to please them, and to supply their wants, that we have taken up the subject.

We shall not suppose it necessary to begin with showing our students how to draw straight strokes upon the proper slope for writing; we shall suppose that they can do this for themselves, that they can practise this elementary step while

METHOD OF HOLDING THE PEN.

learning to hold the pen, and to sit right before the table or desk. If they require more than this, for the matter of twopence they can easily purchase ruled copy-books with straight strokes set on a line for them to imitate, by which they will learn, with a little care and attention to the preceding directions, both how to hold the pen, and to draw a straight stroke, before they reach the end of one copy-book. Perhaps they may require one or two more copy-books to learn how to make *pot-hooks and hangers*, as they are called, but which are neither more nor less than the turned strokes of the letters *m* and *n*, and which constitute the elements of almost all the other letters of the written alphabet; that is, of the small letters, but not the capital letters. Having practised these lessons in two or three copy-books at twopence each, which may be had from any bookseller who deals in stationery, our students may then proceed to practise the making of the letters of the small alphabet so that they may, progressively, advance

> "From black rough pot-books, horrid to the sight,
> To fairest lines that float o'er purest white."

As to the capital letters of the alphabet, the elementary letter or key to all the other letters is the letter I; if this letter is first learned to be well made, all the rest will naturally follow. But we must defer our remarks on the formation of the different letters both large and small till the next Lesson in Penmanship can be given.

LESSONS IN ENGLISH.—No. XIX.

By JOHN R. BEARD, D.D.

SUFFIXES (*continued*).

Dom, a suffix, found as a noun in the Latin and the Saxon, as well as the English; as in *dom*us, a house; *dom*inus, master; hali*dom*, holiness; king*dom*, the jurisdiction of a king. *Dom* is found also in the German *thum*; as reichthum, *riches*. *Dom* denotes *power, authority, office*. It is the same word that we have in *doom*; as doom's-day, *the day of judgment*. It occurs in the Saxon dom-boc, *doom-book*.

"For neither the fadir jugith ony man, but hath youun eche *dome* to the sone."—*Wiclif's* "Testament, John v. 22."

"And looke, when I am king, clayme thou of me the earl*dome* of Hereford."—*Shakspear*, "Richard III."

Ee, a termination of Gallic origin, found in refug*ee*, debauch*ee*, originated in an effort to represent in English the vocal force of the French accented *e*; as *debauché, refugié*. The French word is the passive participle. Hence, frequently the words ending in *ee* have a passive sense; a trust*ee* is *one who is trusted* by a trustor or truster; that is, *one who trusts*. It is the same with feoffer and feoff*ee*.

"And though his majesty came to them by descent, yet it was but in nature of the heire of *a feoffe* in trust, for the use and service of the kingdom."—*Prynne*.

El, le, a suffix, denoting an *instrument*; as, shov*el*, from *to shove*; stopp*le*, from *to stop*; need*le*, from the Dutch naad, *a seam*; in Anglo-Saxon, *naedle*; German, *nadel*, doubtless allied to the Anglo-Saxon *naegel*, the German *nagel*, and the English *nail*. According to Richardson, needle is "the dim. (diminutive) of need," because it is "*pushed*, driven, forced into!" *Damsel*, a young woman, is an abridged form of the French *demoiselle*, which of old denoted *a daughter of noble parents*: the transition of demoiselle into damsel may be seen in the rendering of the word by English versions of different ages; as, Wicliff (1380), *a damysel*; Tyndale (1534), *a damsell*; Cranmer (1539), *a damsell*; the Authorised (1611), *a damosell*. The Greek word, which properly denotes a female servant, is translated by the Geneva version (1557), *a mayde* (maid); and by the Rheims version (1582), *one veneche* (wench). Matt. xxvi., 69.

En, a suffix, by which nouns are converted into adjectives, and adjectives into verbs; as, brass, braz*en*; white, to whit*en*. In the same way, we have long, length, length*en*; dark, dark*en*; soft, soft*en*; leather, leather*n*; south, southern, and southr*on*. *En* forms also one ending of passive participles; as, weave, wov*en*; shear, shorn. It is found in some nouns as their plural termination; as ox, ox*en*. Of old, *en* and *n* formed the plural of the present tense of verbs, representing the Anglo-Saxon *don*. I quote the words of Ben Johnson:—"The persons plurall keepe the termination of the first person singular. In former times, till about the reigne of King Henry the Eighth, they were wont to be formed by adding *en*, thus: Love*n*, Sage*n*, Complaine*n*."—"Grammar."

Ence, a suffix, formed from the active participle in Latin ending in *ens*; as, poenit*ens*, poenit*entia*, peni*tence*; exist*ens*, exist*entia*, exist*ence*.

End, a Saxon termination, which denotes an agent; as, weg-fer*end*, *a wayfarer*; fri*end*, in Saxon *freond*; German, *freund*; probably connected with the verb *to free*; that is, *to make free*; and to free may have its source in the more general import of the term,—namely, *to love, to woo*; so that a friend is one who loves, and therefore frees another. Friend and friendly, in the older forms of the language, signified *lover* and *loving*

"The true faith, whereever it is, worketh and frameth the heart to *friendlike* dispositions unto God, and brings forth *friendlike*[a] carriage in the life towards God.—*Goodwin*.

Ent, (sometimes *ant*, as in "church milit*ant*), an adjective termination, the origin of which is found in both the Saxon and the Latin; as, writ*end*, *writing*; abs*ens* (absentis), *absent*. Adjectives ending in *ent* denote a present condition,—e. g., different; or a quality considered concretely; that is, in relation to some subject.

"Lord God, how frequ*ente* and famyliar a thynge with euery estate and degree throughout Christendom, is this reverent othe (oath) on the Gospills of Christ."—*Sir T. Elyot*.

Er (in the forms er, r, re). By comparing the Anglo-Saxon writ*ere*, the Latin scriptor (scribo, *I write*), and the English writ*er*, we find that the termination *er, or*, denotes *an agent*. So in Saxon saed*ere*, *a sower*; pleg*ere*, *a player*; and in Latin, amat*or*, *a lover*; doct*or*, *a teacher*. The endings *ere* in Saxon, *or* in Latin, and *er* in English, are very common. You must, however, in following analogy, use words so formed with judgment and taste. Having an active signification, they are generally formed from verbs, thus: to mend, *a mender*; to think, *a thinker*; to build, *a builder*. But it is not from every verb that such nouns can properly be formed. We can say, *to better*, but not a betterer; yet *a bettering* has some authority. Proper names arise from these nouns,—e. g., Mr. Bark*er*, Mr. Tyl*er*, Mr. Hely*er*, Mr. Fish*er*.

The suffix *er* also forms the comparative in adjectives; as, green, green*er*. It is, too, found in some verbs of Gallic origin; as in encount*er* (encontre, *a meeting*); cov*er* (couvrir, *to cover*).

Ery, erie; compare together coop (*a barrel*), coop*er*, coop*ery*; brew, brew*er*, brew*ery*; smite, smith, smith*y*; and you see that the terminations *ery, ry*, or *y*, denote a place where a certain trade, &c., is carried on. Similar is the force of the ending *ary* and *ory*; as, aviar*y* (avis, Latin, *a bird*), *a bird-room*; dormit*ory* (dormio, Lat. *I sleep*), *a sleeping-room*; granar*y*, *a place for grain*. Compare *ary*.

"I can look at him (a national tiger) with an easy curiosity, as prisoner within bars, in the menager*ie* of the tower."—*Burke*, "Regicide Peace."

Menager*ie* comes from the French *menage*, which is the origin of our *manage*, and both are from the Latin manu (*with the hand*), and ago (*I drive*), signifying *to tame, to keep in order*.

Es or *s*, is a suffix, by which is formed the third person singular of verbs, and the plural of nouns; as, I read, he read*s*; ship, ship*s*; box, box*es*. When an apostrophe precedes the *s*, as in man'*s*, the genitive case is intended,—e. g., man'*s* book; God'*s* word.

Esque, a termination derived from the Latin *iscus*, through the Italian *esco*, and the French *esque*, is found in grot*esque* and pictur*esque*. Grotesque means *distorted, unnatural*, and *heterogeneous*; from the strange and extravagant figures which were painted in the *grottos* or crypts of the ancient Romans.

> "An hideous figure of their foes they drew,
> Nor lines, nor looks, nor shades, nor colours true
> And this *grotesque* design expos'd to public view."
>
> *Dryden*.

Picture*sque* is *that which makes a picture*, or may enter into a picture.

"*Picturesque* properly means what is done in the style and with the spirit of a painter."—*Stewart*, "Philosophical Essays."

Ess, derived from the Latin *ix*, the feminine of *or*; as, adjut*or*,

[a] Friend*like*, abbreviated into friendly; in German, it is frund*lich*. Compare what is said before on the termination *ee*.

a helper; adjutrix, *a female helper*, converts masculine nouns into feminine,—e. g., abbot, abbess; actor, actress; prince, princess.

Est, a verbal suffix, forming the second person singular of the present tense; as read, read*est*. It finds corresponding terminations in the *s* of the Latin; as, legis, *thou readest;* and the *st* of the Saxon; as baern*st*, *thou burnest*. This suffix is rapidly becomming obsolete, since the second person singular of the verb is now rarely used; and in the cases in which it is chiefly used,—namely, by the poets, and by the Society of Friends, the *est* is for the most part dropped. Indeed, but for its constant employment in the public prayers of Christian churches, it would now probably be wholly out of use. Nor would the language suffer by its discontinuance; for, as the person is marked by the pronoun thou, there is no occasion for any inflection of the verb, and such inflection abates the euphony, and diminishes the adaptability of our verbs.

Et, as in turr*et* (turris, Lat. *a tower*), is a diminutive, *a small tower;* coming to us from the Italian torr*etta*.

> "Now like a maiden queen she will behold,
> From her high *turrets*, hourly suitors come;
> The east with incense, and the west with gold,
> Will stand like suppliants to receive her doom."
>
> *Dryden.*

Eth, the old termination of the third person singular of the present tense of the English verb; as eat*eth*, found in part in the Latin leg*it*, and found in full in the Anglo-Saxon baern*ath*, *he burneth*.

"He that goeth forth and weepeth."—(Ps. cxxvi. 6.)

LESSONS IN GEOGRAPHY.—No. XII.

ASTRONOMICAL PRINCIPLES OF GEOGRAPHY.

In our last lesson we endeavoured to explain to our geographical students the nature of the motion of the earth round the sun, and of its motion round its own axis. We there stated the principle or law of attraction in the language peculiar to the science of astronomy, somewhat modified and simplified; but as some of our readers may be entire novices, and may never have heard or understood several of the terms we made use of, we shall in this lesson endeavour to make the subject clearer still. First, then, as to the said law of attraction; let us illustrate this, by a very familiar instance taken from the heat of a common fire. Suppose two persons, A and B, sitting at the same distance from the fire, both in front of it, at least, the one as much as the other; it is plain that they would both feel the same degree of heat; for, whatever reason may be assigned to show that A received more heat than B, the same reason might be assigned to show that B received more heat than A; therefore, they must both receive the same heat. Now, suppose that B removes to double the distance that he was at when alongside of A, and that A remains in the same place; it might then be supposed that B would receive only *half* as much heat as he did before; or that A was now enjoying double the heat which B was receiving in his new position. Such is not the case, however; for the degree of heat does not diminish at the same rate that the distance increases, as you might expect at first sight; but it diminishes at a much greater rate, and the question is how much greater? Now, well conducted and careful experiments in Natural Philosophy have proved that the heat received at the distances of 2, 3, 4, 5, 6, 7, 8, 9, &c., feet, is *not* $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, $\frac{1}{7}$, $\frac{1}{8}$, of the heat received at 1 foot; but it is $\frac{1}{4}$, $\frac{1}{9}$, $\frac{1}{16}$, $\frac{1}{25}$, $\frac{1}{36}$, $\frac{1}{49}$, $\frac{1}{64}$, $\frac{1}{81}$, &c., of the heat received at one foot. So that B will receive at *double* the distance of A, only *one-fourth* of the heat which A receives; at *triple* the distance only *one-ninth* of the heat; and so on. The law of progression then is as follows: Let the heat received at the distance of 1 foot be denoted by 1, then the heat received at the distance of 2 feet will be represented by 1 divided by 2 times 2, or $\frac{1}{4}$; the heat received at the distance of 3 feet will be represented by 1 divided by 3 times 3, or $\frac{1}{9}$; the heat received at the distance of 4 feet will be represented by 1 divided by 4 times 4 or $\frac{1}{16}$; and so on. Now, dividing 1 by any number gives a result which in mathematics is called the *reciprocal* or *inverse* of that number; and multiplying any number by itself gives a result which is called the *square* of that number. But the numbers 1, 4, 9, 16, 25, 36, 49, 64, 81, &c., are the *squares* of the numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, &c., because they are found by multiplying the latter numbers each by itself; and the fractions $\frac{1}{1}$, $\frac{1}{4}$, $\frac{1}{9}$, $\frac{1}{16}$, $\frac{1}{25}$, $\frac{1}{36}$, $\frac{1}{49}$, $\frac{1}{64}$, $\frac{1}{81}$, &c., are called the *reciprocals* or *inverses* of the *squares;* and *ratio* means the *rate* at which any thing increases or decreases; hence, the force of heat, or quantity of heat received from a common fire, is in the *ratio* of the *inverses* of the *squares* of the distances; or more shortly, *in the inverse ratio of the squares of distances*. This may be explained in another way still. Suppose A to be placed at 2 feet distance from the fire and B at 3 feet distance; then B will receive less heat than A, not in the ratio of 2 to 3, the numbers which represent their distances; but in the ratio of 2 times 2 to 3 times 3, that is of 4 to 9; in other words, as 4 is contained $2\frac{1}{4}$ times in 9, so A will receive $2\frac{1}{4}$ times more heat than B; and this is all that is really meant by the phrase *the inverse ratio of the squares of the distances*.

Having thus explained the law of the influence of heat upon two bodies, or any number of bodies, at different distances from the source of heat, in the case of a common fire, we again observe that this law is equally true of the influence of light and of the influence of attraction upon bodies at different distances from the source of light and of attraction. Thus we know and feel that the sun is the great source of light and heat to this world of ours; and Astronomy teaches us that it is also the source of attraction, or of that power which has operated upon the earth and the other planets, and which continues still to operate upon them, by causing them to revolve in elliptical orbits or paths round that luminary, as explained in our last lesson. From the earliest ages up to the time of Kepler, the planets (planetes, Gr. *wanderers*) *or wandering* stars, so called in opposition to the *fixed* stars which appear always to preserve the same relative distances from each other, were reckoned to be in number *only six*; and this number being mathematically *perfect*, that is, equal to the sum of all its factors, 1, 2, 3, it was imagined that no more planets could exist, or could be expected to be found. Kepler, indeed, inquired most earnestly *why* they were only *six in number;* but Galileo, who re-invented the telescope, opened a new door in the temple of science, by the discovery of the *four* satellites of Jupiter, in January 1610, and led by this discovery to that of the other planets at a later period, which put to flight all reasons why the number of the planets should be limited to any given number. He would be a bold man indeed now-a-days who would try to limit the number of the planets, seeing that so many have been discovered within these few years past. The six planets known from antiquity are the following: *Mercury*, *Venus*, *the Earth*, *Mars*, *Jupiter*, and *Saturn*; no satellite was known from antiquity but the *Moon*. The first addition to the planets of the Solar System was *Uranus*, at first called the Georgium Sidus (*the Georgian Star*), in honour of King George III., by Sir William Hersehell, who discovered it March 13th, 1781. It was afterwards called Herschell in honour of the discoverer; but it is now called *Uranus*, because, forsooth, Uranus was in the Greek mythology (the fables of the heathen gods) the father of Saturn! Sir William Herschell believed that he had discovered *six* satellites attending this planet; only *two* have been observed by other astronomers. The first half of the present century has been prolific in planetary discoveries. The planet *Ceres* was discovered by M. Piazzi, on Jan. 1st, 1801; *Pallas*, by Dr. Olbers, March 28th, 1802; *Juno*, by M. Harding, Sept. 2nd, 1804; *Vesta*, by Dr. Olbers, March 29th, 1807; *Astræa*, by M. Hencke, Dec. 8th, 1845; *Neptune*, by Dr. Galle, Sept. 23rd, 1846; *Hebe*, by M. Hencke, July 1st, 1847; *Iris*, by Mr. Hind, Aug. 13th, 1847; *Flora*, by Mr. Hind, Oct. 18, 1847; *Metis*, by Mr. Graham, April 26th, 1848; *Hygeia*, by M. De Gasparis, April 12th, 1849; *Parthenope*, by M. De Gasparis, May 11th, 1850; *Victoria*, by Mr. Hind, Sept. 13th, 1850; *Egeria*, by M. De Gasparis, Nov. 2nd, 1850; *Irene*, by Mr. Hind, May 19th, 1851; and *Eunomia*, by M. De Gasparis, July 19th, 1851.

The additions made to the satellites of the planets, since the discovery of those of Jupiter and the ring of Saturn by Galileo, are the following: M. Huygens discovered *one* of Saturn's satellites in 1665; M. Cassini, *four*, between 1671 and 1685; Sir W. Herschell, *two*, between 1787 and 1789; and MM. Lassell and Bond, *one*, Sept. 19th, 1847; making in all *eight* satellites for Saturn. M. Lassell discovered a satellite belonging to Neptune, July 8th, 1847; it is also sup-

posed that this planet possesses a ring like Saturn. The following is a table of the distances of the planets from the sun, the lengths of their diameters, the inclinations of their axes to the plane of their orbits or paths round the sun, the inclination of the plane of their orbits to that of the Ecliptic or orbit of the earth, and their periodic times, or times of a complete revolution round the sun, as far as they are known. More particulars than these respecting the planets and their satellites we must reserve for our Lessons on Astronomy, otherwise we shall lose sight of those on Geography. We have arranged the planets in the order of their distance from the sun.

TABLE OF THE SOLAR SYSTEM.

Names of the Planets.	Astron. Marks	Mean distances. Millions of Miles.	Mean diameters. Miles.	Inclination of their axes.	Inclination of their orbits.	Periodic Times.
Mercury	☿	37	3094		7° 0′	88 days
Venus	♀	69	7600	15° 0′	3° 23½′	7½ months
The Earth	⊕	95	7912	66° 32′		1 year
Mars	♂	145	4100	61° 33′	1° 51′	1y. 10½m.
Flora		209				3 8
Victoria		222				3 7
Vesta	⚶	225	270			3 7½
Metis		227				3 8
Iris		230				3 9
Parthenope		233				3 10
Hebe		240				4 0
Egeria		245				4 1¾
Irene		246				4 2
Astræa		247				4 2
Eunomia		252				4 4
Juno	⚵	253	1430			4 4½
Ceres	⚳	263	400			4 7½
Pallas	⚴	263	80			4 7½
Hygeia		299				5 7
Jupiter	♃	495	87000	86° 55′	1° 19′	11 10½
Saturn	♄	915	79000	60° 0′	2° 30′	29 6
Uranus	♅	1800	35000	11° 0′	0° 46′	84 0
Neptune		2870	38000		1° 47′	166 years

In the preceding table it will be observed that almost all the new planets are found nearly at the same distance from the sun, and in the space *intermediate* between Mars and Jupiter. These planets were discovered in this space because they were sought for; and the origin of their search is curious. Kepler had discovered that the distance between Mars and Jupiter was anomalous as compared with the distances between the other planets, that it was greater in proportion to their distances from the sun, and he strove by some analogies of nature to find out the reason, but failed. Titius, a professor of Wittenberg, in Saxony, endeavoured to discover the law of progression in the distances of the planets, and succeeded. This discovery was published by Bode, in 1772, in the *Connaissance du Ciel Etoilé*; and hence it is usually called *Bode's law*. It is the following: calling the earth's distance from the sun 10, it was found that the distances of the other planets with that of the earth were very near to one another in the proportion of the following numbers:

Planets—Mercury, Venus, Earth, Mars, Jupiter, Saturn.
Numbers— 4, 7, 10, 16, 52, 100.

On further inquiry it was discovered that these numbers were related as follows:

$$4=4$$
$$7=4+3$$
$$10=4+3\times2$$
$$16=4+3\times2\times2$$
$$52=4+3\times2\times2\times2\times2$$
$$100=4+3\times2\times2\times2\times2\times2$$

(To be continued.)

LESSONS IN NATURAL HISTORY.—No. X.

THE BAT.

(Order CARNIVORA.)

THE gambols of the bat are taken in twilight; concealing itself during the day, it rambles abroad as the dusk of evening advances, chasing moths and other insects, skimming the water like a swallow, darting through the dark foliage of the trees, or wheeling round the outhouse or the barn, and uttering on its way the sharp shrill cry which is expressive of its delight. It may, therefore, excite some surprise among our readers to be told that this creature has been placed by the most distinguished naturalists among the CARNIVORA; hence it is necessary to observe that though the circumstance of living on the flesh of other creatures is one of its chief peculiarities, and one from which it receives its generic title, this is not to be regarded as absolutely universal, for there is at least one family whose diet is chiefly vegetable, flesh being only added occasionally; indeed, the differences in habits and structure which occur in this order are so many and great as not to admit of the genera being arranged in a definite and unbroken line. They rather lead to the distribution of the animals into families, branching out from a common centre, and connected among themselves by various ties, while the title of the order is fully established, and its boundaries are skilfully marked out. Thus, in this order, we always discover three kinds of teeth: *cutting-teeth*, *canine teeth*, and *grinders*. The first are generally small and feeble, the second are strong, firm, and well developed, and the third are exactly modified according to the proper food of the animal. The creatures which subsist entirely on plants have jaws which they can move from side to side in order to *grind* their food, but the jaws of the carnivora move like a hinge, and therefore, only *cut* like a pair of scissors. Of the senses of these animals that of *smell* is the most acute, and the object of this is evident, since by this means many of them track the steps of their prey.

The bat, placed among the carnivora on the grounds above specified, is a very remarkable animal, as will appear on a careful examination of its wing. This structure is very commonly spoken of as a wing of leather, and the idea attached to this term undoubtedly is that it is composed of a callous membrane, and is as insensible as the substance of a lady's glove or shoe. But this is a serious error, for were we to select an organ of the most exquisite delicacy and sensibility, the very opposite of the shoe or the glove, it would be, assuredly, the wing of a bat. Spallanzani, a philosopher celebrated for his ingenuity and love of research, but, unhappily, as notorious for his extreme cruelty, observed that bats could fly with great certainty in rooms however dark without striking against the walls. He found that when their eyes were covered they could fly with as much precision as before, and even when their eyes were put out no failure in this respect was observed. When branches of trees or threads were suspended from the ceiling the bats avoided them, nor did they brush the threads when they flew past or between them; and even when the space was too small to admit their expanded wings, they contracted them so as to suit their dimensions to the breadth of the passage. Spallanzani thought, therefore, that the bat must possess a sixth sense, which served it instead of sight. As the organs of vision had been destroyed it was not by them that obstacles were avoided. Nor could it be by hearing, for the ears of many of the bats were stopped. It was equally clear that no aid was afforded by the sense of smell, as the same precaution was taken with the nostrils. And any exercise of taste was out of the question.

The wings of bats are stretched over the limbs, of which the anterior, as well as the fingers, excessively lengthened, serve the same office as the whalebone, or the steel frame-work of an umbrella. As the wings present an extent of surface much greater in proportion than is found in those of birds, and as their muscles are completely adapted to them, the flight of the bat is strong, rapid, and marked by sudden turns which are made with astonishing celerity. What may be termed the thumb, is not long and attenuated like the fingers, nor is it inclosed in the membrane; it is short, free, and armed with a strong hooked claw, by which the bat can crawl along the ground.

According to Cuvier, it is not by any additional sense, but by the acuteness of the sensation of touch in the wing that the phenomena observed by Spallanzani, are to be explained. He says:—"The bones of the metacarpus, and the phalanges of the four fingers, which succeed the thumb, are excessively elongated. The mem-

brane which unites them presents an enormous surface to the air; the nerves which are distributed to it are numerous, and minutely divided; they form a net-work, very remarkable for its fineness and the number of its interstices. It is probable that, in the action of flight, the air, when struck by this wing, or very sensible hand, impresses a sensation of heat, cold, mobility, or resistance on that organ, which indicates to the animal the existence or absence of obstacles which would interrupt its progress. In this manner, blind men discover by their hands, and even by the skin of their faces, the proximity of a wall, door of a house, or side of a street, even without the assistance of touch, and merely by the sensation which the difference in the resistance of the air occasions."

THE BAT (BACK VIEW).

The common bat is about the size of a small mouse, and measures nearly nine inches from the tip of the one wing to that of the other, when they are expanded. The ears are short, and each has a small inner valve. The eyes are deeply seated in the head, and are very small in several of the species. The fur is of a reddish mouse colour.

On the approach of the cold evenings at the latter end of autumn, the bats fall into their long winter slumber, and cluster together to defend themselves from the cold. This state of lethargy cannot be very remote from actual dissolution; for some of the most important animal functions are so far suspended, as to be scarcely perceptible. The action of the head and the arteries, for example, becomes so languid, that the pulse can scarcely be felt; and it is very doubtful if respiration can be carried on. The circulation of the blood is not discernible in the smaller vessels; but when the animal is revived by warmth, it may be observed by means of a microscope.

During this state of hybernation, as it is called, the animal's temperature falls far below the ordinary standard, while digestion and the visible secretions are arrested. It is presumed, however, that the adipose, or fatty matter, is gradually taken up by the absorbents into the languid circulation; for the bats enter into their dormant condition very fat, and revive from it much emaciated. In the winter, the lingering remains of vitality may be ascertained by touch, or the approach of a lighted candle, from either of which the animal will be observed to shrink. Its natural posture during this period is that of suspending itself by the hind-claws, with the head downward. On the whole, they fare better during a severe than a mild winter; for warm weather not only awakens them, but re-excites their digestive powers at a time when the requisite supply is not attainable. Some have been observed to come forth at the temperature of 42° of Fahrenheit's thermometer, and others only at that of 48°. A moderate, and equable heat, such as that of the human hand or bosom, is most likely to revive them, as well as other torpid animals, which are often killed when placed too near the fire.

THE BAT (FRONT VIEW).

The natural posture of repose to the animal during the days of summer is the same as that taken in its wintry state. In this suspension, the wings serve as a sort of cloak or mantle; and in this, bats also sometimes cover up their young, although they will, at other times, fly about with two young ones at the breast in the act

of sucking. These young ones together, frequently exceed the weight of the parent; and the tenacity with which they retain their hold is truly astonishing.

Such was the case with several female bats, taken with their young, as well as others, for the purpose of careful observation. All the young were devoid of down, and of a black colour. After they were taken, they were shut up in a box, and refused all food for several days. During the day time, they were extremely desirous of retirement and darkness, and, while confined to the box, never moved or endeavoured to get out while it was light. When spread on the carpet, they commonly rested for a few minutes; and then, beginning to look about, crawled slowly to a dark corner or crevice. But at sunset the scene was entirely changed. Every one then endeavoured to scratch its way out of the box; a continued chirping was kept up, and no sooner was the lid of the prison opened, than each one was active to escape, either flying away immediately, or running nimbly to a place which was convenient for taking wing.

The bat is capable of being rendered somewhat tame. Mr. White says:—"I was much entertained last summer with a tame bat, which would take flies out of a person's hand. If you gave it anything to eat it brought its wings round before the mouth, lowering and hiding its head, in the manner of birds of prey when they feed. While I amused myself with it, I saw it several times confute the vulgar opinion, that bats, when down on a flat surface, cannot get on the wing again, by rising with great ease from the floor. It ran, I observed, with more dispatch than I was aware of, but in a most ridiculous and grotesque manner."

LESSONS IN LATIN.—No. XXVII.

By JOHN R. BEARD, D.D.

DEPONENT VERBS, THIRD CONJUGATION.

EXAMPLE.—Loquor, *I speak*. *Chief parts*, loquor, loqui, locutus sum.

		Indicative	*Subjunctive.*	*Imperative.*	*Infinitive.*	*Participles.*
PRESENT.	*I speak, &c.*	*Singular.* loquor, loquĕris, loquĭtur	*I may speak.* loquar, loquāris, loquātur	*Speak thou, &c.* loquĕre, loquĭtor; loquĭtor	loqui, *to speak*	loquens, *speaking*
		Plural. loquĭmur, loquĭmini, loquuntur	loquāmur, loquāmini, loquantur	[minor loquĭmini, loqui- loquuntor		
IMPERFECT.	*I was speaking, &c.*	*Singular.* loquēbar, loquebāris, loquebātur	*I might speak.* loquĕrer, loquerēris, loquerētur			
		Plural. loquebāmur, loquebāmini, loquebantur	loquerēmur, loquerēmini, loquerentur			
I. FUTURE.	*I shall speak, &c.*	*Singular.* loquār, loquēris, loquētur			locutūrum esse, *to be on the point of speaking*	locutūrus, *on the point of speaking*
		Plural. loquēmur, loquēmini, loquentur				
PERFECT.	*I spoke, &c.*	*Singular.* locūtus sum, locūtus es, locūtus est	*I may have spoken.* locūtus sim, locūtus sis, locūtus sit			locūtus, *having spoken*
		Plural. locuti sumus, locuti estis, locuti sunt	locuti simus, locuti sitis, locuti sint			
PLUPERFECT.	*I had spoken, &c.*	*Singular.* locutus eram, locutus eras, locutus erat	*I might have spoken.* locutus essem, locutus esses, locutus esset			
		Plural. locuti eramus, locuti eratis, locuti erant	locuti essemus, locuti essetis, locuti essent			
II. FUTURE.	*I shall have spoken, &c.*	*Singular.* locutus ero, locutus eris, locutus erit				
		Plural. locuti erimus, locuti eritis, locuti erunt				

GERUNDS.
- Genitive..... loquendi, *of speaking.*
- Dative. .... loquendo, *to speaking.*
- Accusative .. loquendum, *speaking.*
- Ablative.... loquendo, *by speaking*

SUPINES.
1. locutum, *to speak.*
2. locutu, *to be spoken.*

After this model conjugate sequor, sequi, secutus sum, *to follow*; fungo, fungi, functus sum (with abl.) *to discharge*; labor, labi, lapsus sum, *to fall*; obliviscor, oblivisci, oblitus sum (with gen.) *to forget*.

VOCABULARY.

Complector, complecti, complexus sum 3, *to embrace*; congredior, congrĕdi, congressus sum 3, *to come together, meet, fight* (E. R. *congress*); fruor, frui, fructus and fruitus sum, *to enjoy*; nascor, nasci, natus sum 3, *to be born, to arise*; part. fut. nasciturus (E. R. *nascent*); innascor 3, *to be born in*; nitor, niti, nixus, or nisus sum (with abl.) 3, *to lean, to depend on, endeavour*; ad aliquid, *an object*; adnitor 3, *to strive for*; paciscor, pacisci, pactus sum 3, *to make a treaty or agreement*; revertor, *perfect*, reverti, *participle*, reversus 3, *to return* (E. R. *reverse*); ulciscor, ulcisci, ultus sum 3 (with acc.) *to avenge yourself, punish*; cumŭlo 1, *to heap up* (E. R. *accumulate*); persevĕro 1, *to persevere*; discedo, discedere, discessi, discessum 3, *to depart*; superior discédo, *I come off conqueror*; gratia, ae, f. *gratitude, favour, thanks* (E. R. *grateful*); angŭlus, i, m, *a corner*; pestis, is, f. *the plague*; detestabĭlis, e, *to be shunned, detestable*; quotiescunque, *as often as*; semen, seminis, n, *seed*; visum, i, n, *sight, appearance*; superior, ōris, m, *a superior, conqueror*; parum diu, *too short a time*; expergiscor, expergisci, experrectus sum 3, *I arise*; simulatque (simul and atque), *as soon as*; succurro, succurrere, succurri, succursum 3, *to aid, succour* (with dat.).

EXERCISES.—LATIN-ENGLISH.

Salus hominum non veritate solum sed etiam famâ nititur; cives, cum hostibus pacti, pace fruĭti sunt; Deum et divinum animum cogitatione complectimur; lacte, carne, multisque aliis rebus vescĭmur; cavete ne ulciscamini inimicos vestros; Romani Numidis hoc polliciti sunt; Numidi perseveraverunt bello urgere Carthaginienses; Romani adnisuri sunt; Romani se adnisuros esse dicunt; cumulatam gratiam reddiderunt Romani; Romani Numidis polliciti sunt, si perseverarent bello urgere Carthaginienses, se adnisuros esse, ut cumulatam gratiam redderent; nemo parum diu vixit, qui virtutis perfectae functus est munere; visa in somnio contemnunt sapientes; simulatque experrecti sumus, contemnimus visa in somnio; Aristotĕles, Zeno, innumerabiles alii, e patriâ profecti, nunquam domum reverterunt; nulla tam detestabilis est pestis quae non homini ab homine nascatur; non sum uni angulo natus; patria mea totus hic est mundus; sunt ingeniis nostris semina innăta virtutum; Hannibal cum Romanis congressus est in Italiâ; Hannibal cum Romanis congressus semper discessit superior; Hannibal, quotiescunque cum Romanis congressus est in Italiâ, semper discessit superior.

VOCABULARY.

Defetiscor, defetisci, defessus, sum 3, *to be weary*; elăbor, elabi, elapsus sum 3, *to slide, get away*; enitor, enisus, enixus sum 3, *to struggle out, to do our best*; patior, pati, passus sum 3, *to suffer*; excédo, excedere, excessi, excessum 3 (with abl.), *to go out of, or beyond* (E. L. *excess*); tendo, tendere, tetendi, tentum 3, *to stretch, extend*; ad aliquid, *to strive after*; stultitia, ae, f. *folly* (E. R. *stultify*); nefas, indeclinable, n. *wickedness, something too bad to be spoken of* (from for, fari, fatum); proprius, a, um, *one's own, peculiar*; diuturnitas, ātis, *length of time*; quo, *whither*; ubicunque, *wheresoever*; adipiscor, adipisci, adeptus sum 3, *to attain, acquire*; ubicunque gentium, *in whatever part of the world*; regius, a, um, *royal*; regia res est, *it is like a king*, or *worthy of a king*; lapsus (labor), *fallen, the fallen*; irascor, irasci, iratus sum 3, *to be angry*; avidus, a, um, *eager for, greedy of*; recens, tis, *recent, fresh*; careo 2, *to be without*; consuetudo, Inis, f. *acquaintance*; vicinitas, ātis, f. *neighbourhood*.

EXERCISES.—LATIN-ENGLISH.

Optimi cujusque animus maxime ad gloriam immortalem nititur hostes diuturnitate pugnae defessi sunt; hostes diuturnitate pugnae defessi, praelio excedebant; adeptus est virtutem; ubicunque gentium erit vir bonus, ab amicis diligĕtur; qui virtutem adeptus erit, ubicunque erit gentium, a nobis diligetur; avida est periculi virtus; virtus quid passura sit non cogitat; avida est periculi virtus, et quo tendat, non quid passura sit cogitat; Augustus dominum se appellari non est passus; animalia alia rationis expertia sunt, alia ratione utuntur; animo elapso, corpus nihil valet; valet apud nos clarorum hominum memoria, etiam mortuorum; regia res est, succurrere lapsis; proprium est stultitiae, aliorum vitia cernĕre, oblivisci suorum; ut plurimis prosimus, enīti debemus; irasci iis quos amare debemus est nefas; amicitiae, consuetudines, vicinitates habent aliquid voluptatis; carendo magis quam fruendo intelligimus bona nostra; amicitiae, consuetudines, vicinitates quid habeant voluptatis, carendo magis intelligimus quam fruendo; semper recentes defessis succedebant.

LATIN-ENGLISH.

Happiness depends on virtue; does happiness depend on man? No, happiness depends on God; we ought to do our best to cultivate virtue; the father embraced his son; the son avenged the death of the father; the king promised a reward; did the queen promise a reward to your sister? the soldiers will endeavour to attain heaped-up glory; in the morning they arose and departed; they have well discharged the duties of life; Aristotle and Zeno discharged the duties of præceptors; when will your friends return home? They returned home yesterday; they went from their country, and will never return; this plague is borne in the minds of men; where is your country? my country is the world; the seeds of vice are inborn in human souls; the general fought with the enemy; as often as the English generals fought with their enemies, they came off conquerors; the mind of every very good boy, very greatly loves his parents; the good strive for salvation (salus animae); boys and girls live on milk; the scholars have discharged their duties; pity the fallen, O God; succour the poor; it is peculiar to folly to do good to no one.

You may make great progress in a knowledge of syntax as you pass on through these exercises on the formation of the verbs, if you will carefully mark the various forms and constructions that come successively under your notice. With a view to aid you in this, I mark any considerable deviation; e. g., when a verb has its object not in the accusative case, but the objective, I introduce the abbreviation, *cum dat.*, which means that this verb requires its object to be in the dative case. But I cannot impress it too deeply on your mind, that it is mainly by your own observations, by your own reflections, generally, by your own studies and efforts, that you can acquire an acquaintance with the Latin, or indeed any other branch of knowledge. There are many, very many, peculiarities which I have not here space to point out. You, too, have difficulties of which I am not aware. It is only by attention and diligence on your own part that the one can be learned, and the other overcome. Study every lesson in all its parts and relations with the utmost care. Go over every lesson again and again. What you do not see now, you will see by and bye; and what you do not understand now, you will understand hereafter.

I have spoken of vereor and metuo, I will say a few words of timeo. Timeo (timére, timui 2) is given in the dictionaries as signifying *I fear*. Is it then of the same meaning with vereor and metuo? Not exactly. Timere represents a state of mind, an habitual state of mind, a state of mind habitual because natural, the state of mind which is designated *timid*; hence timere has for its primitive import to be timid, or afraid. Accordingly timere denotes mental solicitude, to be anxious, to be afraid, to be apprehensive. Metuĕre points out a more active, more decided, and more formidable sentiment. There is between metuĕre and timére the difference that there is between the English to be afraid and to fear; we are afraid, harm has come to our friends, and we fear the lightning. Hence we may understand these words metui cupiunt, metuique timent, *they wish to be feared, and they are afraid to be feared*. When I add that the words are used of tyrants, you will see that they are very descriptive.

CONSTRUCTION OF TIMEO.

Accusative of object; instead of an accusative, timeo, like many other verbs, may have as its object a member of a sentence, or a dependent and imperfect sentence; ne and ut; with dative of object, for which or whom you are afraid.

Accusative:—

"Si coactus esset respicere ac timere oppidanos."—*The Gallic War*.

Lit. Trans.:—*If he had been compelled to regard and fear the town's people*.

Id. Trans.:—*If he were compelled to regard and fear the town's people*.

Here you see the literal translation and the idiomatic are very nearly the same—showing you that the Latin and the English may exactly correspond in both word and order.

With a dependent member:—

"Haec quo sint eruptura timeo."—*Cicero*.

Lit. Trans.:—*These things where they may break out I am afraid*.

Id. Trans.:—*I fear what may be the issue of these things*.

With ne:—

"Timeo ne malefacta mea sint inventa omnia."—*Plautus*.

Lit. Trans.:—*I am afraid lest bad deeds my may be discovered all*.

Id. Trans.:—*I am afraid that all my bad deeds are discovered*.

With ut:—

"Omnes labores te excipere video; timeo ut sustineas."—*Cicero*.

Lit. Trans.:—*All labours thee to undertake I see; I fear that thou may support*.

Id. Trans.:—*I see that you undertake all labours; I fear you will not be able to support them*.

With dative:—

"Nostrae causae nihil nos timere."—*Quintilian.*

Lit. Trans.:— *For our cause nothing we fear.*

Id. Trans.:—*We (say that we) fear not at all on our account.*

VOCABULARY.

Objicio 3, *I cast in the way of, I oppose to*; conor dep. 1, *I endeavour*; experior, experiri, expertus sum, dep. 4, *I make trial of* (E. R. *experiment, experience*); circumvenio (circum and venio) 4, *I surround* (E. R. *circumvent*); angustiae, arum, f. *narrowness*; ang. itineris, *the narrow road*; supporto 1, *I carry*; res frumentaria, *corn for horses and men*; de suo ac legionis periculo, *concerning (on account of) his own peril and the peril of the legion.*

EXERCISES.—LATIN-ENGLISH.

Caesar timebat tantae magnitudinis flumini exercitum objicere; Caesar conandum atque experiendum judicat; Caesar etsi timebat tantae magnitudinis flumini exercitum objicere, conandum tamen atque experiendum judicat; neque timerent ne circumvenirentur; non se hostem vereri dicebant; angustias itineris timere se dicebant; ut satis commode supportari res frumentaria timere dicebant; non se hostem timere, sed angustias itinĕris, et ut satis commode posset supportari res fumentaria timere dicebant; salva est navis, ne time; de Republicâ valde timeo; de suo ac legionis periculo nihil timebat; non times ne locum perdas; timuit ne non succederet.

ENGLISH-LATIN.

I fear that thou hast lost thy labour; I am afraid the house will fall; I fear corn will not be brought into the city; the general feared that his army would not come; they fear for their beautiful little girl; concerning thy fortune, I am not at all afraid; the king and his generals are afraid of being surrounded; Cicero judges that he must make a trial; I fear he will not be able to make a trial.

LESSONS IN GERMAN.—No. XVIII.

SECTION XXXII.

INSEPARABLE PARTICLES.

Besides the separable particles, (Sect. 27.) there is another class (be, emp, ent, er, miß, ver, &c. §. 94.) that, unlike the former, are never used apart from the radical words to which they are prefixed, and hence are called *inseparable* particles; thus, by the union of these particles be, emp, ent, er, &c., with the radicals fehlen, &c., we have the compounds, befehlen, empfinden, entbehren, erholen, mißfallen, verhören, zermalmen, &c. corresponding in formation, to the English compounds, be-tray, de-rive, dis-may, mis-take, &c. With few exceptions, (as begeistern, beseelen,) however, *German, unlike* most *English radicals*, may be used as well *alone*, as in combination with prefixes; as, stören, to disturb; zerstören, to demolish, &c.

Many particles in German, which are used to modify radical verbs, have their exact equivalents in English. Ex.: Deuten, to interpret; mißdeuten, to misinterpret; sänftigen, to calm; besänftigen, to becalm, &c. (§ 97. 1. 2., &c.)

In German, as in English, the inseparable particles never take the primary accent. (§ 98.)

I. Vor, which is often rendered by the English, "*ago*," unlike the latter, always *precedes* the word of time to which it refers. Ex.: Er war vor zwei Stunden hier; he was here two hours *ago*, (literally, he was here *before two* hours.)

Seit, (since), when used with words denoting time, often answers to "*for*" or "*during*." Ex.: Er ist seit einer Woche krank; he (is Sect. 18. VI.) has been sick *for* a week. Ich habe ihn seit einem ganzen Jahre nicht gesehen; I have not seen him *during* a whole year, (a whole year since).

EXERCISE 34.

Antwor'ten, to answer;	Gewit'ter, *n.* tempest, thunder and lightning;	Stören, to disturb, interrupt;
Beant'worten, to reply, rejoin;	Halten, to hold;	Tragen, to carry;
Begründen, to constitute;	Nest, *n.* nest;	Trinken, to drink;
Beschrei'ben, to describe;	Paar, *n.* pair;	Verspre'chen, to promise?
Betra'gen, to behave;	Reise, *f.* journey;	Verste'hen, to understand;
Erfin'den, to invent;	Reisen, to travel;	Zeitung, *f.* news-paper, gazette;
Erhal'ten, to receive;	Schwalbe, *f.* swallow;	Zerstö'ren to destroy, demolish.
Erniedrigen, to lower;	Sich, himself, &c (Sect. 18. II.).	
Essen, to eat;	Stiefel, *m.* boot;	

Diesen schönen Kana'rienvogel hat mir mein Vater heute Morgen gege'ben.	My father gave me this beautiful canary-bird this morning.
Die Freunde haben sich in den Garten bege'ben.	The friends have betaken themselves to the garden.
Die feindliche Armee hat sich erge'ben.	The hostile army has surrendered (itself).
Der Lehrer hat dem Knaben verge'ben.	The teacher has pardoned the boy.

1. Will Ihr Sohn mein Pferd halten? 2. Er hat es gehalten, aber er hat einen Brief erhalten, welchen er lesen will. 3. Wie hat sich dieser Knabe betragen? 4. Er hat sich gut betragen, er hat meinen Regenschirm getragen. 5. Die Russen haben einen tapfern Helden gefunden. 6. Die Deutschen haben viele nützlichen Künste erfunden. 7. Dieser Bettler hat eine Stunde an der Thüre gestanden, er hat mich nicht verstanden. 8. Hat der Schuhmacher Zeit, mir ein Paar (Sect. 62.) Stiefeln zu machen? 9. Er hat keine Zeit, Ihnen Stiefeln zu machen, er hat zu viel andere versprochen. 10. Hat der Bauer mehr Kaffe zu trinken, als Brod zu essen? 11. Er hat Brod genug zu essen und Wasser zu trinken, aber er hat keinen Kaffee. 12. Haben sie dieselben Bücher, welche mein Nachbar gehabt hat? 13. Hat der Matrose seinem Bruder geantwortet? 14. Nein, ich habe seinen Brief beantwortet.

1. They have recommended the foreigners to me and to you. 2. There lives in Naples a friend of mine, I shall recommend him to you. 3. One of my friends, whom you have seen with me, has travelled in America, and has written a letter to me, in which he described his journey. 4. A man of honour lowers himself to nobody, in whatever condition he may find himself. 5. Did you receive the news before us? 6. I received it after you; the whole neighbourhood too was informed of it, as we received your letter. 7. The children promised their father to be obedient. 8. Advantages may be derived from this invention, which nobody can account for.

EXERCISE 35.

An'fangen, to begin;	Aus'länder, *m.* foreigner;	Feuer, *n.* fire;
An'kommen, to arrive;	Aus'sprechen, to pronounce;	Sechs, six (§ 44);
An'machen, to kindle, (to make a fire);	Erheben, to raise;	Trösten, to comfort;
An'zünden, to light;	Erzei'gen, to render, show;	Verderben, to hurt;
Auf'stehen, to rise;	Vergnü'gen, *n.* pleasure;	
Aus'gehen to go out;	Wort, *n.* word;	
	Zweimal, twice (§ 50).	

1. Geht Ihr Herr Vater heute nicht aus? 2. Er ist schon ausgegangen, er ist (Sect. 23.) heute Morgen sehr frühe aufgestanden. 3. Wo ist er hingegangen? 4. Er ist zu seinem Nachbar gegangen, er will auf das Land gehen. 5. Wo wollen Sie hingehen? 6. Ich muß auf den Markt, in den Garten, ast den Brunnen gehen. 7. Sein Freund hat ihm geschrieben, daß er in Amerika angekommen ist. 8. Wann haben Sie angefangen Deutsch zu lernen? 9. Ich habe vor sechs Wochen angefangen zu lesen. 10. Wann wollen Sie anfangen, französisch zu lernen? 11. Ich habe schon angefangen zu lesen, und werde bald anfangen zu sprechen. 12. Wollen Sie mir den Gefallen erzeigen, eine Lampe anzuzünden? 13. Ich will es mit dem größten Vergnügen thun. 14. Hat das Dienstmädchen das Feuer schon angemacht? 15. Nein, sie hat es noch nicht angemacht.

1. Will you have the goodness to pronounce those words to me. 2. Do you pronounce well? 3. I believe I pronounce well, but my brother pronounces better. 4. Many an innocent mind has been hurt by reading pernicious books. 5. The tempest has disturbed the company in their enjoyments, and has destroyed the house. 6. I have papers to read and letters to write. 7. Those persons, who set fire to the house, ought to be punished.

EXERCISE 36.

Ab'holen, to take away;	Hin'schicken, to send to;	Wie'dernehmen, to take again;
Ab'reisen, to depart;	Johann, John;	Wilhelm, *m.* William;
Ab'schreiben, to copy;	Lust, *f.* desire, wish;	Zurück', back;
Clavierun'terricht, *m.* instruction on the piano;	Mit'bringen, to bring or take with;	Zurück'kommen, to come back;
Gärtner, *m.* gardener;	Mit'gehen, to go with;	Zurück'schicken, to send back.
Herum', about, round;	Seit, since;	
	Spazier'gang, *m.* walk;	

1. Wo ſchicken Sie Ihren Bedienten hin? 2. Er iſt krank, er kann nirgends hingehen. 3 Schreiben Sie einen Brief ab? 4. Ich habe ihn ſchon abgeſchrieben. 5. Glauben Sie, daß der Buchbinder mir meine Bücher zurückſchickt? 6. Hat Ihre Schweſter die Blumen erhalten, die ich ihr gekauft habe? 7. Der Gärtner kommt morgen und wird ſie mitbringen (Sect. 27. II.) 8. Wann geht Johann in die Schule? 9. Er geht morgen dahin, und der kleine Heinrich geht auch mit. 10. Wo ſind die neuen Tiſche, welche der Schreiner gemacht hat? 11. Haben Sie den ſchönen Wagen geſehen, in welchem Herr G. ſeine Frau und ſeine Kinder abholte? 12. Wann kommt Ihr Herr Bruder von Paris zurück? 13. Er iſt ſchon ſeit (Sect. 58.) fünf Tagen zurückgekommen. 14. Haben Sie Luſt einen Spaziergang zu machen? 15. Nein, ich habe ſchon einen Spaziergang um die Stadt gemacht.

1. He was beginning to tell us, what he had written, but he was interrupted by the arrival of a stranger. 2. When does your sister start for France? 3. She left the day before yesterday. 4. Has she taken little Mary with her? 5. It will be very difficult to make his conduct agree with the principles that he professes. 6. You, who have forsaken your friends, are intitled to no confidence. 7. Good women are the most charming class of society, they comfort us, raise our minds, constitute our happiness, and have no vices, but those which we communicate to them.

LESSONS IN GEOLOGY.—No. XVI.

By Thomas W. Jenkyn, D.D., F.G.S., &c.

CHAPTER I.

ON THE ACTION OF VOLCANOES ON THE EARTH'S CRUST.

SECTION X.

ON EXTINCT VOLCANOES.

On the surface of the globe there are many mountains whose summits and depressions are so much like the cones and craters of active volcanoes, and whose constituent rocks are so decidedly volcanic, that geologists regard them as extinct volcanoes, and call them by this name in all geological works.

Extinct volcanoes are so designated on account of the fact that no eruption has taken place in them for many ages. Their craters are closed in and are covered with herbage; and, in some instances, they form the sites of large and populous cities.

The designation "extinct" does not imply that they never will again be active. As they are known to cover immense reservoirs of subterranean fires, there is no certainty that they may not again be opened. It is rather from want of communicating vents with the surface, than from any real stifling of their energies, that they appear to be extinct. As the existence of hot wells or thermal springs indicate that a slow volcanic action is still going on below the point of their efflux, it will follow that there are but few districts of the globe, which can be regarded as exempt from such slow action of volcanic forces.

Mount Vesuvius supplies an illustration of these statements. At some geological era, this mountain was an active volcano, as is evident from the form and composition of its ancient cone called Mount Somma. But, as far as historical records, or even mythological traditions, inform us, Vesuvius was an extinct volcano up to A. D. 79, when its terrible eruptions overwhelmed Pompeii and Herculaneum.

There are some spots of the earth where there are vents which emit only gaseous exhalations and aqueous vapours. Such vents are called solfataras, and may be regarded as half extinct volcanoes. These vents are by no means rare in volcanic districts, and the very gases and salts which they send forth are so evidently volcanic, that there is no certainty that they may not again, at any time, come into full and terrific activity.

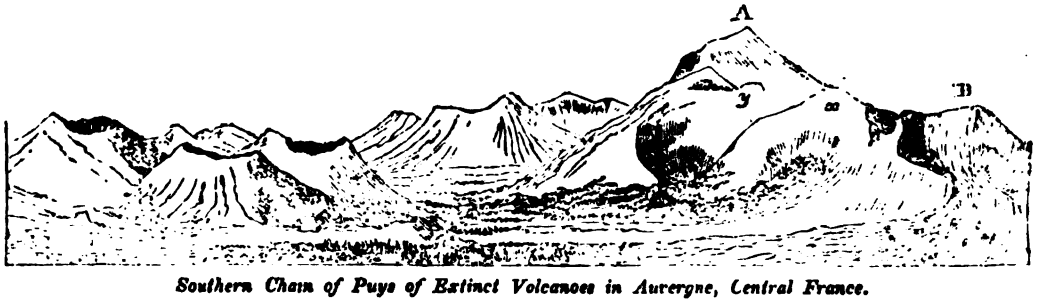
The discovery of extinct craters in volcanic regions is what you might naturally expect; for it is possible and probable that the volcanic fires below might find a new vent in the same neighbourhood. What is surprising is, that mountains which are clearly extinct volcanoes occur in places, where there is not the least trace of volcanic activity to be found within historical periods; unless, indeed, as I have just intimated, the presence of hot wells and mineral springs may furnish such indications.

The countries, where these extinct volcanoes are exhibited to the highest advantage for geological study, are the south of Sicily, the neighbourhood of Naples, Hungary, the central departments of France, the lower Provinces of the Rhine, and the north of Spain.

The extinct volcanoes of central France have attracted great attention. In the districts of Auvergne, Velay, and the Vivarais, are seen several hundreds of conical hills, having the shape of modern volcanoes, and on their tops are found craters more or less perfect. This district consists of an immense plain, forty-five miles long and twenty miles wide, covered with hills of various elevations. They are all of them dome-shaped, and varying in height from 500 feet to a thousand, above the plain. The plain itself is 1,200 feet above the level of the sea, and some of the mountains are full 4,000 feet above that level. These hills form an irregular chain, thirty miles in length and two miles in breadth.

All the cones are formed of volcanic materials, such as lava, sand, and cinders, just like volcanoes now in action. In many of these cones are found well-defined craters. Where these craters are broken or ruptured, currents of lava may be traced as distinctly as those of Vesuvius or Etna in our own day. In some instances, these lava currents may be followed to the adjoining valleys. There the lava has choked up the ancient courses of the rivers, and has compelled them to cut for themselves a narrow passage between the volcanic cinders and the harder rock on the other side.

Fig. 37.



Southern Chain of Puys of Extinct Volcanoes in Auvergne, Central France.

Some of these volcanic cones have retained a form almost perfect. Others look like the skeletons of volcanoes; for rains and torrents have washed away the ashes and the cinders that covered their sides, and have left behind only the harder materials. The internal structure of these cones has been laid open, partly by earthquakes which have produced large fissures, and partly by torrents which have formed ravines and glens in their sides. It is in sections of this kind that we learn the real constitution of these cones. They are found to consist of successive beds of porous lava, which seems to have spread in continued sheets around the base of the mountain; and these beds of lava, sand, and cinders are found, in some instances,

penetrated by perpendicular dykes of trap, like those figured in your last lesson.

These cones are very remarkable objects in the scenery. They are called puys. Puy is a provincial name for a conical hill, or a mountain peak. In some districts in England they would, perhaps, be called sugar-loaves.

The highest of these peaks is called Puy de Dome. It is 4,000 feet above the level of the sea; that is, as you will remember, higher than Snowdon or Ben Nevis. It is composed entirely of volcanic materials, and has a regular crater, fifteen hundred feet round, and three hundred feet deep.

Another of these conical hills is called Puy de Pariou. It is a perfect specimen of a volcano. As you ascend the cone you walk over fine turf. When you reach the top you are on the rim or edge of an extinct crater, now closed in and covered with turf and grass. This crater is a mile round, and very deep. The descent slopes at an angle of thirty degrees, about as steep as from one corner of this page diagonally to the other. From the lower part of this cone a current of lava has issued, and there it lies cooled, rugged, and black, covering the plain with volcanic cinders to the depth of about twenty feet.

Puy de Come is another of these remarkable cones. It rises nine hundred feet above the plain, and is covered from its base to its summit with trees. On the summit there are two craters, one of which is two hundred feet deep. A stream of lava has issued from the base of it. At a short distance the current was obstructed by a mass of granite rock, which has caused it to separate into two branches. These can be followed down the sides of the hill into the valley, where it has filled the ancient bed of the river, which has been forced to cut a passage for itself between the lava and a granite rock on the opposite side. The general aspect of this range of extinct volcanoes is represented in fig. 37, where A is Puy de Dome, the highest point in the whole range, and has two craters; B is the broken crater of Chaumont, with a current of cooled lava which has issued from its base. Towards the centre of the figure, *x* and *y*, are two other ruptured craters, at the bases of which, cooled lava currents remain as when they issued. The darkened lines on the summits of other hills on the left represent different extinct craters of this volcanic district.

The limits of these lessons compel us to confine ourselves to the extinct volcanoes of Auvergne; otherwise it would have been pleasant to have made an excursion to the north of Spain, and another to the south provinces on the Rhine, especially in the Eifel, for the sake of studying the striking phenomena of those volcanic districts.

In Great Britain we do not find similar specimens of extinct volcanoes. Yet, in England, Scotland, and Ireland, there are in abundance, rocks of volcanic origin, though they do not rise in the form of hills with cones and craters like those of Auvergne. There can be no doubt that the remarkable rocks of Staffa and the Giant's Causeway are the productions of an extinct volcano, because their mineral composition and columnar structure perfectly agree with basaltic lava, which has been known to have flowed from the craters of volcanoes.

The reason why the basaltic hills of the British Isles are destitute of cones and craters, and have no streams of cooled lava issuing from their bases, is that the eruptions of these volcanoes took place under the bed of the ocean. To the phenomena of such eruptions your attention was directed in our lesson on "submarine volcanoes."

A comparison of extinct volcanoes with those which are now in activity has led some geologists to think, that there is a very marked difference between the materials erupted by modern volcanoes, and the productions ejected by the ancient ones. It has been thought that the lavas of modern volcanoes are more cellular and porous, are of a harsher feel, and are more vitreous or glassy in their appearance, than those of ancient ones.

This is a question not easily settled. In the districts of extinct volcanoes, especially in central France, the eruptions have taken place at different epochs. The distinctions, therefore, between the erupted materials are only occasioned by their being the products of new vents, which have opened for the discharge of volcanic products in the same region. It is also to be borne in mind that while volcanic eruptions continued through, perhaps, the same vent or neighbouring vents for a long period, very many and very great geological changes were, in the meantime, taking place around them, and on the surface of the earth generally. There can, however, be no doubt that there is a general difference in mineral character between igneous rocks of ancient epochs, and the products of modern volcanoes. In many instances the ancient lava seems more feldspathic than the recent, and we know of no modern volcano producing either eruptions of granite or streams of serpentine.

One of the most interesting questions about these extinct volcanoes is their respective ages. Geologists have applied various tests for ascertaining the different epochs in which they were active. Some have tested this question by the presence or absence of craters. Others examine it on the supposition that some of these volcanoes existed before the valleys in their neighbourhood had been excavated, and some after such denudations. The best geologists seem now to think that no tests of this description are to be depended on; for it is well known that craters may be obliterated, and that valleys are perpetually liable to change.

In the previous lessons I have endeavoured to explain to you the action of fire on the crust of the earth, and to make you familiar with igneous phenomena. I now close this chapter, and, in our next lesson, I shall begin another on the action of water on the crust of our earth.

LESSONS IN BOTANY.—No. XV.

CLASS XVIII. POLYDELPHIA.

Dodecandria.

In this order there are from twelve to twenty-five stamens, as the orange-tree.

Icosandria.

Here the filaments, in several parcels, are inserted in the calyx.

Polyandria.

This order is remarkable for many stems, unconnected with the calyx, as St. John's wort. This plant is an evergreen perennial, common in our woods and copses, blowing from July till August, with a yellow blossom, which, on being squeezed, gives out a dark-coloured blood juice. The calyx has five divisions; the corolla has five petals; the leaves are dotted as if perforated with a needle, a peculiarity common also to the elegant St. John's wort, a much smaller plant, with a red stem, which may not unfrequently be met with in the same places as the common one.

CLASS XIX. SYNGENESIA.

Here are arranged the plants, whose flowers, all made up of a head of florets, have the anthers of their stamens united into a tube.

Polygamia Æqualis.

In this order all the florets of the head have the same form and structure, that is, all flattish, as in the dandelion, or all tubular, as in the thistle.

Polygamia Superflua.

The exterior florets of the head bear pistils, and no stamens; the interior florets bear both stamens and pistils. Examples of this are found in the field-daisy and the common groundsel.

Polygamia Frustanea.

Here the exterior florets of the head are without either stamens or pistils, while the interior florets have both stamens and pistils. Such are many very common plants, among which is the common blue-bottle, more frequently seen, however, in the corn-fields of Scotland than those of England. The wild plants are usually of a bright ultra-marine blue; but sown as an annual in gardens, they have numerous shades of purple and white.

Polygamia Necessaria.

The exterior florets of the head have stamens and no pistils; and the interior, pistils and no stamens. One instance is the marigold, of which there are many species and varieties. In this class, too, the opening and shutting of flowers is more common than in some other classes.

Polygamia Segregata.

Several of the flowers of this order appear together in a general calyx, each floret having, besides, its particular calyx. The com-

mon globe-thistle, a hardy perennial, indigenous to Austria, and several other parts of Europe, and introduced into this country in 1596, may be taken as an example of this order. In its wild state, it grows in any soil or situation, not more than two feet high; but, by cultivation, in rich soil, it will grow to the height of four or five feet. It blows in July and August, and ripens its seed in September.

CLASS XX. GYNANDRIA.

MONANDRIA.

We find here most of the British orchideous plants, so remarkable in all their varieties. The common way-blade may be found in woody places, in most parts of the country, and by the London botanist, near Woolwich. The blossom, which appears in May and June, is green. The leaves are broad, egg-oblong, and two in number, by which it may be readily distinguished. The butterfly-orchis, and the bee-orchis, are also of this order.

DIANDRIA.

The lady's-slipper, which grows in some remote, and little frequented woods in Yorkshire. The flower has four blue petals, long and pointed, with a large inflated nectary behind.

HEXANDRIA.

The roots of the birth-wort have an aromatic scent, and are used in medicine as a warm bitter. The flowers, which appear from May to August, are of a greenish-yellow.

CLASS XXI. MONÆCIA.

In this class the plants are placed, on which some of the flowers have stamens only, without pistils; and others of the flowers have pistils only, without stamens; but all on the same plant, or, as it were, in "one household," as the term *monœcia* indicates.

MONANDRIA.

Ditchweed is an indigenous annual, abundant in ditches and marshes in this country, blowing in July, without petals.

TRIANDRIA.

Here are placed the numerous species of sedge, most of which are marsh-plants, resembling coarse grass. There are above one hundred species, and about half the number indigenous to Britain, so that the student may be almost certain to find one or other of them in every spot of marshy or wet ground which he chooses to examine. The sharp-leaved is common on the banks of rivers, and of ditches, having creeping roots, increasing so rapidly, as soon to fill up any piece of water. In this class, also, stand the maize, or Indian corn; the reed muce, or great cat's-tail sedge; and the floating bur-weed.

TETRANDRIA.

The common stinging-nettle, the birch, the box-tree, and the wild amaranth, are examples of this class.

POLYANDRIA.

Here are several very common trees, as well as small plants. Among the former stand the oak and the beech.

CLASS XXII. DIÆCIA.

In this class are arranged the plants in which some flowers have stamens only, and others have pistils only; but are separate plants, or in "two households," as the term *diœcia* implies.

DIANDRIA.

The willow consists of a very great number of species and varieties, more perhaps than have yet been well ascertained by botanists. One of the most marked species is the weeping willow.

TETRANDRIA.

The mistletoe is an evergreen, which grows, as is well-known, on the hawthorn, the apple, and other trees, and will not grow at all when planted in the ground. It flowers in May with a white blossom, bulging at its base.

CLASS XXIII. POLYGAMIA.

Here are arranged such plants as have both stamens and pistils, and also only one of these, or both on the same plant, and on separate plants of the same species, as the term *polygamia*, or "many nuptials," is designed to denote.

MONÆCIA.

Here the stamen-bearing and pistil-bearing flowers are united, accompanied by one stamen-bearing, or only pistil-bearing flowers, or both, all on one plant. Such is the case with the white hellebore.

DIŒCIA.

Here stand the ash and the fig-tree.

Our limits forbid us to indulge in details in reference to trees and flowers, which we should gladly have given. And another paper will conclude an account of the system of botany founded by Linnæus, in our judgment the most easy to the student, especially as most of the best books take this system as their basis, and well-adapted to all ordinary purposes. We wish that the number of such persons were greatly increased; and we rejoice in the opportunity we have had of directing and stimulating their efforts.

> "What grateful scenes! what pleasant hours,
> And happy thoughts we owe to flowers!
> Or, rather, to His heavenly hand,
> Who richly spreads them through the land!"

THE PHILOSOPHY OF STUDY.—No. I.

THE object of the following course of observations is to illustrate the adaptation of time and talent (by which we understand every kind and degree of ability) to the acquirement of knowledge. There are three things necessary for acquiring knowledge,—time, talents, and information. The possession of these separately does not constitute knowledge. A man may, in the possession of an ample library, have all the information which science can place within his reach, he may have talents sufficient to master any portion of its contents, and time enough to make daily conquests from its stores, but if he neglects the application of his time and talents to his information, he will remain as ignorant as if he had none of these advantages.

The amount of knowledge which a man may possess is in exact proportion to his time and talents, and the information within his reach. The amount of knowledge which he does possess is in exact proportion to the wisdom and diligence with which he applies his time and talents to his information. The disparity between these two proportions indicates the time and talent that is wasted, and it is this disparity which calls for the study on which we are about to enter. Our aim is to reduce the problem of the student's attainments from a question of compound to a question of simple proportion, to show in other words how we may reach the maximum or highest point of success in the pursuit of knowledge, and this is what we call the PHILOSOPHY OF STUDY.

The maxim that time is money has long been the rule of the merchant, that that time is knowledge ought to be the principle of the student. "The hand of the diligent maketh rich," says Solomon, and if riches do not always follow diligence, it is not because they are not the natural result of it, but because this result is frequently counteracted by other causes. But though material wealth is not always at the command of diligence, it can never be without an adequate reward. Even the slave who toils for a master reaps the reward of his diligence in the estimation in which he is held, and the respect with which he is treated. The diligent have resources to fall back upon in emergencies when the slothful are at once driven to extremity. But if labour is always profitable, its reward is never more certain than when it is expended in the pursuit of knowledge. The slave may toil all the day long to enrich his master, but he who toils to enrich his mind cannot be robbed of the fruit of his labours, and if he enriches others by his knowledge, the benefit they derive from it does not impoverish himself. It is this certainty that labour expended in the pursuit of knowledge will meet with a due reward that is expressed by saying that time is knowledge. In order, however, that this certainty may be attained, it is necessary that the time should be *rightly* expended. Time can be wasted in study as well as in anything else, but wasting time is not diligence, and has no right to look for its reward.

If time is knowledge, the amount of knowledge which we acquire should bear a regular proportion to the time spent in acquiring it. How few students are there who can trace such a regular progression in their course! How frequently, on looking back over a term of months or years and considering the amount of time spent in study, and comparing it with the results achieved, are we struck with the utter disproportion between them, and can only regard the one as an adequate

compensation for the other, by considering it as a lesson for the future, a part of that experience which teaches fools. Here then we have a field for the employment of labour, capable of yielding an adequate return, and we have labour expended on it with the most irregular and inadequate results. Such a state of things clearly points to the misapplication of labour, and forcibly suggests the necessity of FORETHOUGHT.

Before proceeding further with our remarks it is necessary to state for whom they are intended. It is not our design to interfere with those who are engaged in the successful pursuit of any course of study. We address ourselves to the more numerous class, who are struggling under the disadvantage of real or supposed obstacles to their progress. We propose as far as possible to remove these obstacles, by pointing out the most natural and appropriate means for rendering study agreeable and profitable.

If any are bewildered by the variety of topics, which claim their attention, we will endeavour to give them satisfactory reasons for a choice. If any, from lack of energy or want of management, have fallen into arrears with their studies, we will endeavour to stimulate their zeal by means which will give permanence as well as promptitude to their application. If any are discouraged by supposed lack of time, of talent, or of opportunity, we will endeavour to show them how by the patient accumulation of little things, great ones may be accomplished; by the careful cultivation of small talent, large intelligence may be acquired; and by the diligent use of what we have, we may attain a degree of present enjoyment and future success, which will never fall to the lot of those who continue merely sighing after what they have not.

Of the value of knowledge it is unnecessary to speak. It is knowledge which makes us intelligent beings, and renders us superior to the beasts that perish. It gives to memory the consciousness of the past, to imagination the anticipation of the future. It is the source of our higher feelings and the foundation of our moral consciousness. It gives us sympathies with higher orders of intelligence than our own, and with God himself who is its source.

Knowledge has its duties as well as its privileges. In giving us moral consciousness it lays us under moral responsibility. In acquainting us with the perfections of God, it imposes on us the obligation to love and serve him. As knowledge is of so much importance to us, it concerns us to obtain all the knowledge in our power, and to neglect no species of it which promises an adequate reward for our labour. It concerns us also that our knowledge should be of such a nature as to fit us for performing the duties and discharging the responsibilities which it lays us under. It concerns us therefore that our knowledge should be pure, that it should be accurate, and that it should be extensive. The highest source of knowledge is revelation. It possesses all the requisites we have enumerated in the highest degree; to it, therefore, we must recommend the student both as the first and greatest source of knowledge, and as the only and infallible guide to direct him how to use his knowledge aright. Science presents a field for the acquirement of knowledge at once ample and prolific. There is no situation in life in which the knowledge derived from it may not be made subservient to our interests or conducive to our enjoyments. It refines our sensibilities, exalts our understanding, and enlarges our capacities. It is with this species of knowledge that we have chiefly to do. We propose to direct the student's attention to the means of making accurate and extensive acquirements in science; but our aim requires that we should first direct him to the SOURCE of all knowledge, that we should point to the necessity of a pure and holy aim in the acquirement of knowledge, that we should inform him where this is to be found.

All knowledge is pure in itself, but it may be received into impure vessels. What is necessary to the purity of our knowledge is that it should be viewed in the light of the great fact of our existence, our dependence upon God for all things and our consequent responsibility to him in all things. Keeping this in view, let us go on to consider the best means of acquiring knowledge. We announced, as the first practical conclusion of our course, the necessity of forethought to the student. Experience teaches fools, forethought teaches the wise. He who would engage in any enterprise without forethought shows that he has neither acquired correct notions of the value of time nor taken the measure of his own capacity. Want of forethought is the certain guide to instability of purpose. He who in this sense takes no thought for to-morrow, will find that to-morrow will upset all the plans of to-day. He who does not think before he begins his enterprise will think after he has abandoned it. Your choice then is simply between forethought and afterthought.

Before you can exercise forethought, however, you must know what it is. It is not, when you have resolved upon an enterprise, to sit down and think on something else. It is not to dream of success, but to take means for attaining it. It is not to build castles in the air, but to seek for a foundation on the earth. Forethought is a calculation, as far as you can see, of the advantages and disadvantages of the course which you mean to pursue, of the obstacles which you are likely to encounter, and of your means for encountering them. Its object is that you may not engage in any pursuit further than you can see your way through with it, and that you may not engage in a less advantageous pursuit when a more advantageous is within your reach.

There are three things on which the student must exercise forethought. First, the aim or what he is to strive for; second, the means or what he is to expend on it; and third, the process or how he is to accomplish it.

The aim of study comprises two things: the general aim or purpose, and the particular aim or plan.

The general aim of study comprises the aim which is natural and proper to it, and such as are contingent or accidental. The proper aim of study is the acquisition of knowledge, the accidental aim is the acquisition of some particular kind of knowledge. The first of these ought to be the principal object of the student, and may be his sole object; the second may be *an* object but ought never to be the exclusive one. The point then to which the student's attention must be directed, is to how far the second and subsidiary object ought to be allowed to modify the first and principal one.

All plans of study are not equally good, there is a very wide difference between the best and the worst. In determining, therefore, whether or not he ought to make some particular study a positive and immediate object of pursuit, the student must remember that he does so at a sacrifice. He is to a certain extent choosing his plan of study on different principles from that of its being the best, and he has no reason to expect that it will be the best. It may be that the object he has in view may be sufficient to compensate him for the sacrifice; but he must be aware that there is a sacrifice, and consider well if he gains an equivalent for it.

The first thing, then, which the student must consider is, *How much of his time is to be occupied in following out particular objects of study, and what proportion of it is to be devoted to the pursuit of knowledge for its own sake.*

LITERARY NOTICES.

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THE DUKE OF WELLINGTON.—An interesting Memoir (with a Portrait and other illustrations) of this great Warrior and Statesman was commenced in the WORKING MAN'S FRIEND AND FAMILY INSTRUCTOR, for the week ending October 2. Weekly Numbers, 1d.; Monthly Parts, 5d. or 6d., according to the number of weeks in each month.

THE ILLUSTRATED EXHIBITOR ALMANACK, with upwards of Thirty beautiful Engravings, price sixpence, will be ready for delivery Nov. 1st.

CORRESPONDENCE.

In your article on Physiology, page 390, you have some remarks on the Glowworm as being a common insect in this country. These remarks received the confirmation of a phenomenon which I saw a few evenings ago. My chamber window is three stories high, and is on a level with the roof of the opposite house. About half-past ten o'clock, whilst preparing to go to bed, I happened to look out of the window; it was a clear moonlight night, and the roofs of the houses were very wet with a shower which had fallen a few minutes previously. I observed on the roof of the opposite house a bright light, about the size of two stars of the first magnitude, and of a very similar appearance. The light was in the shadow of the broad chimney, and could not be caused by reflection from the moon. There are no attics in the house, so that a light from the inside could not gleam through a chink in the slates. I watched it for four minutes, during which time it gradually disappeared. It could not be an optical illusion, as others saw it also. Do you think it likely to have been a *Glowworm?*—I am, yours respectfully, T. P. BARKAS.

ANSWERS TO CORRESPONDENTS.

R. HOGG (Nottingham): We strongly advise him to go on with Dr. Beard's "Lessons in English," as preferable to any other.—ONE WHO IS TRYING TO GET OUT OF THE MINE (Leeds) will find what he wants,—viz., "how, by plain figures (not algebra), to find the logarithm for any given number," in Professor Wallace's "Universal Calculator's Pocket Guide," price 1s. 6d.—CÆSAR (London): His letter has been mislaid.—R. S. (Doncaster) wishes to know the country, and the dates of the births and deaths of the following *Penmen*:—Meterot, Seddon, Velde, Ayres, Perling, and Barbedor; and of six modern *Penmen* to match.—THOMAS SLEIGH (North Ives): Alligation is a most useless rule in arithmetic. The number of answers to the questions is generally unlimited; questions in this rule belonging to the doctrine of Indeterminate Analysis in Algebra. As to the 3rd question of Alligation Partial in Walkingame, By linking the given prices, in pence, with the average or mean price, you obtain 6, 18, and 24 against the first price, which make 48 in all; then 6 against the second price; 6 against the third; and 6 against the fourth. Hence, by the rule 6 : 48 : : 12 : 96 bushels of wheat; 6 : 6 : : 12 : 12 bushels of rye; and the same number is obtained for barley; while the question gives the 12 bushels for oats. But many other numbers will answer as well. Thus: 60 bushels of wheat, 9 of rye, 1 of barley, and 12 of oats, will give the same result. M. B. (Manchester): There is no difference whatever between the two editions of the P. E. but the *paper*, and the *first page*, which wants the *heading* or *title* in the *fine copy*.—ANXIETAS (Kennington): Alfred the Great published a description of the north of Europe, which forms one of the best records of the geography of the age; you will most likely find it among his works in the British Museum. Strictly speaking, the terms *terraqueous* and *antediluvian* have no single synonyme, a circumlocutory phrase must be used.—INTENDING EMIGRANT (Glastonbury): We should think that the P. E. will find its way to Sydney, at least in volumes; especially, if ordered from a bookseller there.—WOULD-BE ALGEBRAIST (Belfast): Yes; time not fixed.—D. CRAWFORD (Largs): One right, and one wrong.—CHARLES G (Norwich): We know of no method of improving the memory, but exercising it; perhaps the study of Euclid might strengthen it.—E. T.: Common sense would say that B.'s "power of attorney" died when A. died.

M. GRANT (Rathfriland): We thank him for his solutions and queries.—Mr. DAWSON (Knaresborough) will please to send his address.—B. V.: We cannot admire his poetry; *thou vowed* should be *thou vowedst*.—DAVID (Norwich): We recommend "Breeze's Commercial Class Book," price 3s. 6d., Longman and Co. To find the number of flags, each 18 inches by 9, that will cover 20 square yards, reduce the 20 square yards to square inches, by multiplying first by 9 (the number of square feet in a square yard), and then by 144 (the number of square inches in a square foot); this process gives the number 25,920 of square inches in 20 square yards. Now in each flag there are 162 square inches; for the length 18 inches multiplied by the breadth 9 inches gives this number. Therefore, dividing 25,920 by 162, you get 160, the number of flags required. Then as to the price, at 15s. per 100 flags, this is easy to find; for as 100 cost 15s., 50 will cost 7s 6d, and 10 will cost 1s. 6d.; therefore the whole will cost £1 4s.—NUMERO will oblige us by information as to Mr. Lewis's short plan of the rule of three.—JAMES J. G. (Pendleton): The "Educator" published by the Congregational Board treats on the subjects of *teaching* and *conducting schools*, &c.—T. O. F. (Liverpool): Thanks.—H. IBBETSON (Manchester): Bell's "Elocutionary Manual," price 3s. 6d., Hamilton, Adams, and Co. The difference in the pronunciation of the words he mentions is so small that it is imperceptible to our ear.—W. W. (Ochiltree): Thanks.—TYRO: All large English grammars give rules for correct spelling from Lindley Murray downwards. The study of Dr. Beard's lessons in the P. E. would soon make you an adept.—D. LANCASTER (Leeds): A *knot* in nautical language means a nautical mile, and it is longer than a British mile by one furlong and eight poles nearly. The length of a *knot* on the *log-line* is about 50 feet.—EIN ARMER YUNGER (Liverpool): See vol. I., p. 288, col. 2, line 51.—RICHARDSON (Gray's Inn Terrace): In numerous questions in the Rule of Three, Interest, &c., we multiply money by money, and get a sensible result; but the multiplier is then considered as an abstract number.—C. A. TYPO (Liverpool) will find the errors corrected by reference to p. 411, vol. I.—E. MAGEE (Belfast): See back of title page, vol. I.—AUTODIDACTOS (Anottingley): If you send your solutions, we shall insert the queries.—A CONSTANT READER: We cannot make out the penmanship of the inscription on the mausoleum of the late Duke of Hamilton.—J. S. W. (Ayton School): *Lebens* is right; thanks for his exertions on our behalf.—B. C. H.: For your sister try "Learning to Think," published by the Religious Tract Society, or, if you want something higher, Dr. Paris's "Philosophy in Sport Made Science in Earnest."—J. F. P. O. (Stanmore-place) will need a little of Euclid to understand the description of the hemispheres.—E. B. M. your exercises are pretty well performed; but there is some levity in the graver subjects which does not suit them, and not a few errors; for instance, the government of this country is not *autocratic* (where the power is all in the hands of one man) but a *limited monarchy*, one recommended by Cicero, nearly 2,000 years ago, consisting of king or queen, lords and commons.—ISAAC BLAKE (Derby): The *i* for *e* in the ablative is a misprint. The authority for *us* instead of *u* in the genitive of the 4th declension is Dr. Freund, a celebrated German philologist.—A STUDENT (Leith): "Cassell's Elements of Arithmetic."

A. J. F. (Belfast): We really cannot go into discussions on books and dictionaries. We have said that Liddell and Scott's Greek Lexicon *is the best*; what more can we say? The key to our Euclid will appear in the Lectures on Euclid in the P. E.—DISCIPULUS (Glasgow): His solution of the snail question is right.—W. H. and J. B. (Knightsbridge): Clarke, Fleet-street; Yes.—J. S. SNELGROVE (Longbridge, Deverill, Wilts): Thanks for the following corrections in *our Euclid*, page 8, line 22, for *triangles* read *angles*.—J. TWADDELL (Cathcart): Thanks.—PEEB END (Islington): Yes, fine edition 1s. 3d., common 1s.—EMMA BARTON: We strongly advise her to study Dr. Beard's Lessons in English, and ours in Arithmetic, and Lectures on Euclid.—P. W. (Dublin): Study Ilay's Gauger.—J. C. L. (Montrose): Received.—S. S. W. (Sheffield): Study our Lessons on Arithmetic in the P. E., and Cassell's Elements, price 1s.—N. T. BOURKE (Dublin): "Our Evenings" are replaced by the "Manual of the French Language," price 2s.—ONE WHO HATES IGNORANCE (Co. Down): Right.—T. W. (Newport): He is right in the solution of the Dean's riddle; but he must for ever abandon *smoking*; his age is no objection, but an advantage; let him go on with our Lessons in Penmanship and English.—QUA MENTE SIS (Pitcaple): See the Notice to our Readers, vol. I. We doubt the propriety of the step he proposes. There is too much truth in the "Prize Essay;" the introduction of the P. E. instead of "whisky" and "the lasses" is the only cure we see at present.

AN ARTILLERYMAN: Right about the snail.—A. A. CHADDERTON: The "construction of words" means their structure as to the letters and the syllables of which they are composed.—G. RENCZYNSKI (Londonderry): Received.—JOHN HENRY: We recommend Cassell's Arithmetic, on the eve of publication.—CYMRAES (Llanbadarnfawr): A Welshwoman hits hard; but never mind we love her for her patriotism, and whenever we have fully made up our mind we shall let her know. Would she have any objection to write and let us know what *she* would like best to be done for "dear old Wales;" could she not render her *patriotic* feeling *practical* by assisting us?—A CORRESPONDENT (Berwick) should make himself well acquainted with the art of gauging, and the calculations connected therewith; see "Ilay's Gauger."—A. G. (London): Grey's "Memoria Technica" is an old English book, written in English, but having a Latin title. We do not recollect any modern edition at this moment, but it may be had among old book collectors.—F. H. (Winchester): Right.—E. JONES (Pembroke) wishes to know how far above the surface of the earth a man must be elevated in order to see *one fifth* of the surface of the globe.—DAWSON (Knaresborough): Right.—S. T. W. is informed that the most correct French Testament may be had of Messrs. Bagster, Paternoster-row. The *latest* edition of the dictionary he mentions contains all that he requires.—ALPHA: Thanks for his queries, we shall take an opportunity of giving them a place.—BUCKINGHAM: Try Troughton and Simms, or West, Fleet-street, or Jones, Holborn.—O. O.: We advise him to try the sum again; he will be sure to find that he is wrong.—J. D. D. (Aberdeen): For his purpose we recommend the Latin dictionary of Dr. Freund, very recently published.—ALPHA (Sheffield): The remuneration of a reporter in London varies, according to ability, from two to five guineas a-week; but his duty does not merely consist in writing short-hand, to think this would be a very great mistake. Tact, tact, tact; this is the thing.—A. TAYLOR (Prestwich) should apply for the information he wants to the principal of some normal or training school, when a paper of rules and regulations will be sent on application.—AN ARDENT ADMIRER: His penmanship will do very well; but he must have great personal interest before he can get into a London banking house as clerk.—W. MATTHEW: Staunton's Chess Player's Handbook, we have just been told, is the best for chess; consult Bohn's "Handbook of Games," for Draughts, &c.—J. ELLIOT (Stanhope): Thanks for his suggestions; his query will be answered.—F. H. O. (Warwick): See p. 288, col. 2, line 49.—OPIFEX (Hartlepool): We intend to give lessons in all the European languages in their turn.—J. T. WILSON (Syke): We do not recollect the question; have the goodness to repeat it.—HENRY L'ARTRIDOR (Long-lane): The portfolio of the P. E. is only intended for one volume; but if you can make it suit two volumes, there can be no possible objection; at the same time, if the book be pressed into *half the bulk* before the numbers be *thoroughly dry*, it will certainly be rendered unreadable, in fact it will be quite destroyed.

S. A. M.: We believe that the "Notices of the Royal Astronomical Society" are not for sale, but are only given to the members of the society.—OMICRON: We have not seen Dr. Reid's English dictionary. Dr. Tiark's German grammar is a very good one, and so is Ollendorf's. As to the best Latin, French, German, and Greek dictionaries, we have mentioned our opinion on all these already in our first volume.—PUPIL TEACHER (London) will find his query answered in this number.—J. WILKINSON (Earby): His query shall be answered.—GLASSGUTTER: We are much pleased with his account of himself, and will soon answer his queries.—JOHN GRAINGER (Coseley): Received.—JAMES SCHOLES (Oldham): We shall soon explain how to draw parallels of Latitude.—In compliance with the wishes of some correspondents we ask the following question: If a barrel of herrings cost £2 2s. 6½d., how many barrels can be bought for £99 19s. 11½d? Here our pupils will have to divide *money by money*, and the quotient will not be *money but barrels!*—H. GRANT, jun. (Knightsbridge): The letter *e* in German is always pronounced, with a few exceptions mentioned by us before; the rules for French genders will be given at a future time; as to the German, such rules have so many exceptions that we cannot give them at present, but they will also be given in the second part of the German Lessons.—The preceding remarks will partly answer J. W. B. G. B., and to him we say the *sun* is feminine in German, and the *moon* is masculine! This we think right, as the sun is warm and prolific, and the moon cold.—W. JONES asks "how long could a man live in a Tetrahedron, the side of the elementary triangle being 17½ feet, the breathing 18 times in a minute, and inhaling 30 cubic inches of oxygen at each inspiration?"

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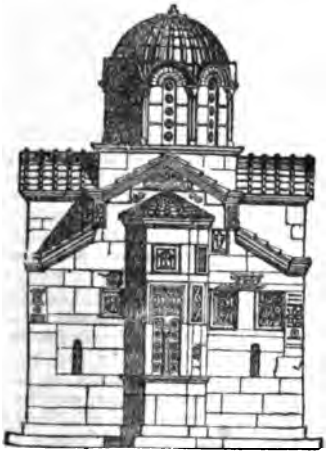
LESSONS IN ARCHITECTURE.—No. IX.

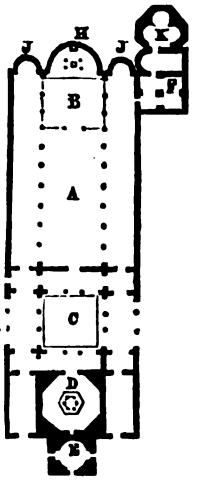
The Byzantians, the successors to the arts of the Romans, in consequence of the transference of the seat of empire from Rome to Byzantium (afterwards called Constantinople), followed their arched system of architecture, and even extended it to such a degree in their edifices that the architrave which their predecessors had hitherto preserved in the construction of their temples was at last almost entirely abandoned. The Byzantine architects not only used the arcade as the connecting link from column to column in their erections, but they surmounted their churches with cupolas or domes of an immense size. This kind of vaults, which had been seldom used by the Romans, were very common at the period above mentioned. The pendentives, or portions of the vaults suspended out of the perpendicular of the walls, that is, the portions between the arches and the dome, were of Byzantine invention, and formed a new and bold application of the arch in building, of which they soon began to make an improper use in the erection of towers, belfrys, spires, and steeples of every description. An example of this application of the arch and vault will be seen in the Catholicon, at Athens, fig. 26. The first Christians of the West, in their adoption of the style of architecture which we have called the Latin style, substituted the arcade for the architrave; but possessing less skill as builders than those of the East, their innovations terminated at this point. The great Basilicas, that is, palatial or royal churches of the West, were edifices covered with plain woodwork, and had only vaulted roofs or domes at the extreme or lower end above the chancel, and sometimes also above the aisles. They had commonly in front the accessory buildings, including the baptistry and the rooms for the catechumens, or those who were preparing for admission into the church. These adjoining erections were then separated from the church by an atrium or hall, surrounded by columns, which led from outside to the door of the church, which always had a porch or *narthex*, as it was called. In the interior, two rows of columns divided the edifice into the nave and the aisles. The nave alone in the Basilicas or churches of the

Fig. 26.



The Catholicon at Athens.

Fig. 27.



A. The principal Nave.
B. The Chancel.
C. The Hall or Atrium.
D. The Baptistry.
E. The Steeple or Belfry.
F. The Sacristy or Vestry.
H. The Choir.
J. J. Small Choirs.
K. The Triclinium, or Supper Room.

Plan of the Basilica of Parenzo.

Fig. 28.

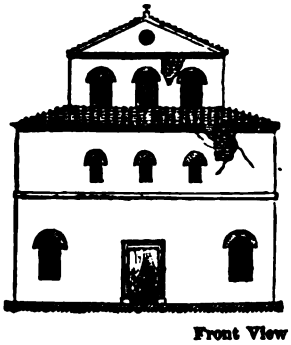
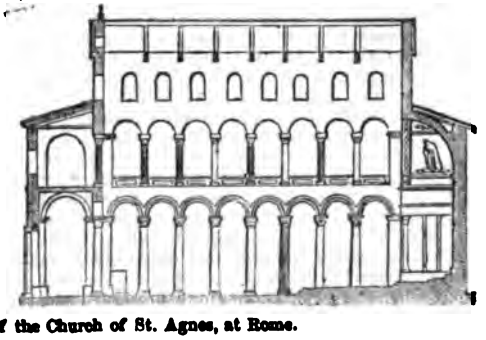


Fig. 29.



Front View and Section of the Church of St. Agnes, at Rome.

primitive Christians, terminated in a semicircular arch or choir. At a later period the aisles had also their choirs; it was then that the first story or gallery which was erected upon the aisles disappeared, and the women, for whom it was reserved, began to occupy the left side of the building. The different parts of the Basilica of Parenzo, fig. 27, will convey to the mind of the reader the arrangement of the principal parts of the churches now described.

The exterior aspect of the Basilicas was extremely simple, as exemplified in fig. 28, which represents the façade or front of the Basilica or church of St. Agnes at Rome; but the interior was richly decorated with mosaics, with paintings, and particularly with splendid marbles, which were used in great profusion; also, with monoliths, or columns, made of a single stone, usually stolen from antique edifices, all of the most magnificent description; and the pedestals, capitals, and cornices, were of equally splendid and rich materials, as may be seen in the section of the Basilica or church of St. Agnes at Rome.

The Romanesque style was formed from the combination of

Fig. 30.

The Church of Rosheim, in the Department of the Lower Rhine.

the two former, the Latin and the Byzantine; and in these, the arcade played the most prominent part. Arches, indeed, were multiplied in endless variety, from the choirs which rose on a circular plane, to domes and arched buttresses, those appendages to buildings which were first employed in this style of Architecture. The Romanesque period, however, produced edifices different from the Basilicas, by characters well defined. Orientation, or building churches *East and West*, became the decided rule; a transverse nave, or transept, changed the arrangement of the interior of churches, and gave them the form of a cross. The choir or recess, of a semicircular form, was commonly unique, and spanned the whole width of the edifice, including the nave and the aisles. Some Romanesque churches, however, have preserved the three recesses or choirs; and these are generally the oldest. The columns were replaced by square piers, ornamented on each side by a column carrying groined arches; and when stone mouldings were introduced at the edges of the domes, the number of the columns was increased to eight. The shafts of the four intermediate columns were then disproportionally lengthened, and departing from the proportions established by antiquity, lost their rational proportion to their diameter; the choir alone preserved the isolated columns. Independently of the principal altar, ...ary ones were erected, of which the number was after-...mented by those of the chapels built round the ... exterior of the Romanesque churches also pre-...y different aspect from that of the Basilicas. The ...ch were at first small, became then of great im-...nd were raised above the porch, or above the cross ...ese constructions were very solid, and had several ...artially open except at top; and were surmounted by ...one spires. At a later period, the abutments or spur-... became insufficient to sustain the thrust of the great ...; and were then detached from the walls and transformed into buttresses. Specimens of this kind of edifice may be seen in the church of Rosheim, in the Department of the Lower Rhine, (see fig. 30), St. Germain-des-Prés at Paris, of L'Abbaye-aux-Hommes at Caen, of Bocherville near Rouen, and others in France. In the most of these churches, there is a small gallery over the aisle, like that of St. Germain-des-Prés at Paris, which represents the gallery of the early Basilicas. The columns or pillars, are united by circular arches, ornamented by archivolts in simple profile, and the whole of the edifice is covered with groined vaulting, and with stone mouldings of the same description.

At the commencement of the Romanesque period in the West, the Eastern style of art, the parent of so many architectural novelties, was developed anew in Asia and Africa, and the Arabs, who played so prominent a part in the history of this epoch, covered Arabia and Egypt, and penetrated the interior of Persia, with their edifices. The Moorish branch extended along the northern side of Africa to the ocean, and there all that an Eastern imagination could produce that was fantastical and marvellous, was reproduced in their architectural works. During the most ancient period of this art the semicircular arch predominated; but it soon overstepped its central point, and the arch becoming more than a semicircle, took the shape nearly of a horse-shoe. At a later period, the intrados or inner ring of the arch was carved in the manner exhibited in the celebrated Mosque of Cordova. The second period was that of the pointed arch, very ancient specimens of which are found at Cairo. These monuments or erections are purely Arabic, such as the Mekias o. Nilometer, and various mosques of that city. In Persia and in India the same style is exhibited, and is always found in connexion with the pointed arch, and the same principles are followed in the architecture of that country at the present day. In fig. 31 is represented a specimen of the Arabic arch. An important question has never yet been answered respecting the origin of the pointed arch, which was first, as we have seen, used by the Pelasgians, but which, abandoned until the middle ages, was again taken up by the Arabian and the Western architects, at an epoch when it is difficult to ascertain whether the East preceded the West in its application, or whether the reverse was the case. Whichever was the case was of little moment, until

Fig. 31.

Specimen of the Arabic Arch.

it was extended as a complete system of construction, and became the foundation of the Gothic or ogival style of architecture. It appeared in the West, in the 12th century, in several rare edifices, in which it usually occupied the lower part of the building, as presenting more resistance in supporting its elevated portions. From this use, first originating in the demand for solidity, it was extended to all parts of the building. Thus applied, this new system of architecture was developed, took its flight, and the 13th, 14th, and 15th centuries saw its rise, its full vigour, and its decay. The Gothic churches are in general larger than those of the Romanesque period, they are disposed in the same way, but their architecture becomes softer, and the forms more graceful.

LESSONS IN FRENCH.—No. XXIX.

By Professor Louis Fasquelle, LL.D.

Section LX.

Irregularities of the Future.

1. The two irregular verbs of the first conjugation, aller, *to go*, and envoyer, *to send*, make in the future *j'irai, j'enverrai* [*see* § 62].

2. All the verbs of the second conjugation, which end in *enir*, change that termination into *iendrai*, &c., for the future: as, tenir, *to hold*, venir, *to come*; *je tiendrai, je viendrai*. Acquérir, *to acquire*; conquérir, *to conquer*; requérir, *to require*; mourir, *to die*; and courir, *to run*, and its compounds, double the *r* in the future: *j'acquerrai, je mourrai, je courrai*. Cueillir, *to gather*, and its compounds, change the *i* preceding the *r* into *e*: *je cueillerai*.

3. In the third conjugation, s'asseoir, *to sit down*, and seoir, *to sit*, make *je m'assiérai* and *je siérai*. Falloir, *to be necessary*, vouloir, *to be willing*, and valoir, *to be worth*, make *il faudra, je voudrai*, and *je vaudrai*. Voir, *to see*, and revoir, *to see again*, make *je verrai, je reverrai*. Pouvoir, *to be able*, makes *je pourrai*, and pourvoir, *to provide*, *je pourvoirai*. Savoir, *to know*, and avoir, *to have*, make *je saurai*, and *j'aurai*.

4. Etre, *to be*, faire, *to make*, and its compounds, are the only verbs of the fourth conjugation which are irregular in the future: *je serai, je ferai*, &c.

5. The futures, simple and anterior, are used in French after an adverb of time, in cases similar to those in which the English use the present and perfect of the indicative, with a future meaning:—

Quand vous verrez ces messieurs...	*When you see those gentlemen...*
Dès que vous aurez reçu cette lettre.....	*As soon as you have received this letter....*

Résumé of Examples.

Irez-vous en France cette année?	*Shall you go to France this year?*
Nous irons en France et en Italie?	*We shall go to France and Italy.*
Nous vous enverrons chercher.	*We shall send for you.*
Ne viendrez-vous pas nous trouver?	*Will you not come to us?*
Ne nous assiérons-nous pas?	*Shall we not sit down?*
Quand ils viendront, j'aurai ma lettre.	*When they come, I shall have my letter.*
Cela vaudra-t-il la peine?	*Will that be worth the while?*
Cet habit ira-t-il bien?	*Will that coat fit well?*
Il faudra leur envoyer de l'argent.	*It will be necessary to send them money.*

Exercise 119.

Avec, *with*.	Lentement, *slowly*.	Permett-re, 4 ir. *to permit*.
Bientôt, *soon*.	March-er, *to walk, to go on foot*.	Plaisir, m. *pleasure*.
Connaît-re, 4 ir. *to know*.	Moi-même, *myself*.	Prêt-er, 1. *to lend*.
Demeure, f. *dwelling*.	Où, *where*.	Sort-ir, 2 ir. *to go out*.
Fraise, f. *strawberry*.	Part-ir, 2 ir. *to set out, to leave*.	
Guitare, f. *guitar*.		

1. Ne viendrez-vous pas nous voir demain? 2. J'irai vous voir, si le temps le permet. 3. N'enverrez-vous pas chercher le médecin, si votre fils est malade? 4. Je l'irai chercher moi-même. 5. Quand je serai fatigué, je marcherai plus lentement. 7. Quand vous connaîtrez sa demeure irez-vous le voir? 8. J'irai le voir aussitôt que je saurai où il demeure. 9. Ne le verrez-vous pas aujourd'hui? 10. Je le verrai cette après-midi. 11. Ne pourrez-vous point nous accompagner? 12. Je le ferai avec beaucoup de plaisir. 13. Ne leur enverrez-vous point des fraises. 14. Je leur en enverrai quand les miennes seront mûres. 15. Ne faudra-t-il pas leur écrire bientôt? 16. Quand nous aurons reçu des nouvelles de leur parent, il faudra leur écrire. 17. Que ferons-nous demain? 18. Nous irons à la chasse. 19. N'irez-vous pas chez votre père? 20. Nous irons certainement. 21. Quand votre guitare sera arrivée, la prêterez-vous. 22. Je ne pourrai la prêter. 23. A quelle heure partirez-vous demain? 24. Je partirai à cinq heures du matin. 25. Ne sortirez-vous pas ce soir? 26. Je ne sortirai pas, et je me coucherai de bonne heure.

Exercise 120.

1. Will you send for the physician? 2. I will send for him this afternoon. 3. Will not the little girl go and fetch apples? 4. She will send for some. 5. Will you not sit down when you are tired? 6. We will not sit down, we have no time. 7. What will your brother do when he is tired? [R. 5.] 8. He will do what (*ce que*) he can. [R. 5.] 9. Will it be worth the while to (*de*) write to him? 10. It will not be worth the while, for (*car*) he will not come. 11. Will it not be necessary to speak to the merchant? 12. It will not be necessary to speak to him. 13. Will it be necessary for us to take passports? 14. It will be necessary (*il le faudra*). 15. Will not your little boy walk more slowly when he is tired? 16. When he is tired, he will sit down. 17. What will your sister do to-morrow? 18. She will go to church and to school. 19. Will she not come here? 20. She will not be able to come. 21. Will you walk or go on horseback? (*Irez vous à pied ou à cheval?*) 22. I shall go on horseback. 23. Why do you not go in a carriage? 24. Because my carriage is in London. 25. When will you see them? 26. I shall see them as soon as I can. 27. Will they come to our house to-morrow? 28. They will do so with much pleasure. 29. When you see that gentleman, will you speak to him? 30. I will not speak to him. 31. When you have written your letters, what will you do? 32. I shall come to your house. 33. When you have read that book, will you send it to me? 34. I will send it to you. 35. Will you send it to-day? 36. I will send it to-morrow 37. They will come to you to-morrow.

Section LXI.

The two Conditionals (§ 125).

1. The conditional present may be formed from the future, by displacing the terminations *ai, as, a, ons, ez, ont*, and substituting those of the imperfect of the indicative, *ais, cis, ait, ions, iez, aient*.

2. Every verb in the French language, regular and irregular, has in this tense the above terminations.

3. Conjugation of the Conditional Present of the Regular Verbs.

Je	chanter –ais *would sing*	finir –ais *would finish*	recevr –ais *would receive*	rendr –ais *would render*
Tu	parler –ais *wouldst speak*	chérir –ais *wouldst cherish*	apercevr –ais *wouldst perceive*	vendr –ais *wouldst sell*
Il	donner –ait *should give*	fournir –ait *should furnish*	percevr –ait *would gather*	tendr –ait *should tend*
Nous	chercher –ions *would seek*	punir –ions *should punish*	concevr –ions *would conceive*	entendr–ions *should hear*
Vous	porter –iez *should carry*	saisir –iez *would seize*	devr –iez *should owe*	perdr –iez *would lose*
Ils	aimer –aient *would love*	unir –aient *should unite*	décevr –aient *would deceive*	mordr –aient *should bite*

4. The irregularities of the conditional appear not in the terminations, but in the *stem* of the verb. They are precisely the same as those of the future. The irregularities will be found in the last section, and need not be repeated here. The conditional of any irregular verb may be formed by placing after the last *r* of the future the terminations of the imperfect of the indicative.

5. The conditional past is formed from the conditional present of one of the auxiliaries *avoir, être*, and the past participle of the verb [§ 125 (2)]:—

J'aurais écrit, je me serais flatté.	*I should have written, I should have flattered myself.*

6. The two futures and the two conditionals should not be used after the conjunction *si* (*if*). But in such case, the present and the imperfect of the indicative should be used:—

S'il pouvait quitter son père, il viendrait.	*If he could leave his father, he would come*
Si j'étais à votre place, j'irais.	*If I were in your place, I would go.*

Résumé of Examples.

Nous irions à la chasse, si nous avions le temps.	*We would go hunting if we had time.*
Je lirais, si j'avais des livres ici.	*I would read if I had books here.*
J'aimerais mieux aller à pied qu'à cheval.	*I would prefer walking to riding.*
Votre mère se porterait mieux à Paris.	*Your mother would be better in Paris*
Nous nous passerions facilement de ce livre.	*We might easily do without that book*

Ne vaudrait-il pas mieux lui écrire?	*Would it not be better to write to him?*
Ne faudrait-il pas lui écrire?	*Would it not be necessary to write to him?*
Je m'assiérais si j'étais fatigué.	*I would sit down if I were tired.*
Cet habit m'irait bien, s'il était assez large.	*That coat would fit me well if it were broad enough.*

Exercise 121.

S'amus-er, 1. ref. *to amuse one's self.*	Interromp-re, 4. ir. *to interrupt.*	Se tromp-er, 1. ref. *to be mistaken.*
S'approch-er, 1. ref. *to come near.*	Invit-er, 1 *to invite.*	Se port-er, 1. ref. *to be* or *do.*
S'éloign-er, 1. ref. *to go from.*	Mett-re, 4 ir. *to put on.*	Voyage, m. *journey.*
S'ennuy-er, 1. ref. (§ 49] *to be* or *become weary.*	Mouill-er, 1. *to wet.*	
	Ot-er, 1. *to take off.*	
	Peut-être, *perhaps.*	
	Séch-er, 1. *to dry.*	

1. Quel habit mettriez-vous si vous alliez à la chasse? 2. Je mettrais un habit vert. 3. N'ôteriez-vous pas vos bottes, si elles étaient mouillées? 4. Je les ôterais, et je les ferais sécher. 5. Si vous aviez froid, ne vous approcheriez-vous pas du feu? 6. Je m'en approcherais certainement. 7. Votre petit garçon ne s'en éloignerait-il pas, s'il avait trop chaud? 8. Il s'en éloignerait bien vite. 9. Vous ennuieriez-vous ici? 10. Je ne m'ennuierais pas, je m'amuserais à lire. 11. Ne vous tromperiez-vous pas, si vous faisiez ce calcul? 12. Je me tromperais peut-être, si j'étais interrompu. 13. Viendriez-vous si on vous invitait? 14. Je viendrais avec beaucoup de plaisir. 15. Ne vous porteriez-vous pas mieux, si vous lisiez moins? 16. Je me porterais beaucoup mieux. 17. Ne faudrait-il pas lui parler de votre affaire? 18. Il faudrait lui en parler. 19. Combien d'argent vous faudrait-il? 20. Il me faudrait mille francs, si je faisais ce voyage. 21. Ne vaudrait-il pas mieux lui parler qui lui écrire? 22. Il vaudrait mieux lui écrire. 23. Si vous étiez à ma place, que feriez-vous? 24. Si j'étais à votre place, je lui paierais ce que je lui dois. 25. Si j'avais le temps, je porterais volontiers vos lettres à la poste.

Exercise 122.

1. Would you not read if you had time? 2. I would read two hours every day if I had time. 3. What coat would your brother put on if he went to church? 4. He would put on a black coat. 5. Would you put on a black hat? 6. I would put on a straw hat (*chapeau de paille*) if it was warm. 7. Would you not draw [Sect. 38, 6] near the fire if you were cold? 8. We would draw near it. 9. Would you not take off your coat? 10. I would take it off, if it were wet. 11. Would you go to my father's if he invited you? 12. I would go to his house and to your brother's, if they invited me. 13. Would you put on your boots if they were wet? 14. If they were wet, I would not put them on. 15. How much money would you want, if you went to England? 16. We would want three thousand francs. 17. Would you not be better if you lived (*demeurer*) in the country? 18. I should not be better. 19. Would it not be better to write to your brother? 20. It would be better to write to him. 21. Would you read the book if I lent it to you? 22. I would certainly read it. 23. If you were in his place, would you go to school? 24. If I were in his place, I would go. 25. If you were in my place, would you write to him? 26. I would write to him every day. 27. Would your sister be mistaken? 28. She would not be mistaken, she is very attentive. 29. If you rose every morning at five, would you be better? 30. I should not be better. 31. Would you prefer going on foot? 32. I would prefer going on horseback. 33. Would you not sit down? 34. I would sit down if I were tired.

Section LXII.

1. The verb faire (4 ir.) is used in the formation of a number of idiomatic sentences. See Sect. 31, R. 3, 4. Faire faire, *to have made, to bespeak*; faire raccommoder, *to have mended*; faire la cuisine, *to cook*; faire cuire, *to cook, to bake*; faire bouillir, *to boil*; faire rôtir, *to roast*; faire chauffer, *to warm* (in speaking of food); faire bonne chère, *to live well*:—

Nous avons fait faire des habits.	*We have had clothes made.*
Vous avez fait raccommoder vos gilets.	*You have had your waistcoats mended.*

2. The past participle of faire never varies, when it precedes an infinitive:—

Les livres que vous avez fait venir.	*The books which you have sent for.*

3. Faire peur, *to frighten*; faire attention, *to pay attention*, faire tort, *to injure*; faire mal, faire du mal, *to hurt*, take à before a noun:—

Nous avons fait peur à ces enfants.	*We have frightened these children.*
Vous leur avez fait mal.	*You have hurt them.*

4. The last example will show that, when a noun preceded by à, expressed or understood, is replaced by a pronoun, that pronoun will take the form of the indirect regimen (*dative*). By an exception to the rules for the place of personal pronouns, when *faire attention* has for its indirect object a pronoun representing a person, that pronoun follows the verb:—

Nous ferons attention à lui.	*We will pay attention to him.*

5. In speaking of the parts of the body, the French use the article *le, la, les*, &c., instead of the possessive adjective [§ 77 (9)] when the possession is expressed by a reflective [Sect. 36, R. 1] or other personal pronoun, or by some other word in the sentence:—

Vous m'avez fait mal à la main.	*You have hurt my hand.*
Le bras lui fait mal.	*His arm hurts or pains him.*

Résumé of Examples.

Ferez-vous raccommoder vos souliers.	*Will you have your shoes mended?*
Je ferais faire un habit si j'avais de l'argent?	*I would bespeak a new coat if I had money.*
Il ne sait pas faire la cuisine.	*He does not understand cooking.*
Avez-vous fait cuire votre viande?	*Have you cooked your meat?*
Ferez-vous chauffer votre bouillon?	*Will you warm your broth?*
Vous lui avez fait mal au coude.	*You have hurt his elbow.*
Vous m'avez fait mal au pied.	*You have hurt my foot.*
Vous avez fait peindre votre maison.	*You have had your house painted.*

Exercise 123.

Bât-ir, 2. *to build.*	Gravure, f. *engraving.*	Poignet, m. *wrist.*
Bouillon, m. *broth.*	Maçon, m. *mason.*	Tête, f. *head.*
Bras, m. *arm.*	March-er, 1. *to step, tread.*	Tout-à-l'heure, *by-and-by.*
Cuisinier, m. *cook.*	Où, *where.*	Travail, m. *work, labour.*
Epaule, f. *shoulder.*	Pied, m. *foot.*	
Gigot-de-mouton, m. *leg of mutton.*		

1. Quand ferez-vous bâtir une maison? 2. J'en ferai bâtir une l'année prochaine, si je reçois mon argent. 3. Avez-vous fait bouillir ce gigot de mouton? 4. Je l'ai fait rôtir. 5. Le cuisinier a-t-il fait chauffer votre bouillon? 6. Il ne l'a pas encore fait chauffer, mais il le fera tout-à-l'heure. 7. N'avez-vous pas fait venir des livres? 8. Nous n'en avons pas fait venir, mais nous avons fait venir des gravures. 9. N'avez-vous pas fait peur à ces petites filles? 10. Nous leur avons fait peur. 11. Ferez-vous attention à votre travail? 12. J'y ferai attention. 13. Avez-vous fait mal à cette petite fille? 14. Je ne lui ai pas fait mal. 15. N'avez-vous pas fait mal à ce chien? 16. Je lui ai fait mal. 17. Où avez-vous fait mal à votre fils? 18. Je lui ai fait mal au bras et à la main. 19. Ne lui avez-vous pas fait mal au pied? 20. Je lui ai fait mal à l'épaule. 21. A qui ce maçon a-t-il fait mal? 22. Il n'a fait mal à personne. 23. Vous ai-je fait mal au pied. 24. Vous m'avez marché sur le pied et vous m'avez fait mal. 25. La tête, l'épaule, le bras, le poignet et la main me font mal. [R. 5].

Exercise 124.

1. Will you have your coat mended? 2. I will not have it mended. 3. Will your brother have his house painted? 4. He will have it painted next year. 5. Will you not have a coat made? 6. I would have one made if I had money. 7. Have you hurt your brother? 8. I have hurt him, I have stepped upon his foot. 9. Does his arm pain him? 10. Yes, Sir, his shoulder, arm, and wrist pain him. 11. Will not your son pay attention to his work? 12. He will pay attention to it, he has nothing else (*rien autre chose*) to do. 13. Have I hurt your hand or your elbow? 14. You have hurt my fingers (*doigts*). 15. Does your cook understand cooking? 16. He understands cooking. 17. Has the cook roasted that leg of mutton? 18. He has boiled it. 19. Has he not warmed it? 20. He has not had time to warm it. 21. Has the physician sent for engravings? 22. He has sent for books. 23. Have you hurt his elbow? 24. I have not hurt his elbow, but his

hand. 25. Have I not hurt your fingers? 26. You have hurt my wrist. 27. Where have you hurt your son? 28. I have not hurt him. 29. Would the cook boil that meat if he had time? 30. He would not boil it, he would roast it. 31. When will he warm your broth? 32. He will warm it by-and-by, if he has time. 33. If you had stepped upon my foot, would you not have hurt me? 34. I should certainly have hurt you, if I had stepped upon your foot.

LESSONS IN MUSIC.—No. XI.

By JOHN CURWEN.

1. In pursuance of our design to illustrate the proper mental effect of each note of the scale, we intend in this lesson to illustrate the fourth and the sixth—FAH and LAH. But let us afresh guard our pupils against misunderstanding. The mental effects of which we speak do not reside in the musical sound itself, but in the *association* with which *the mind* invests each note as it rises, clothing and colouring it with the relationship it holds *to other* sounds just heard, and which still linger on the ear. In other words, the *key* must be "established" by singing its common chord, or, yet more clearly, by adding also its TE and FAH, before the distinctive character and mental effect of any particular note is felt. The more completely "the ear is filled" with the other notes of the key, especially with those of opposite effect, the more clearly will the note to be illustrated be "brought out." Let the pupils also remember that these mental effects are modified in a marked manner by rate of movement, as well as by the accompanying harmony and other circumstances. We shall first give the result of our own observations, and then follow them by illustrations which will enable the pupil to test the truth of our assertions.

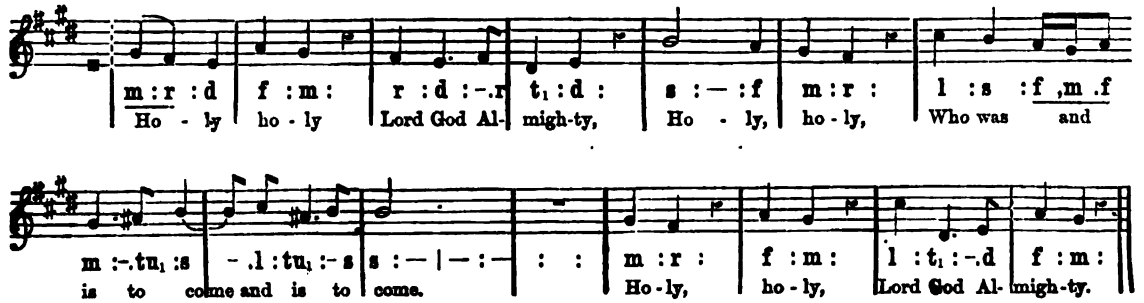
2. The *general* character of *suspense* and *expectancy* belongs both to FAH and LAH, but more strongly to the former. When FAH is held at any length the mind is conscious of an urgent and increasing desire for its solution in ME. But to LAH is allowed a greater independence, and it does not so soon demand its rest in SOH. Dr. Bryce compares ME and SOH to objects lying at rest on the ground, while LAH is "thrown loose and detached, with little indication of return," and FAH is "in the act of alighting." We have often likened LAH to the "sky-rocket" which mounts with an upward aim, but having reached its height shines beautifully for a moment, and then softly and elegantly descends. Such comparisons must, of necessity, be "far fetched." But you cannot form a comparison, or judge of one, without minutely *observing* the things compared. If, by our far fetched comparisons we secure your doing this we are quite satisfied. Let the pupil *observe* for himself, and he will presently form a more perfect *mental conception* of the thing itself than any description or any language can convey.

3. If the mental impressions produced by FAH and LAH be further sought, it will soon be noticed that they have an effect, when sung slowly, which would lead us to denominate

FAH as the *desolate* or *awe-inspiring* NOTE.
LAH — *weeping* or *sorrowful* NOTE.

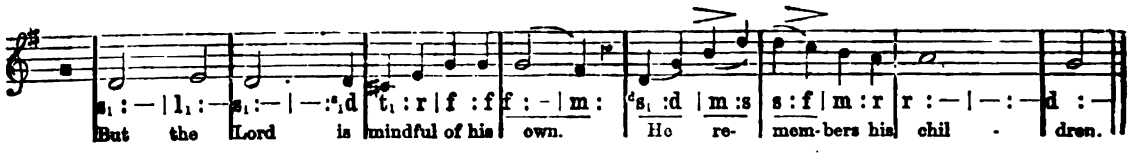
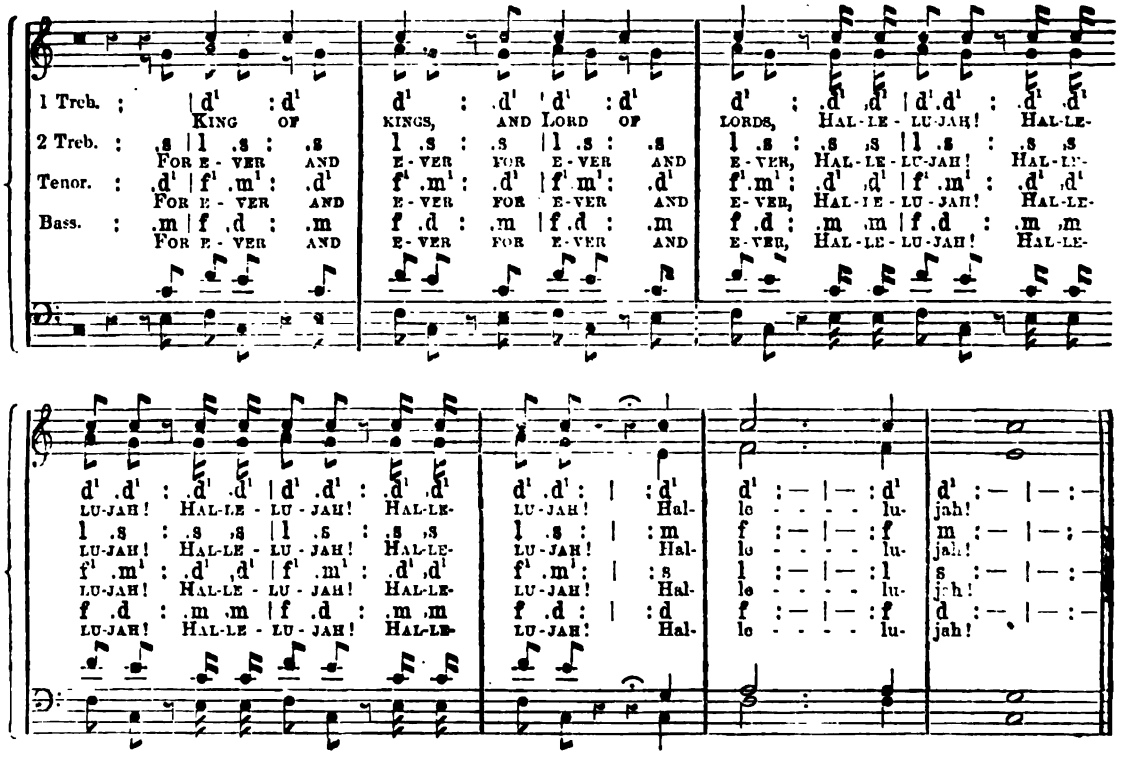
The names thus given help greatly to fix the attention, and many adults as well as children have been very thankful for the aid they give to the mind's command over the voice. We have seen many a class who could not at first strike LAH correctly, but were *unable to mistake* when told that they must make it a "weeping note." But it should be borne in mind that neither these nor any other single or ordinary *terms* of language can fittingly describe the mental effect which shall belong to a certain note of the scale under all its modifications of pitch, force, length, &c. We can only describe it proximately. But the effort to do so, or only to *perceive* the proximate truth of the description, kindles thought and feeling. If you were teaching others to understand these points, your best plan would be first to *produce the effect*, and then to get your pupils to describe their own impressions of it, with as much variety of language as possible. For instance you might sing a short phrase to words or figures, and ask your pupils to describe the effect of the note which fell to such a word or figure. Another good exercise would be for you, after the mental effect of a note has been described or perceived, to sing a short phrase or tune to figures, and to ask your pupils *which* figure such a note was sung to. Thus the true *conception* and recognition of the mental effect of the notes will be reached. The mind is quicker than our words, and will form the *idea* long before we can express it. Thus it often is with some word in a new language which has no perfect synonyme in our own, much study of dictionary, context and concordance, with many endeavours to express it, at last brings us to *the thought*, and we enter on the luxury of *mental* translation, which is pleasanter to us than the verbal, but could not have been reached without its aid. Thus may our pupils be able to study and mentally enjoy the beautiful tunes we lay before them.

4. If you notice the modification of these notes by rate of movement, you will find that while they give PATHOS to a tune when sung *slowly*, they give a peculiar LIGHTNESS and ELEGANCE to it when sung quickly.

5. A correspondent, Mr. Peyton (who has for years adopted this plan of teaching his pupils the mental effect of notes in the first stages of their course), has reminded us that the mental effect of FAH is strikingly illustrated in Handel's song "Holy Lord." It opens with the *calm* utterance of the word "Holy" on ME, and then uses the *awe-inspiring* note on its very next emphasis. Presently, having repeated the same word with SOH and ME emphatic, as in uplifted song, and having passed into a related key (of which subject of "transition" we shall have to speak hereafter) on other words, the music returns to the *worshipful* expression of the word "Holy," by means of FAH—now rendered many times more effective by contrast with the preceding passage. Some of our pupils must excuse our introducing, by way of illustration, passages too difficult for them.

m : r : d | f : m : | r : d : -.r | t₁ : d : | s : — : f | m : r : | l : s : f , m . f
Ho - ly | ho - ly | Lord God Al- | migh-ty, | Ho - ly, | ho - ly, | Who was and
m :-.t₁ :s | - .l : t₁ :- s | s : — | — : — | : : | m : r : | f : m : | l : t₁ :-.d | f : m :
is to come and is to come. | Ho - ly, | ho - ly, | Lord God Al- | migh-ty.

In like manner Mendelssohn, when he wished to express the tender parental care of God, the "overshadowing of his wings," the "yearning" of his love, to the words, "The Lord is mindful of *his own*,"—travels into a new key on purpose to obtain the effect of FAH. Our pupils, who may be puzzled by the "transition" into a new key, must have patience with us. At the proper place, we shall be pleased to explain to them this exceedingly interesting subject at length. It is enough at present for them to understand that in the first instance below, the note SOH is treated, by ear and voice, as though it had suddenly become DOH, and the best way of pronouncing it is—by throwing the two syllables together thus, s' DOH;—and that,

in the next instance below, the new DOH becomes SOH again, as it was before, and it is to be pronounced, in sol-faing, D' SOH.

Notwithstanding this little difficulty, we could not exclude you from so beautiful an example of the mental effect of FAH.

But the grandest manifestation of the power of the "awe-inspiring" note is to be found at the close of Handel's Hallelujah Chorus,—where he employs it on nearly all the accented notes of the male voice parts (tenor and bass), while the treble voices hold clear and aloft the key-note. Never did music breathe forth the spirit of solemn awe so mightily as in this passage. That the pupil may be able to study it both now and at other stages of his course, we here print it, accompanied by our interpreting notation. It is put into the key of c. The highest "part" is the first treble, the next the second treble or alto, the next the tenor, and the lowest the bass. [Our old notation friends may need to be informed that the mode of printing "part" music here adopted is called "short score," of which more anon.]

1 Treb.
2 Treb.
Tenor.
Bass.
KING OF KINGS, AND LORD OF LORDS, HAL-LE-LU-JAH! HAL-LE-LU-JAH! HAL-LE-LU-JAH! HAL-LE-LU-JAH! HAL-LE-LU-JAH!
FOR E-VER AND E-VER FOR E-VER AND E-VER, HAL-LE-LU-JAH! HAL-LE-LU-JAH! HAL-LE-LU-JAH!
FOR E-VER AND E-VER FOR E-VER AND E-VER, HAL-LE-LU-JAH! HAL-LE-LU-JAH! HAL-LE-LU-JAH!
FOR E-VER AND E-VER FOR E-VER AND E-VER, HAL-LE-LU-JAH! HAL-LE-LU-JAH! HAL-LE-LU-JAH!

In trying to recall illustrations of FAH and LA, there came stealing into our memory the peculiarly mysterious, almost sad, and certainly awe-inspiring effect of the last note in that rising phrase, "Not here, not there my *child*," in Mrs. Hemans's song, "I hear thee speak of a better land." We knew not to what note of the scale to ascribe the effect as it dwelt on our memory. Turning to the piece, we were, at first, surprised to find that the word "child" is sung to a long note on upper DOH! But, when we looked at the accompanying harmony, this mysterious complex effect was at once explained,—for the bass gives two accented notes, the first on lower LAH, the second on upper FAH. We mention this not only to illustrate these notes, but to show the influence of harmony, and to suggest what *boundless variety* may spring from the simple mental effects of the *seven notes* we are studying, when the various groupings of harmony, the colouring of "transition," and the changes of rhythmical movement are employed to develop them.

In the next lesson we hope to complete our illustrations of the mental effects of FAH and LAH, and to supply some exercises on these notes for the pupil.

LESSONS IN PENMANSHIP.—No. II.

IN our last lesson, we promised, on the next opportunity, to explain the formation of the letters. In the WRITING ALPHABETS on next page, look at the letter *m* in the SMALL LETTERS; this is their *key*; it is composed of three *top turns*, of which the last becomes also a *bottom turn*; a *top turn* consists of a *hair-stroke up* and a *black-stroke down*; a *bottom turn* consists of a *black-stroke down* and a *hair-stroke up*. Look at the letter *o* in the same alphabet; it enters into the formation of several letters; it is an oval consisting *partly* of a black-stroke on the left, and a hair-stroke on the right, with the point of union fairly marked; you begin to make it at the top part of the hair-stroke, and turn round on the black-stroke ending with a hair-stroke where you began. The letter *a* is formed of the letter *o*, and a bottom turn joined to it at the point where the hair-stroke meets. The letter *b* mainly consists of a bottom turn, beginning in a hair-stroke loop above the line, or common level of the other letters, and ending in a small hair-stroke loop at that level. The letter *c* is an *o* begun with a point at top.

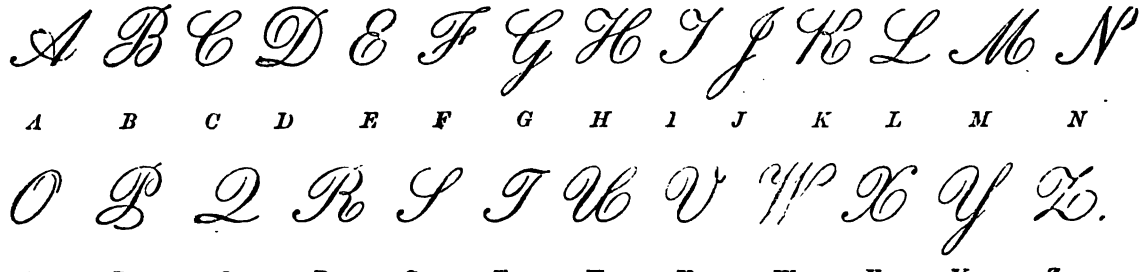
near the common level, and ending in a hair-stroke not joined to the point, but carried to the next letter of any word in which it occurs. The letter *d* consists of an *o* and a bottom turn commencing above the common level. The letter *e* is an *o* commencing at the middle of the place over which the black-stroke is to be drawn. The letter *f* is composed of a black-stroke extending above and below the common level, which commences in a loop to the right, and terminates in a similar loop at the middle of that stroke. The letter *g* is composed of an *o* and a black-stroke carried below the line, and ending in a loop to the left. The letter *h* is composed of a black-stroke commencing in a loop to the right and terminating in the lower level of the line, and of a double turn like that in the letter *m*. The letter *i* is a bottom turn with a dot; the letter *j* is like the letter *g* without the *o* part, and having a dot above it like the letter *i*. The letter *k* is like the letter *h* with this difference that the shorter or second part has a small loop in the middle of it turned to the left. The letter *l* is like the letter *b* without the small loop in which it terminates. The letter *m* has been described. The letter *n* is the letter *m without* the first top turn. The letter *o* has been described. The letter *p* consists of a black-stroke extending above and below the level, and a double turn like the last in the letter *m*. The letter *q* is like the letter *g*, without the loop; the hair-stroke in which the black-stroke terminates is usually brought up to the common level, to join any other letter. The letter *r* consists of a top turn, and a small hair-stroke to the right, ending in a very small bottom turn. The letter *s*, instead of a top turn, ends in a sharp point at the top, and a full dot to the left at the bottom. The letter *t* is a bottom turn, extending a little way above the common level, and crossed with a hair-stroke near the top. The letter *u* is composed of two bottom turns. The letter *v* of a double turn, ending in a small hair-stroke loop near the top. The letter *w*, is like the letter *u*, with the same loop as the letter *v*. The letter *y* is like an inverted *h*; and the letter *z* is like a printed z, formed chiefly of hair-strokes; sometimes it is made with a loop below the level like that of the letter *g*. So much for the small letters.

In the CAPITAL LETTERS of the WRITING ALPHABET the letter *I* is the key, and forms the principal part of most of the letters; it consists of a nicely tapering black stroke, commencing with a hair-stroke, and ending in a hair-stroke with a full point or a scroll. The head or top of this letter is variously made; a common form is seen in the capital letters on this page; sometimes the head is formed like that of the letter *J*, which is the same letter in writing, with the black-stroke and the bottom hair-stroke carried below the level and termined in a loop to the left. The letter *A* is very like the printed *A*, with a loop or hair-stroke drawn across the middle; the hair-stroke generally begins with a full point, and the black-stroke tapering from the top terminates with a hair-stroke like a bottom turn, or with a scroll; but it often terminates in a straight stroke, as seen on this page. The letter *B* consists of the letter *I* without its head, and a curved black-stroke to the right with a loop in the middle to the left; this curved black-stroke commences with a curved hair-stroke on the left of the middle stroke, and terminates with the same on the right of it, close to the bottom of the middle stroke. The letter *C* is composed of a tapering black-stroke, beginning with a loop in hair-stroke, and ending with a scroll. The letter *D* is composed of the letter *I* without its head, with the hair-stroke ending in a loop to the left at bottom, but carried round the top and made to terminate in a scroll. The letter *F* is composed of the letter *I* with its head formed in a scroll and loop to the right at the top, it is also marked with a hair-stroke across the middle of the black-stroke, and terminating also in a small loop. The letter *G* consists of a tapering black-stroke curved to the left, beginning in a loop at top, and ending in a hair-stroke, to which is atached a black-stroke like the letter *j* among the small letters. The letter *H* is composed of the letters *I* and *C* joined together by a hair-stroke in the middle. The letters *I* and *J* have been described. The letter *K* is like the letter *H*, with this difference, that the black-stroke of the *C* part has a small loop in the middle to the left; the first or *I* part is sometimes a mere black-stroke, tapering from top to bottom. The Letter *M*, is like two *A*'s joined together; but the middle stroke is generally made to taper gently to a sharp point. The letter *N* is anomalous; the middle is a black-stroke, tapering at both ends; it is joined at top by a hair-stroke like the letter *A*, and at bottom by a hair-stroke running up into a curve. The letter *O* is like the small *o*, only it is left open at the top, and generally turned round in a loop at the end of the hair-stroke. The letter *P* is like the letter *B* wanting the latter part of the curved black-stroke from the loop downwards. The letter *Q* is a curved tapering black-stroke, commencing at the top with a scroll, and ending in a loop, to the left, of which the hair-stroke is carried across the black-stroke at the bottom in a waving curve. The letter *R* is like the letter *B* with this difference, the latter part of the curved and looped black-stroke is turned *to the right* with a scroll. The letter *S* is the body of the letter *I*, with a hair-stroke loop *to the right*, at the top. The letter *T* is like the letter *I* with a larger head, made exactly like the head of the letter *F*. The letter *U* is a tapering black-stroke, commencing with a scroll, and ending in a hair-stroke to which is attached the body of the letter *C*, with or without the head. The letter *V* is like the first part of the letter *U*, but the hair-stroke terminates in a small loop at the top.

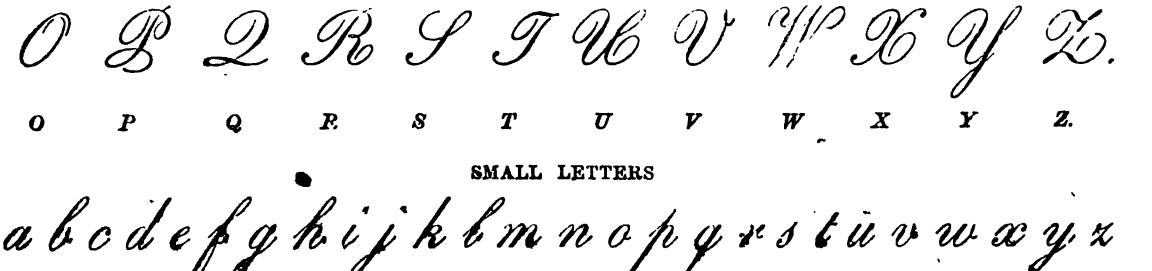
(For the remainder of this description see next Lesson.)

WRITING ALPHABETS.

CAPITAL LETTERS.

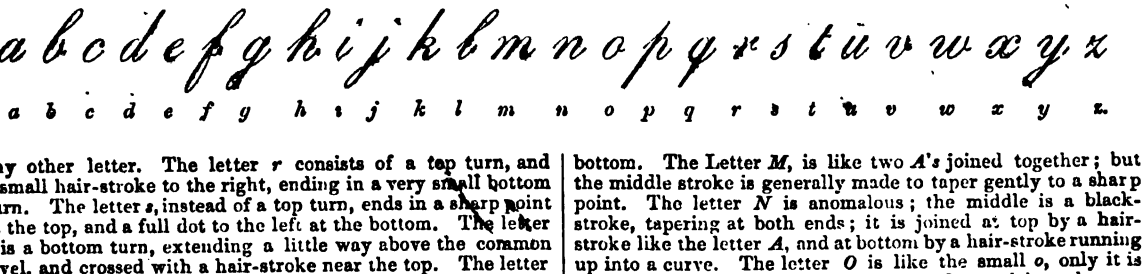


A B C D E F G H I J K L M N



O P Q R S T U V W X Y Z.

SMALL LETTERS



a b c d e f g h i j k l m n o p q r s t u v w x y z.

Alexandria

Amendment of manners is commendable.

A man's manners most commonly make his fortune.

Birmingham

Benevolence is an amiable endowment.

Be constantly in some commendable employment.

Cumberland

Contentment is better than a kingdom.

Commendation most commonly encourages the ingenious.

Darlington

Decency is respected and commended.

Diligence most commonly overcomes all difficulties.

LESSONS IN LATIN.—No. XXVIII.

By John R. Beard, D.D.

DEPONENT VERBS, FOURTH CONJUGATION.

Example.—Blandior, *I flatter*. *Chief parts*, blandior, blandíri, blanditus sum.

		Indicative	*Subjunctive*	*Imperative*	*Infinitive*	*Participles*
Present.	*I flatter, &c.*	*Singular.* blandior, blandíris, blanditur; *Plural.* blandímur, blandímini, blandiúntur	*I may flatter.* blandiar, blandiáris, blandiátur; blandiámur, blandiamini, blandiantur	*Flatter thou, &c.* blandíre, or blandíto; blandímini, blandiuntor	blandíri, *to flatter*	blandiens, *flattering*
Imperfect.	*I was flattering, &c.*	*Singular.* blandiébar, blandiebáris, blandiebátur; *Plural.* blandiebámur, blandiebámini, blandiebántur	*I might flatter.* blandírer, blandireris, blandiretur; blandirémur, blandiremini, blandirentur			
I. Future.	*I shall flatter, &c.*	*Singular.* blandiar, blandiéris, blandiétur; *Plural.* blandiémur, blandiémini, blandiéntur			blanditúrum esse, *to be on the point of flattering*	blanditúrus, *on the point of flattering*
Perfect	*I have flattered, &c.*	*Singular.* blanditus sum, blanditus es, blanditus est; *Plural.* blanditi sumus, blanditi estis, blanditi sunt	*I may have flattered.* blanditus sim, blanditus sis, blanditus sit; blanditi simus, blanditi sitis, blanditi sint			blanditus, *having flattered*
Pluperfect.	*I had flattered, &c.*	*Singular.* blanditus eram, blanditus eras, blanditus erat; *Plural.* blanditi eramus, blanditi eratis, blanditi erant	*I might have flattered.* blanditus essem, blanditus esses, blanditus esset; blanditi essemus, blanditi essetis, blanditi essent			
II. Future.	*I shall have flattered, &c.*	*Singular.* blanditus ero, blanditus eris, blanditus erit; *Plural.* blanditi erimus, blanditi eritis, blanditi erunt				

Gerunds.		Supines.	
Genitive.....	blandiendi, *of flattering.*	1.	blanditum, *to flatter.*
Dative.	blandiendo, *to flattering.*	2.	blanditu, *to be flattered.*
Accusative ..	blandiendum, *flattering.*		
Ablative....	blandiendo, *by flattering.*		

Like blandior, conjugate these deponents of the 4th conjugation: largior, largíri, largitus sum, *to make largesses*, or *liberal gifts, bestow*; mentior, mentíri, mentitus sum, *to lie*; experior, experíri, expertus sum, *to try by experience*; partior, partíri, partitus sum, *to divide*.

Vocabulary.

Potior, potíri, potitus sum 4 (with abl.), *to get master (or possession) of*; opperior, opperíri, oppertus, and oppertus sum 4, *to wait for*; ordior or exordior, ordíri, orsus sum 4, *to begin*; orior, oríri, ortus sum 4, *to arise* (part. oriturus; the indicative present is conjugated after the third conjugation oríris, orítur, orímur; also the compounds, except adorior, *I seize, attempt*, which follows the 4th throughout); sorior 4, *I arise, break out*; exorior 4, *I appear, come forth*; demolior 4, *I break down, demolish*; eblandior 4, *to obtain by flattery*; praelŏquor, praeloqui, praelocutus sum 3, *I speak before*; animadverto, ere, ti, sum 3, *I remark, attend to*; tergum, i, n, *a back*; calor, óris, m, *warmth*; frons, frontis, f. *forehead*; necesse est (with inf. or subj.), *it is necessary*; vero (after the first word of a sentence), *but*; persaepe, *very often*; tandem, *at length*; maeror, óris, m, *sadness, grief*; opplĕo, ere, evi, etum 2, *to fill*; aegrótus, a, um, *sick*, medĭcus, i, m, *a physician*; abutor, abuti, abusus sum 3, *to abuse* (with abl.); accedo 3, *I approach*; laetitia, ae, f, *gladness*; aliquando, *sometime*.

Exercises.—Latin-English.

Frons, oculi, vultus persaepe mentiuntur, oratio vero saepissime, quicquid orĭtur causam habet a naturâ; sol universis eandem lucem, eundemque calórem largítur; quam multi indigni luce sunt! et tamen dies orĭtur; vade tandem tam repente nobis exorĕris? O milites, si feroci impetu in hostem coorĭmur, victoria in manibus nostris est! dum urbem oppugnare adorĭmur, hostes a

tergo nos aggressi sunt; suo quisque metu pericula metîtur; sapiens et praeteríta grate recordatur, et praesentibus ita potîtur, ut animadvertat quanta sint ea, quamque jucunda; cave ne honores eblandiare; oratores prius quam éxordiantur, quaedam praeloquuntur; in omnibus negotiis, prius quam ordiamur, adhibenda nobis est praeparatio diligens; omnes cives domos suas floribus et coronis ornaverant et vestiverant, quia regem opperiebantur; dum exercitus hostîlis urbis domos privatas publicasque demoliebatur, cives maximo moerore opplebantur; quum hostes praedam inter se partiebantur, nos vehementissimo impetu eos adoriebamur; dux milites cohortatus est, ut omnia experirentur, quibus urbem obsidione liberarent; quum saeva tempestas coorirétur, ingens pavor omnes nautas occupavit.

ENGLISH-LATIN.

A fierce tempest has arisen; a fierce tempest will arise; a fierce tempest is arising; fierce tempests were rising; a fierce tempest was arising; the sailors have experienced many labours; the enemies will demolish thy house; I will wait for my sister; my mother waited for me yesterday; they obtained honours by flattery; wilt thou obtain honours by flattery? I do not wish to obtain honours by flattery; before you begin, you should apply industry; he obtains possession of the land; he has obtained possession of all the city; I shall obtain possession of my father's books; never lie, my child; only the bad lie; to lie is wicked; never will I lie, O father; they lied and were punished; it is disgraceful to lie; the sun rises on (dat.) the good and on the bad, so great is God's goodness; the king bestows honours on his brave soldiers; he divided his goods between his two sons; whatever rises from the earth (tellus, úris, f.) comes from God's hand.

VOCABULARY.

Ementior 4, *to lie openly, invent;* emetior, emetîri, emensus sum 4, *to measure out, pass through;* molior 4, *to attempt, undertake;* advŏlo 1, *I fly to;* conservo 1, *I preserve;* commoditas, átis, f. *convenience;* ubertas, átis, f. *richness, productiveness;* consulto, *advisedly;* effugio 3, *I fly away;* fortuito, *by chance;* id agit, *aims at, makes it its object;* gigno 3, *I beget;* tenebrae, arum, f. *darkness;* proficiscor, proficisci, profectus sum 3, *I set out;* specto 1, *I behold;* expergiscor, experrectus 3, *I awake, arise.*

EXERCISES.—LATIN-ENGLISH.

Ridiculi sunt qui, quod ipsi experti non sunt, id docent caeteros; omne animal se ipsum diligit ac, simulatque ortum est, id agit ut se conservet; ad hominum commoditatem et usus tantam rerum ubertatem natura largîta est, ut, ea quae gignuntur, donata consulta nobis, non fortuito nata videantur; Herodŏtus multas terras emensus, multas quidam res prodigiosas narravit, sed eas non ipse ementitus est, sed alii ex quibus audivit; jam per tres menses opperti eramus amicum, quum nobis ejus mors nuntiata est; repente Romanis Sulla exortus, et atrocissimum bellum civile exorsus est; sapiens nunquam malis hominibus blandietur, nunquam aliquid falsi ementietur, nunquam aliis calamitatem molietur; si celeriter hostem adoriémur, non est dubium quin brevi tempore urbe potîturi simus; simulatque sol ortus est, proficiscemur; cave ne blandiare malis hominibus; hostes advolaverunt urbe potîtum; numerus aequalis facilis est partîtu; sole oriente, profecti sumus; coortâ saevâ tempestate, omnes nautas ingens pavor occupavit; solem oritarurum maximâ cum voluptate spectamus.

Observe that *sole oriente* is in the ablative case. You see the words are not, in construction, connected with any other words. Words thus disconnected are said to be in the absolute (absolutus, *free, dis*connected) case; and the absolute case in Latin is the ablative. This case is commonly called "the ablative absolute." The ablative absolute construction comprises a noun and a participle, as in the instance sole oriente. Coortâ tempestate offers another ablative absolute. To this kind of construction the Roman writers were partial.

ENGLISH-LATIN.

The sun rising, darkness flies away; with great pleasure do I behold the sun when about to rise (fut. part.); a tempest having arisen, our ships were scattered; I will devise (molior) evil to no one, not even to the bad; has the sun risen? the sun will rise at eight o'clock; he fell on the enemy suddenly; I will begin my oration; the orator was beginning his oration when the judge entered; there is no doubt but you will obtain possession of your own; as soon as we are born, we move; all human beings love themselves, and as soon as they have obtained goods, (facultates) ought to divide them among each other; he divided his goods among the needy; many having passed over Britain, are ignorant how happy and powerful it is; I hope that thou wilt never lie; a storm will arise; all think that a storm is about to arise.

EXERCISES ON ALL THE FOUR CONJUGATIONS OF DEPONENT VERBS.

LATIN-ENGLISH.

Artes eo ipsae tuentur; semper miserorum hominum miserebímur; quum aegrotus es, obsequi debes praeceptis medici; stulti aliorum vitia cernunt obliviscuntur suorum; prima pueri commendatio proficiscitur a modestiâ; veremini, O pueri, senectutem! fateor, O puer, verum; miseremini inópum; discipuli verentur praeceptores; non dubito quin tuum praesidium mihi pollicîturus sis; cum magnâ voluptate intuimur praeclara virtutis exempla, quae in historiâ consignata sunt; quis nescit quam multi eloquentiâ abutantur? per multos annos pace fruîti sumus; omnes cives metuunt ne hostes urbem aggrediantur; simulatque experrecti sumus, ad negotia nostra accedimus; cives, libertatem adepti, summâ laetitiâ fruuntur; succurre lapsis; tam audacter cum amico loquere quam tecum; ne irascimini iis quos amare debetis; si virtutis viam semper sequimur, aditus in coelum aliquando nobis patebit; munere tuo bene fungĕre! concordiâ res parvae crescunt discordiâ maximae dilabuntur; gloria virtutem tanquam umbra sequitur; ne blandîtor malis hominibus; magnos homines virtute metîmur non fortunâ; voluptas blandîtur sensibus nostris; metuo ne amicus moriatur.

ENGLISH-LATIN.

My friend died yesterday; I fear thy friend is about to die; do not bestow favours on bad boys; God will bestow favours on the pious; access to heaven always lies open to good men; I fear access to heaven will not lie open to Alexander; how long did thy country enjoy peace; we shall enjoy peace as long as the king's army is in our country; hast thou discharged thy duty? do not abuse thy father's favour; I will speak with thee, but I will not flatter thee; he flattered the king and obtained praise; will thy son obtain glory? my son has obtained very great glory; honour follows distinguished virtue; he promised me that he would return; he has returned; no, he will return to-morrow; boys support each other; boys ought to support each other; I pity and shall pity the wretched; never forget thy own faults; I shall set out within a few days; when wilt thou return? boys, reverence the aged; reverence thy father; reverence God; he confessed his fault; a storm having arisen, fear seized our minds.

Observe, that in the ablative absolute construction there are properly two sentences, and consequently two subjects; e. g., sole oriente, tenebrae diffugiunt; in the words sole oriente there is a subject, namely, sol; and in tenebrae diffugiunt there is a subject, namely, tenebrae. The former sentence is incomplete, nevertheless, there is a subject in it.

Now it is an element in the ablative absolute construction, that the subject of the sentence having the verb is not the same as the subject of the imperfect sentence containing the participle. You may see this fact exemplified and illustrated in these instances:—

ABLATIVE ABSOLUTE.

1. *Senescente lunâ*, astraea tabescere dicuntur.
   The moon waning, oysters are said to waste away.
2. *Geryone interempto*, Hercules in Italiam venit.
   Geryon being slain, Hercules came into Italy.
3. *Sabinis debellatis*, Tarquinius triumphans Romam rediit.
   The Sabines being subdued, Tarquin in triumph returned to Rome
4. Chilo, *filio victore** Olympiae, prae gaudio exspiravit.
   Chilo, his son BEING *conqueror at Olympia, died of joy.*
5. Apes, *aculeo amisso*, statim emŏri existimantur.
   Bees, their sting being lost, are thought to die at once.

LESSONS IN ARITHMETIC.—No. XVIII.

ANALYSIS OF COMPOSITE NUMBERS.

EVERY *composite* number, it has been shown, may be resolved into *prime* factors.

EXAMPLE.—Resolve 210 into its prime factors.

Explanation.	*Operation.*
We first divide the given number by 2,	2)210
which is the least number that will divide	3)105
it without a remainder, and which is also a	5)35
prime number. We next divide by 3, then	7
by 5. The several divisors and the last	
quotient are the prime factors required.	Ans. 2, 3, 5, and 7.

To resolve a *composite number* into its prime factors. Rule:—

Divide the given number by the smallest number which will

* The participle, especially when it would be the participle of the verb to be (which is not found in good Latin authors), is sometimes omitted.

divide it without a remainder; then divide the quotient in the same way, and thus continue the operation till a quotient is obtained which can be divided by no number greater than 1. *The several divisors with the last quotient will be the prime factors required.*

Every *division* of a number, it is plain, resolves it into *two factors*, —viz., the divisor and dividend. But according to the rule, the divisors, in every case, are the *smallest* numbers that will divide the given number and the successive quotients without a remainder; consequently they are all *prime* numbers. And since the division is continued till a quotient is obtained, which cannot be divided by any number greater than 1, it follows that the *last* quotient must also be a *prime* number; for, a prime number is one which cannot be exactly divided by any whole number except a *unit* and *itself*.

Since the *least divisor* of every number is a *prime* number, it is evident that a composite number may be resolved into its prime factors, by dividing it continually by *any prime number* that will divide the given number and the quotients without a remainder.

A composite number, therefore, can be divided by any of its *prime factors* without a remainder, and by the product of any two or more of them, but by *no other* number. Thus, the prime factors of 42 are 2, 3, and 7. Now 42 can be divided by 2, 3, and 7; also by 2×3, 2×7, 3×7, and $2\times3\times7$; but it can be divided by no other number.

EXAMPLE 1.—Resolve 4 and 6 into their prime factors.

SOLUTION.—Here, $4=2\times2$; and $6=2\times3$.

EXAMPLE 2.—Resolve 8 into its prime factors. Here, $8=2\times2\times2$. Ans.

EXERCISES.

1. Resolve all the composite numbers from 9 to 108 into their prime factors.
2. Resolve 120 and 144 into their prime factors.
3. Resolve 180 and 420 into their prime factors.
4. Resolve 714 and 836 into their prime factors.
5. Resolve 574 and 2898 into their prime factors.
6. Resolve 11492 and 980 into their prime factors.
7. What are the prime factors of 650 and 1728?
8. What are the prime factors of 1492 and 8032?
9. What are the prime factors of 4604 and 16806?
10. What are the prime factors of 71640 and 20780?
11. What are the prime factors of 84570 and 65480?
12. What are the prime factors of 92352 and 81660?

GREATEST COMMON DIVISOR.

A *common divisor* of two or more numbers, is a number which will divide each of them without a remainder. Thus 2 is a common divisor of 6, 8, 12, 16, 18, &c.

The *greatest common divisor* of two or more numbers, is the *greatest* number which will divide them without a remainder. Thus 6 is the greatest common divisor of 12, 18, 24, and 30.

A common divisor is sometimes called a *common measure*. It will be seen that a *common divisor* of two or more numbers is simply a factor which is *common* to those numbers, and the *greatest* common divisor is the *greatest* factor common to them.

To find a *common divisor* of two or more numbers. Rule:—

Resolve each number into two or more factors, one of which shall be common to all the given numbers. Or, resolve the given numbers into their prime factors, then if the same factor is found in each, it will be a common divisor.

If the given numbers have not a *common factor*, they cannot have a divisor greater than a unit; consequently they are either *prime numbers*, or *are prime to each other*.

The following theorems will assist the learner in finding factors or divisors:—

1. The number 2 is a factor of every even number, that is, a number whose right-hand figure is divisible by 2. The number 4 is a factor of every number whose two right-hand figures are divisible by 4. The number 8 is a factor of every number whose three right-hand figures are divisible by 8. The number 16 is a factor of every number whose four right-hand figures are divisible by 16; and so on.

2. The number 5 is a factor of every number whose right-hand figure is divisible by 5. The number 25 is a factor of every number whose two right-hand figures are divisible by 25. The number 125 is a factor of every number whose three right-hand figures are divisible by 125; and so on.

3. The number 3 is a factor of every number, the sum of whose digits is divisible by 3. The number 9 is a factor of every number, the sum of whose digits is divisible by 9. The number 6 is a factor of every even number, the sum of whose digits is divisible by 3. The number 18 is a factor of every even number, the sum of whose digits is divisible by 9.

By *divisible* in these theorems, is understood *divisible without a remainder*.

EXAMPLE.—Find a common divisor of 6, 15, and 21.

SOLUTION.—Here $6=3\times2$; $15=3\times5$; and $21=3\times7$. The factor 3 is common to each of the given numbers, and is therefore a common divisor of each of them.

EXERCISES.

1. Find a common divisor of 15, 18, 24, and 36.
2. Find a common divisor of 14, 28, 42, and 35.
3. Find a common divisor of 10, 35, 50, 75, and 60.
4. Find a common divisor of 82, 118, and 146.
5. Find a common divisor of 42 and 66. *Ans.* 2, 3, or 6.

It will be seen from the last example that two numbers may have more than *one* common divisor. In many cases it is highly important to find the greatest common measure or divisor of two or more given numbers, that is, the *greatest divisor* that will divide each of them without a remainder.

EXAMPLE.—What is the greatest common divisor of 35 and 50?

Explanation.

Dividing 50 by 35, the remainder is 15, then dividing 33, (the preceding divisor) by 15 (the last remainder) the remainder is 5; finally, dividing 15 (the preceding divisor) by 5 (the last remainder) nothing remains; consequently 5, the last divisor, is the greatest common divisor.

Operation.

35)50(1
35
15)35(2
30
5)15(3
15

ANALYSIS.—Since 5 is a measure of the last dividend 15, in the preceding solution, it must therefore be a measure of the preceding dividend 35; because $35=2\times15+5$; and 35 is one of the given numbers. Now, since 5 measures 15 and 35, it must also measure their sum, viz., $35+15$, or 50, which is the other given number. In a similar manner it may be shown that the last divisor will, in all cases, be the *greatest common divisor*.

I. To find the *greatest common divisor* of two numbers. Rule:—

Divide the greater number by the less; then divide the preceding divisor by the last remainder, and so on, till nothing remains. The last divisor will be the greatest common divisor.

II. To find the greatest common divisor of a series of numbers. Rule:—

First find the greatest common divisor of any two of them; then find that of the common divisor thus obtained and of another given number, and so on through all the given numbers. The last common divisor found, will be the one required.

Numbers which have no *common measure* greater than 1, are said to be *incommensurable*. Thus 17 and 29 are incommensurable numbers.

EXERCISES.

1. What is the greatest common divisor of 285 and 465?
2. What is the greatest common divisor of 532 and 1274?
3. What is the greatest common divisor of 888 and 2775?
4. What is the greatest common divisor of 2145 and 3471?
5. What is the greatest common divisor of 1879 and 2426?
6. What is the greatest common divisor of 75, 125, and 160?
7. What is the greatest common divisor of 183, 3996, and 108?
8. What is the greatest common divisor of 672, 1440, and 3472?

EXAMPLE.—What is the greatest common divisor of 30, 42, and 66?

Analysis.

By resolving the given numbers into their prime factors, we find that the factors 2 and 3 are both common divisors of them. But we have seen that a composite number can be divided by the product of any two or more of its prime factors; consequently 30, 42, and 66 can all be divided by 2×3; for 2×3 is the product of two prime factors common to each. And since they are the only factors common to the given numbers, their product must be the greatest common divisor of them.

Operation.

$30=2\times3\times5$
$42=2\times3\times7$
$66=2\times3\times11$
Now $2\times3=6$. Ans.

Second Method of finding the greatest common divisor of two or more numbers. Rule:—

Resolve the given numbers into their prime factors, and the continued product of those factors which are common to each, will be the greatest common divisor.

If the given numbers have but *one common* factor, that factor itself is the *greatest common divisor.*

EXERCISES.

1. What is the greatest common divisor of 105 and 165?
2. What is the greatest common divisor of 36, 60, and 108?
3. What is the greatest common divisor of 108, 126, and 162?
4. What is the greatest common divisor of 140, 210, and 315?
5. What is the greatest common divisor of 24, 42, 54, and 60?
6. What is the greatest common divisor of 56, 84, 140, and 168?

LEAST COMMON MULTIPLE.

One number is said to be a *multiple* of another, when the former can be divided by the latter without a remainder.

A *common multiple* of two or more numbers, is a number which can be *divided* by *each* of them without a remainder. Thus, 12 is a common multiple of 2, 3, and 4; 15 is a common multiple of 3 and 5, &c.

A *common* multiple is always a composite number, of which each of the given numbers must be a *factor;* otherwise it could not be divided by them.

The *continued product* of two or more given numbers will always form a common multiple of those numbers. The same numbers may have an *unlimited number* of common multiples; for, multiplying their continued product by any number, will form a new common multiple.

The *least common multiple* of two or more numbers, is the *least* number which can be divided by each of them without a remainder.

Thus, 12 is the least common multiple of 4 and 6, for it is the least number which can be exactly divided by them.

The least common multiple of two or more numbers, is evidently composed of all the prime factors of each of the given numbers repeated *ones* and only *once.* For, if it did not contain all the prime factors of any one of the given numbers, it could not be divided by that number. On the other hand, if any prime factor is employed *more times* than it is repeated as a factor in some one of the given numbers, then it would not be the *least* common multiple.

EXAMPLE.—What is the least common multiple of 10 and 15.?

ANALYSIS.—$10=2\times5$, and $15=3\times5$. The prime factors of the given numbers are 2, 5, 3, and 5. Now, since the factor 5 occurs *once* in each number, we may therefore cancel it in one instance, and the continued product of the remaining factors $2\times3\times5$, or 30, will be the least common multiple.

Explanation. We first divide both the numbers by 5 in order to resolve them into prime factors. Thus, all the different factors of which the given numbers are composed, are found in the divisor and quotients *once*, and only *once*. Therefore the product of the divisor and quotients $5\times2\times3$, is the least common multiple required. Hence,

Operation.

5)10 ,, 15

2 ,, 3

$5\times2\times3=30$ *Ans.*

To find the least common multiple of two or more numbers. Rule:—

Write the given numbers in a line, but distinct from each other. Divide by the smallest number which will divide any two or more of them without a remainder, and set the quotients and the undivided numbers in a line below. Divide this line and set down the results as before; thus continue the operation till there are no two numbers which can be divided by any number greater than 1. The continued product of the divisors into the numbers in the last line, will be the least common multiple required.

We have seen that the *least divisor* of every number is a *prime* number, hence, dividing by the *smallest* number which will divide two or more of the given numbers, is dividing them by a *prime* number.

The result will evidently be the same, if, instead of dividing the *smallest* number, we divide the given numbers by *any prime* number, that will divide two or more of them, without a remainder.

The preceding operation, it will be seen, resolves the given numbers into their *prime factors*, then multiplies all the different factors together, taking each factor as many times in the product, as are equal to the *greatest number of times* it is found in either of the given numbers.

If the given numbers are prime numbers, or are prime to each other, the continued product of the numbers themselves will be their least common multiple. Thus, the least common multiple of 5 and 7 is 35; and of 8 and 9 is 72.

EXAMPLE.—What is the least common multiple of 6, 8, and 12?

Analysis. By resolving the given numbers into their prime factors, it will be seen that 2 is found *once* as a factor in 6; *twice* in 12; and *three times* in 8. It must therefore be taken *three times* in the *product.* Again, 3 is a factor of 6, and 12, consequently it must be taken only *once* in the product. Thus, $2\times2\times2\times3=24$ *Ans.*

Operation.

$6=2\times3$

$8=2\times2\times2$

$12=2\times2\times3$

$2\times2\times2\times3=24$

EXAMPLE 2.—What is the least common multiple of 12, 18, and 36?

Explanation. In the first operation, we divide by the *smallest* numbers which will divide any two or more of the given numbers without a remainder, and the product of the divisors, &c., is 36, which is the answer required.

Operation.

2)	12	18	36
2)	6	9	18
3)	3	9	9
3)	1	3	3
	1	1	1

$2\times2\times3\times3=36$ *Ans.*

"Dividing by any number, which will divide two or more of the given numbers without a remainder," according to the rule given by some authors, does not always give the *least* common multiple of the numbers.

The *reason* of the preceding rule depends upon the principle that the least common multiple of any two or more numbers, is composed of all the *prime factors* of the given numbers, each taken as many times, as are equal to the *greatest number* of times it is found in either of the given numbers.

The reason for dividing by the *smallest* number, is because the divisor may otherwise be a *composite* number, and have a factor *common* to it and one of the quotients, or undivided numbers in the last line; consequently the continued product of them would be too *large* for the *least* common multiple.

EXERCISES.

1. Find the least common multiple of 6, 9, and 15.
2. Find the least common multiple of 8, 16, 18, and 24.
3. Find the least common multiple of 9, 15, 12, 6, and 5.
4. Find the least common multiple of 5, 10, 8, 18, and 15.
5. Find the least common multiple of 24, 16, 18, and 20.
6. Find the least common multiple of 36, 25, 60, 72, and 35
7. Find the least common multiple of 42, 12, 84, and 72.
8. Find the least common multiple of 27, 54, 81, 14, and 63.
9. Find the least common multiple of 7, 11, 13, 3, and 5.

The process of finding the least common multiple may often be shortened, by *cancelling every number which will divide any other given number, without a remainder, and also those which will divide any other number in the same line. The least common multiple of the numbers that remain, will be the answer required.*

By attention and practice, the student will be able to discover, by inspection, the *least common multiple* of numbers, when they are not large.

EXAMPLE.—Find the least common multiple of 4, 6, 10, 8, 12, and 15.

Explanation. Since 4 and 6, will exactly divide 8, and 12, we cancel them. Again, since 5 in the second line will exactly divide 15 in the same line, we therefore cancel it, and proceed with the remaining numbers as before.

Operation.

2)4	6	10	8	12	15
	2)	5	4	6	15
		3)	2	3	15
			2	1	5

Now, $2\times2\times3\times2\times5=120$ Ans

EXERCISES.

1. Find the least common multiple of 9, 12, 72, 36, and 144.
2. Find the least common multiple of 8, 12, 20, 24, and 25.
3. Find the least common multiple of 1, 2, 3, 4, 5, 6, 7, 8 and 9.
4. Find the least common multiple of 63, 12, 84, and 7.
5. Find the least common multiple of 54, 81, 63, and 14.
6. Find the least common multiple of 72, 120, 180, 24, and 36.

The least common multiple of two or more numbers may also be found in the following manner. Rule:—

First find the greatest common divisor of two of the given numbers; by this divide one of these two numbers, and multiply the quotient by the other. Then perform a similar operation on the product and another of the given numbers; thus continue the process until all of the given numbers have been employed, and the final result will be the least common multiple required.

EXAMPLE.—What is the least common multiple of 24, 16, and 12?

SOLUTION.—By inspection, we find the greatest common divisor of 24 and 16, is 8. Now, $24 \div 8 = 3$; and $3 \times 16 = 48$. Again, the greatest common divisor of 48 and 12, is 12. Now, $48 \div 12 = 4$; and $4 \times 12 = 48$. Ans.

PROOF.—Resolving the given numbers into their prime factors, $24 = 2 \times 2 \times 2 \times 3$; $16 = 2 \times 2 \times 2 \times 2$; and $12 = 2 \times 2 \times 3$; consequently, $2 \times 2 \times 2 \times 2 \times 3 = 48$, the least common multiple.

The *reason* of this rule depends upon the principle, that if the *product* of any two numbers be divided by *any* factor which is common to both, the *quotient* will be a *common multiple* of the two numbers. Thus, if 48, the product of 6 and 8, be divided by 2, a factor of both, the quotient 24, will be a multiple of each, since it may be regarded either as 8 multiplied by the quotient of 6 by the factor 2, or as 6 multiplied by the quotient of 8 by the same factor. Hence, it is obvious, that the *greater* the common measure is, the *less* will be the multiple; and, consequently, the greatest common measure will produce the least common multiple.

When the common multiple of the first two numbers is found, it is evident, that any number which is a common multiple of it and the third number, will be a multiple of the first, second, and third numbers.

EXERCISES.

1. What is the least common multiple of 75, 120, and 300?
2. What is the least common multiple of 96, 144, and 720?
3. What is the least common multiple of 256, 512, and 1728?
4. What is the last common multiple of 375, 850, and 3400?

LESSONS IN GERMAN.—No. XIX.

SECTION XXXIII.

Beide (plural) is declined like an adjective, and, unlike its equivalent, (*both*) comes *after* the article, or pronoun with which it is used. Ex.: Die beiden Hände; both the hands: meine beiden Hände; both my hands. Alle (all) is sometimes, for the sake of emphasis, placed *before* beide, and, may together be translated, "*both of them*," or simply, "*both*;" as, alle beide; both of them; both.

I. Beides, (neuter singular) is frequently employed to couple *two* things *different* in kind, whether designated by nouns alike or different in gender. Ex.: Wem ist (§ 129. 2.) dieses Messer und dieses Schwert? Beides gehört meinem Freunde; both belong to my friend. Hat Ihnen der Uhrmacher nur die Uhr oder auch diesen Ring gemacht? Er hat Beides gemacht; or, Beide gemacht. Sind Sie mit der Uhr und dem Ring zufrieden? Nein ich bin mit Beiden unzufrieden, denn Beides ist nicht nach meinem Wunsche; no, I am dissatisfied with both, for both are not according to my wish.

II. For the pronoun "*neither*" the phrase „keines or keins von beiden" is used. Ex.: Haben Sie das neue oder das alte Buch? Ich habe keins von Beiden; I have neither (of the two).

III. Recht and Unrecht like the words "*right*" and "*wrong*" are nouns, adjectives, and adverbs. The phrases, however, "*to be right, to be wrong*," are expressed in German by the *noun*, with the *transitive* verb haben. Ex.: Er hat Recht; he (*has*) is right. Sie haben nicht Unrecht; you (*have*) are not wrong.

IV. Ebenso, before an adjective, signifies, "*just as*." Ex.: Dieses Kind ist eben so alt wie jenes; this child is *just as* old as that. Dieser Mann hat eben so viel Klugheit wie Verstand; this man has *just as* much prudence as understanding.

V. „Ganz wie," with a verb, signifies "*precisely*" or "*just as*" or *like*." Ex.: Er ist ganz wie ich; he is *just as* I (am), he is *just like* me. Sie denkt ganz wie er; she thinks *precisely as* he (thinks), she thinks *precisely like* him.

VI. Noch, besides its signification as disjunction, (Sect. 12.) is variously rendered by "*still, some or yet more, another, besides*," &c. Ex.: Er schläft noch; he sleeps *still*. Gieb dem Kinde noch Brod; give the child *some more* bread. Wann hat er noch ein Pferd gekauft? when did he buy *another* horse? Einen Apfel hat das Kind gegessen, aber es hat noch einen; the child has eaten one apple, but it has one *besides* (or another).

VII. Mehr, connected with a negative word, is used like its equivalent "*more*." Ex.: Ich habe keins mehr; I have no more. Ich habe nicht viel mehr; I have not much more. Used with a noun the adverb *follows*, while in English, it *precedes* the noun

VIII. Ander, with a noun denoting time, may be employed to designate as well a future as a past period; but never, like the word "*other*," as in the phrase "the other day," to denote indefinite past time. Ex. Den andern Tag nach seiner Ankunft besuchte er seinen Vater; the "*next*" day after his arrival, he lost his father. Morgen gehe ich nach Rom, und den andern Tag nach Neapel; to-morrow I go to Rome, and the "*next*" day to Naples. As in the above examples, ander, when similarly employed, is rendered by "*next*."

IX. The neuter anderes, preceded by „etwas," (in conversation usually contracted to was) is rendered by the phrase "*another thing*" Das ist etwas Anderes, or, das ist was Anderes; that is "*another thing*."

X. The *adverb* anders is readily distinguished by its form, and is rendered by "*otherwise, differently*," &c. Ex.: Er spricht anders als er denkt; he speaks *otherwise* than he thinks.

EXERCISE 37.

Ab'segeln, to set sail;	Gustav, *m.* Gustavus;	Spazie'rengehen, to take a walk;
Ander, other (VIII.);	Handeln, to act, deal;	Staat, *m.* state;
An'deres, (See IX.);	Ins'gesammt, altogether;	Thaler, thaler (a German coin);
Anders, otherwise; differently;	Irren, to err;	Trennen, to separate;
Aus'bleiben, to remain out;	Kohle, *f.* coal;	Un'angebaut, uncultivated;
Beide, both;	Liefern, to furnish;	Unmög'lich, impossible;
Beides, (See I.);	Mit'nehmen, to take with;	Unrecht, wrong;
Besu'chen, to visit;	Mittel, *n.* means;	Verstän'dig, intelligent;
Da'bleiben, to remain (there);	Muster, *n* pattern;	Waare, *f.* ware, goods;
Dampfschiff, *n.* steamship;	Pennsylva'nien, *n.* Pennsylvania;	Weg'nehmen, to take away;
E'benso, just as (IV.);	Pflaume, *f.* plum;	Winterrock, *m.* winter-coat;
Ei'nige, some, several;	Recht, *n.* right;	Wohlfeil, cheap;
Elise, *f.* Elisa;	Reden, to speak, talk;	Zu'schauer, *m.* spectator;
Erlau'ben to allow;	Rühren, to move, affect;	Zweck, *m.* aim, purpose.
Freu'denthräne *f.* tears of joy;	Sache, *f.* thing, affair;	
Geleert, vacant, empty;	Som'merrock, *m.* summer-coat;	

Er hat zwei Söhne, aber beide sind taubstumm	He has two sons, but both are deaf and dumb.
Der Riese faßte die Keule mit beiden Händen.	The giant seized the club with both hands.
Hat der Kaufmann ein Pferd oder einen Wagen?	Has this merchant a horse or a wagon?
Er hat Beides.	He has both?
Die Wahrheit und die Rose sind sehr schön, aber Beide haben Dornen.	The truth and the rose are very beautiful, but both have thorns
Ein auf'richtiger Mann verab'scheut eine Lüge.	An upright man abhors a lie.
Fast jeder Mensch hat e'ben so viel Kummer als Freude.	Nearly every human being has quite as much sorrow as joy

1. Wollen Sie ein Muster von diesem oder jenem Tuche haben? 2. Ich will keines von beiden haben. 3. Wir geben ihm einen Thaler für jeden der beiden Männer. 4. Trinken Sie Wein oder Bier? 5. Ich trinke weder Wein noch Bier (or ich trinke keines von beiden). 6. Sie haben Recht, daß Sie das gethan haben. 7. Hat Johann Recht, daß er so lange ausbleibt? 8. Nein, er hat Unrecht, da er seine Aufgaben zu lernen hat. 9. Wie'viel Tuch braucht der kleine Friedrich zu (Sec. 74. I.) einem Sommerrocke? 10. Er braucht ebensoviel, wie zu einem Winterrocke. 11. Der Staat Pennsylvanien liefert ebensoviel Kohlen, als ganz England. 12. Arbeitet Gustav nicht ebensoviel, wie sein Bruder Hermann? 13. Die kleine Elise gab ihrer Schwester Pauline ebensoviel Pflaumen, wie ihrer Freundin Emma. 14. Haben unsere Nachbarn noch keinen Garten? 15 Nein, sie haben noch keinen. 16. Bleiben sie noch lange auf dem Lande? 17. Ich bleibe noch eine kurze Zeit da, und auch meine Freunde 18. Gehen Sie heute noch spazieren? (Sect. 65. I.) 19. Nein, denn ich muß noch arbeiten. 20. Die Freudenthränen der lang getrennten Freunde rührten die Herzen aller Zuschauer. 21. Können sie die Waaren nicht billiger verkaufen? 22. Es ist rein unmöglich. 23. Sie müssen dieses anders machen 28 Was kann ich anders thun? 24. Du kannst anders reden und

handeln. 25. Ich werde Sie besuchen, wenn Sie es erlauben. 25. Er erzählte die Sache ganz anders. 26. Es ist etwas anderes, ob ich schreibe: er ist „gelehrt," oder „gelehrt."

1. Has the teacher taken away the paper or the book? 2. He has taken away both; then both belong to him. 3. Both towns are situated on navigable rivers. 4. They may take either way, as they have proceeded so far. 5. A great part of the land in America is still uncultivated. 6. He who wants the purpose, must will the means. 7. The Rhine steamboat has just set sail for Holland. 8. You err altogether when you say that you have quite surmounted every difficulty, otherwise all that you have stated would be correct. 9. Which of us is right, I or he? 10. You are both wrong. 11. It is quite another thing to say that he was not well, and could not come in consequence of it. 12. I shall speak no more about it; because I have found upon closer investigation, that he is neither covetous, nor prodigal. 13. They do not think themselves better than others. 14. Emma is just as intelligent as Elisa.

Section XXXIV.

Verbs active in form with passive signification.

I. The infinitive of the *active* voice, in certain phrases, is, especially after the verb Sein, often employed in a *passive* signification. Ex.: Er ist zu ehren; he is to *be honored*. Er ist zu loben; he is to *be praised*. Laß ihn rufen; let him *be called*. This use of the infinitive prevails to some extent in English. Thus, we may translate literally the following examples: Dieses Haus ist zu vermiethen; this house is to let. Sind diese Aepfel zu essen? are these apples to eat? Dieses Wasser ist zu trinken; this water is to drink. Dieser Knabe ist zu tadeln; this boy is to blame.

II. Heißen, signifies, to name, to call; also sometimes to command. In the sense of naming or calling, it is most generally used in a *passive* signification. Ex.: Wie heißen Sie? How *are* you *called*? or, what *is* your name? Ich heiße Rudolph; my name is Ralph.

Exercise 38.

Aus'sprache, *f.* pronunciation;	Heißen, to name (See II.);	Uebung, *f.* practice, use;
Bei tragen, to contribute;	Her'stellen, to restore, re-establish;	Ueberre'den, to persuade;
Braunschweig, *n.* Brunswick;	Himmel, *m.* (the) heavens, sky;	Ue'berschuh, *m.* overshoe;
Durch, through, by means of;	Jakob, *m.* James;	Ueberzeu'gen, to convince;
Einzig, single, only;	Je-deste, or je-je, the-	Vermie'then, to let;
Erklim'men, to climb;	the (Sect. 31. VI.);	Vergei'hen, to pardon,
Erler'nen, to learn;	Kunstwerk, *n.* work of art;	excuse;
Gewin'nen, to win, gain;	Mühe, *f.* pains, toil;	Vollkom'men, perfect;
Glückse'ligkeit, *f.* felicity;	Ohne, without;	Werthvoll, valuable.
	Schnell, quick, rapidly;	

Ein böses Gewis'sen ist nicht zu beru'higen.	An evil conscience is not to be quieted.
Ein Gelehr'ter ist leichter zu überzeu'gen, als ein Dummer.	A learned man is easier to convince, than a stupid (one).
Weisheit, ist nicht wie eine Waare zu kaufen.	Wisdom is not to be bought like wares.
Die Rose heißt die Kö'nigin der Blumen.	The rose is called the queen of flowers.
Der Löwe heißt der König der Thiere.	The lion is called the king of the beasts.

1. Diese großen schönen Häuser sind alle zu vermiethen. 2. Das eine Haus ist zu vermiethen, das andere zu verkaufen. 3. Es ist nicht zu glauben, daß er uns verlassen hat. 4. Dieses Buch ist bei Herrn Westermann in Braunschweig zu haben. 5. Kein einziger Stern war am ganzen Himmel zu sehen. 6. Wie ist dieses lange Wort auszusprechen? 7. Wo sind die besten Stiefel, Schuhe und Ueberschuhe zu finden? 8. Die besten, die ich gesehen habe, sind bei meinem alten Nachbar N. zu finden. 9. Das Feuer brannte so schnell, daß nichts im Schlosse zu retten war. 10. Nichts Werthvolles ist ohne Mühe zu gewinnen. 11. Dieser hohe Felsen ist nicht zu erklimmen. 12. Dieses alte Haus ist nicht mehr herzustellen. 13. Durch diesen Wald ist nicht zu kommen. 14. Er ist weder zu überzeugen, noch zu überreden. 15. Sein Betragen ist gar nicht zu vergeihen. 16. Wie heißt Ihr Freund? 17. Er heißt Jakob. 18. Wie heißt das auf Deutsch? 19. Es heißt eine Brille. 20. Ein Kunstwerk ist desto schöner, je vollkommener es ist, das heißt, je mehr Theile es hat und je mehr alle diese Theile zum Zwecke beitragen.

1. The pronunciation of foreign words is only to be acquired through practice. 2. Nothing is to be learned without pains. 3. Perfect felicity is not to be found in this world. 4. You speak so quick, that you are not to be understood. 5. Health is not to be bought with money. 6. The peace of the town was not to be restored through severe orders. 7. How do you call these flowers? 8. They are called tulips. 9. The intelligent scholar is to be praised. 10. The difference between to buy and to sell, must, by this time, be known to the scholar. 11. This book is to be had of the bookseller C. in London.

LESSONS IN ENGLISH.—No. XX.

By John R. Beard, D.D.

SUFFIXES (*continued*).

There is nothing that will more help to form an English heart in ourselves and in others than the study of the English language. We could scarcely receive a single lesson on the growth of our English tongue, we could scarcely follow up one of its significant words, without having unawares a lesson in English history as well; without not merely falling on some curious fact illustrative of our national life, but learning also how the great heart which is beating at the centre of that life was gradually shaped and moulded. We should thus grow, too, in our feeling of connexion with the past, of gratitude and reverence to it; we should estimate more truly, and therefore more highly, what it has done for us, all that it has bequeathed us, all that it has made ready to our hands. It was something for the children of Israel when they came into Canaan, to enter upon the wells which they digged not, and vineyards which they had not planted, fields which they had not sowed, and houses which they had not built; but how much greater a boon, how much more glorious a prerogative, for any one generation to enter upon the inheritance of a language which other generations by their truth and toil have made already a receptacle of choicest treasures, a storehouse of so much unconscious wisdom, a fit organ for expressing the most subtle distinctions, the most tender sentiments, the largest thoughts, and the loftiest imaginations, which at any time the heart of man can conceive.*

Ette, of French origin, is found in words taken from the French; as, coq*uette*, etiq*uette*. *Coquette* is, with us, applied to a female who employs her personal attractions to gain attentions from males. In French, there is the word coquet, *a male coquette*. Coquet seems to come from coq, *a cock*, a showy and uxorious animal; and accordingly, it signifies a man who resembles a cock in his attention to woman. By a natural step, in the progress of language, the term was applied to females.

Etiquette is the same word as our *ticket*, and originally denoted the short inscriptions, or tickets put on packages of goods to point out what they contained. But similar etiquetts or tickets were employed to declare certain observances required in a public assembly; and so the word came to signify *forms* and *formalities*, a strict regard to custom, and in general, social conventionalism, particularly in relation to deportment.

> "*Coquet* and coy at once her air,
> Both study'd, though both seem neglected;
> Careless she is with artful care,
> Affecting to seem unaffected." *Congreve.*

Eur, a French termination, from the Latin *or*; thus vend*eur* (a seller), is from the Latin vendi*tor*; proditeur, *a betrayor*, from Latin proditor. It is similar in import to our ending *er*, and denotes an actor; e. g., producteur, Fr. *a producer*. Of old many English words, now terminating in *or*, terminated in *eur*; as author for author. The termination is still retained in certain nouns denoting abstract qualities; for instance, grandeur (Lat. grandis, *great*); hauteur (Fr. haut, *high*), derived immediately from the French. The notion of the actor is retained in the French douceur (from doux, *sweet*), *a sweetener*; *a fee*, or *bribe*.

Ever, connected in origin with the Latin aevum, *age*; and the Greek aion, *age*, come to us directly from the Anglo-Saxon *aefre*,

* French "On the Study of Words," p. 35-6.

and signifies *always*, an enduring reality, either in time past (Ps. xxv. 6; xc. 2), time present (Ps. cxix. 98), or time to come (Ps. cxi. 5). *Ever*, as a suffix, strengthens the word to which it is appended, thus: "what*ever* you do" has more force than "what you do." *Ever* is found in other compounds; e. g., who*ever*, how*ever*, where*ever*, when*ever*. Additional force is given by the insertion of the particle *so*; as, whoso*ever*, whencesoever, whithersoever. This *so* used to stand where *ever* is now placed; as, whoso, howso, whatso.

"Her cursed tongue (full sharp and short)
Appeared like aspis' sting, that closely kills,
Or cruelly does wound *whomso* she wills."
Spenser, "Faerie Queene."

Full, of Saxon origin, obviously the same as the adjective *full*, gives an instance of the origin of these particles in words which originally had a definite form and signification. According to its root-meaning, *full* (now in combination written *ful*) denotes a large portion of the quality indicated by the word to which it is affixed; as, hate, hate*ful*; thank, thank*ful*; grate*ful*, delight*ful*. *Full* has for its opposite *less*; e. g., merci*ful*, merci*less*. In the employment of words, you cannot follow analogy alone, but must consult authority, thus: you may say penni*less*, but cannot say penni*ful*; yet piti*ful* is as good as piti*less*.

"How oft, my slice of pocket store consum'd
Still hungering, *penyless*, and far from home,
I fed on scarlet hips and stony haws." *Cowper*, "Task."

Fy, is from the Latin facio, *I make*. *Facio*, in combination, becomes *ficio*; as in ef*ficio*. The *fi* in this word, written *fy*, is the particle under consideration. It is seen in fructi*fy*, literally, *to make fruit*; that is, *to make fruitful*.

"Calling drunkenness, good-fellowship; pride, comeliness; rage, valour; bribery, *gratification*."—*Bishop Morton*.

Head or *hood*, from the Saxon had, *head*, in composition, denotes the *essence* of any person or thing; its essential condition, viewed as a whole; thus, in Anglo-Saxon and English, manhad, *manhood*; wifhad, *wifehood*, or *womanhood*; cildhad, *childhood*; brotherhad, *brotherhood*; preosthad, *priesthood*.

"Can'st thou, by reason, more of *godhead* know,
Than Plutarch, Seneca, or Cicero."
Dryden, "Religio Laici."

Head is sometimes employed with a more direct reference to the meaning which it has in current use; as in wrong*head* and wrong*headed*.

"Much do I suffer, much to keep in peace,
This jealous, waspish, *wrongheaded*, rhyming race." *Pope*.

"Whether we [the Irish] can propose to thrive so long as we entertain a *wrongheaded* distrust of England?"—*Bishop Berkeley*.

After a similar manner we use both *heart* and *head*, in faint*hearted*, light*hearted*, hot*headed*, light*headed*, &c.

Ible, see *able* formerly explained under *suffixes*.

Ic, ick, ich, have counterparts in the Latin termination *icus*, and the German *ich*, *isch*; as soporific*us* (sopor, Lat. *sleepiness*), soporific, rustic*us* (rus, Lat. *the country*), rustic, cildis*e* in Anglo-Saxon, childish in English; book*ish*.

"The sweet showers of heaven that fall into the sea are turned into its *brackish* taste."—*Bates*.

Ical, an adjective-ending, from the Latin *icalis*; e. g., amic*alis*, amic*al* (friendly), grammat*icalis*, grammat*ical*, so crit*ical* (krino, Gr. *I judge*), which passes into a noun by dropping *al*, as critic; so mus*ical*, music, myst*ical*, mystic.

"Fool, thou didst not understand
The *mystic* language of the eye nor hand." *Donne*.

Ile, from the Latin adjective termination *ilis*, to be seen in doc*ilis* (doceo, Lat. *I teach*), *docile*, *teachable*; fragi*lis* (frango, Lat. *I break*), *fragile*, *easily broken*. Some Latin adjectives in *ilis* are represented by adjectives in *ful* in our tongue, as ut*ilis*, use*ful*.

In, ine is from the Latin termination *inus*, which denotes sometimes a name, as Tarentin*e*, an inhabitant of Tarentum, but in English more often a quality, as genu*inus* (genus, Lat. *a kind* or *race*), genuine; that is, that which possesses the qualities belonging to its kind, in opposition to spurious, which, in its Latin meaning, signified a *bastard*.

——"We use
No foreign gums, nor essence fetch'd from far,
No volat*ile* spirits, nor compounds that are
Adulterate; but at Nature's cheap expence
With far more genu*ine* sweets refresh the sense." *Carew*.

ANSWERS TO CORRESPONDENTS.

LATIN.—J. R.: In Lesson IX., "norse" qualifies "nothing," and must therefore agree with gender, number, and case. Your statement under "2nd" is incorrect; consult the Lesson, and do not make unnecessary inquiries; your letter has other proofs of haste or want of care. The specimen of your Latin is pretty well; consult the Key.—VINCIO will act foolishly if he quits the Latin so soon as our present series of lessons is completed. By running from one thing to another, he will become master of nothing. Every aid that marks of accentuation can give, is given in the Lessons; only from a living tongue can complete accuracy be obtained.

T. R. N.: We do not remember receiving his communications, and we have a tolerably good memory. Can he kindly *suppose*, not to say charitably *believe*, that WE, THE EDITOR, never received them?—W. O. M. (London): We are not aware that there is at present any professed teachers of *artificial memory* going about town or country.—J. M.: In the sentence alluded to *that* is used for the relative *which*, the antecedent being *years*, and is therefore the nominative to the verb *have*.—AMICUS: See the regulations for the degree of M.A. in the "London University Almanac." Your solution of the snail query is wrong.—W. MOORE (Chelsea): If he will send a list of words requiring explanation it will be given.—J. J. (Aberdeen) must send us a correct copy of the inscription; there is an error in it.—Correct answers to the snail query have been received from J. S. (Woodhall Colliery); A YOUTH TEN YEARS OF AGE (Easington-lane), beautifully done; ISAK (Leicester), still more beautifully done; S. M. P. (Shoreswood); EUPHEMIA SMEATON (Portobello); and others.—A SUBSCRIBER (Piccadilly) should by all means study the Lessons in English *first*.—CONSTANT READER (Dartmouth), and J. O. N. (Liverpool) have not come up to the requirements of the nine-digit-square query.—INQUIRER (Wakefield): The Lessons will ultimately be published as he wishes; in the meantime, we recommend the P. E. or Dr. Beard's "Latin Made Easy," see note, col. 2, page 72, vol. I. P. E.—B. A. S. S.: Apply to the Rev. J. Curwen, Plaistow, by letter.—HENRICUS: Go on and prosper; study the Lessons in Penmanship in the P. E. and Cassell's Arithmetic and Euclid, with the Lessons on the same in the P.E., and then apply to the Normal school nearest to your residence.—J. GOUGH (Liverpool): Thanks for his suggestion; as to eyes, ours are not the best, but we advise him to let doctoring them alone; the improvement of the general health will do all that is required. You know "if one member suffer all the members suffer with it," so, if all the members improve by health so will the eyes.—E. TUCKER (Cheapside): The P. E. Lessons, of course, for the German; and the same for the Spanish when they come out.—J. THURLOW (Minories): We stated repeatedly that this office supplies covers for the P. E. only at the prices 1s for the common edition, and 1s. 6d. for the fine edition. If it is wanted to be bound in any other style, application must be made to regular *bookbinders*.—J. G. jun. (Kelso): As his answer to the snail query is wrong, we do not insert his proposed query; besides we cannot read the word of whose spelling he is doubtful. In the German words the *f* and the *s* are pronounced, and not the *p*.—G. A. jun. (Liverpool): It is now too late to alter our plan; but the two volumes can still be bound together, and the title-pages and indexes retained. There is an *Illustrated Edition of Uncle Tom's Cabin*, issued by Mr. Cassell, price 1s., in boards; and George Cruikshank, Esq., has undertaken to illustrate this surprising tale by 27 drawings from his inimitable pencil, to be published in Weekly Numbers, price 2d. each, the first of which is issued this day.

AMICUS (Liverpool): Whateley's.—M. J. (Belfast) surprises us; here we have FOUR important languages, carrying on from week to week in our penny numbers, besides other important, useful, and varied information, and yet he wants a FIFTH language put in, and all for a *penny!* Greek SHALL be given; but WE MUST take our own time; reason's reason. Because HE FINDS a difficulty in learning Greek nouns, probably in some bad Grammar, this is no reason why we should throw all our numerous students of other subjects overboard, in order to serve him! And he is not alone; we have numerous correspondents like him *every day*; to satisfy all of whom, would require a book as large as the Bible to be given to them every week for a penny. We hope some of our readers will take this friendly hint, and be more considerate in future. We shall do all in our power *to please all*; but we cannot do impossibilities.—W. M. R. W.: We are doubtful if he can Matriculate at the London University, without going under the wing of *some tutor*, but we advise him to try; we have sometimes seen attached to the name of one who passed the Matriculation examination successfully, the words *private tuition*.—A. S. W.: The words Russia and Prussia, are pronounced exactly as they are spelt.

LITERARY NOTICES.

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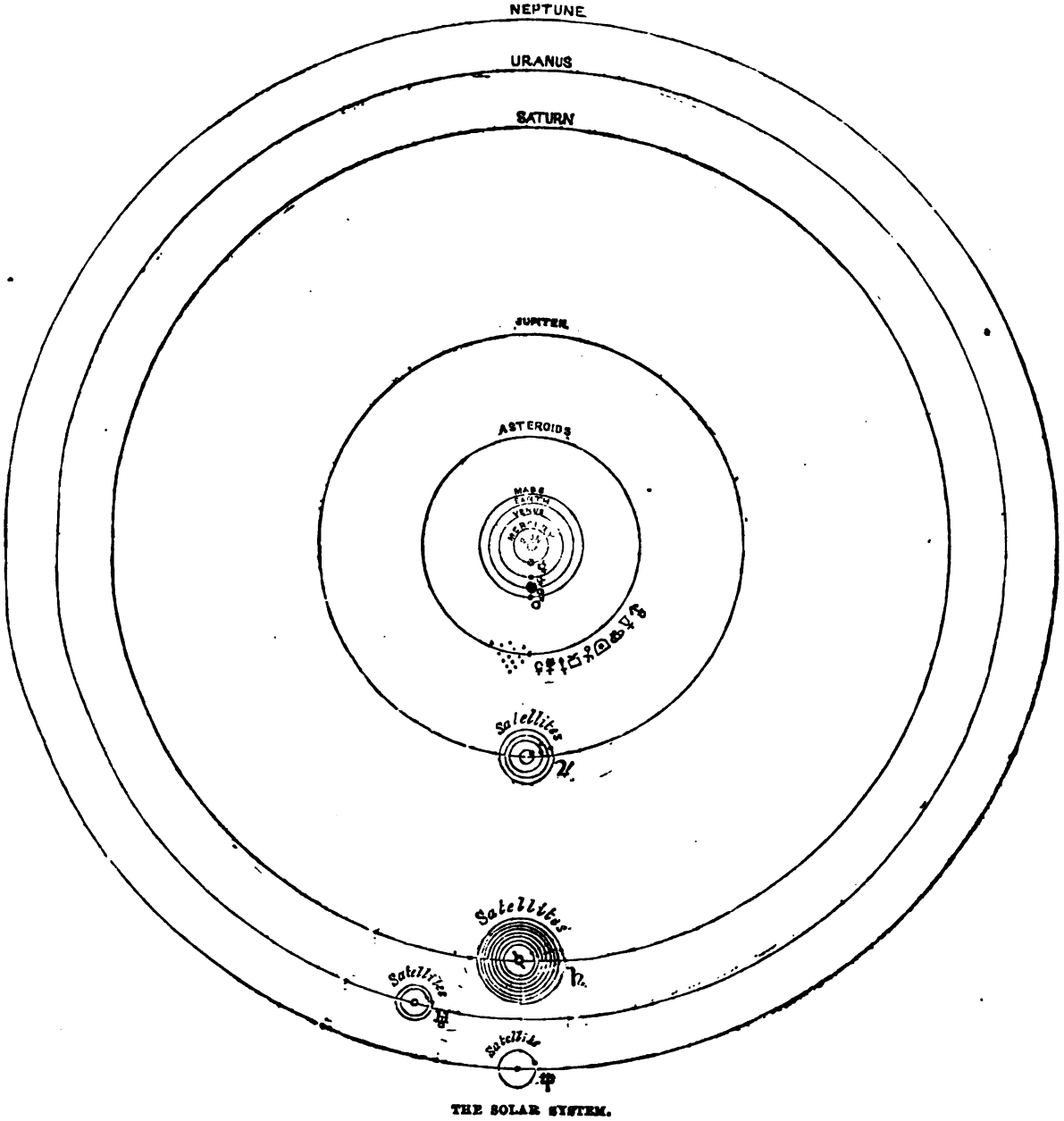
LESSONS IN GEOGRAPHY.—No. XIII.

(*Continued from p. 35, col. 1.*)



THE SOLAR SYSTEM.

OLDER ASTEROIDS.	NEWER ASTEROIDS.	OLD PLANETS.	NEW PLANETS.
⚶ Vesta.	⚷ Flora.	☿ Mercury.	♅ Uranus
⚵ Juno.	⚘ Iris.	♀ Venus.	♆ Neptune.
⚳ Ceres.	⚮ Metis.	⊕ The Earth.	
⚴ Pallas.	⚍ Hebe.	♂ Mars.	
	⚸ Astræa.	♃ Jupiter.	
		♄ Saturn.	

In our last lesson, we explained the nature of Bode's law of the distances of the planets so far as to show that, in the series of numbers which represented this law, there was a gap or chasm between the numbers 16 and 52, which required to be filled up in the following manner, to render the series complete; thus,

$$28=4+3\times2\times2\times2.$$

The discovery of the planet Uranus by Sir W. Herschell, about nine years after the announcement of this law by Bode, confirmed the truth of the series, by showing its applicability to the remotest known planet in the solar system. Had there however, been a planet revolving in the space between Mars and Jupiter, and had it been called *Pluto*, and another called *Neptune* beyond Uranus, then the series would have been so far complete, and the law would have been completely verified. The series would then have stood as follows, with the names of the planets in the order of their distances from the Sun, and the proportionate numbers representing those distances:

Mercury,	$4=4$
Venus,	$7=4+3$
The Earth,	$10=4+3\times2$
Mars,	$16=4+3\times2\times2$
Pluto,	$28=4+3\times2\times2\times2$
Jupiter,	$52=4+3\times2\times2\times2\times2$
Saturn,	$100=4+3\times2\times2\times2\times2\times2$
Uranus,	$196=4+3\times2\times2\times2\times2\times2\times2$
Neptune,	$388=4+3\times2\times2\times2\times2\times2\times2\times2$

With this singular empirical *(the result of trial)* law before them, astronomers, still harping upon the numerical analogies of nature from the time of Kepler, and even from that of Pythagoras till now, were surprised, on the first day of the present century, by the discovery of a planet nearly in the place where our *supposed Pluto* should have been found, namely *Ceres;* and within seven years thereafter, by the discovery of *other three*, revolving nearly at the same distance, but in different orbits, all intersecting each other. The original remarks of Titius on the subject of the law thus so singularly verified will not be unacceptable to some of our readers; we extract them from Humboldt's "Cosmos:"—"If" says he, "we examine the distances of the planets we find in almost all a proportion between their distances apart and the increase of their corporeal magnitudes. If the distance from the Sun to Saturn gives [be divided into] 100 parts, then Mercury is distant 4 such parts from the Sun, Venus $4+3=7$ parts from the Sun, the Earth $4+6=10$, Mars $4+12=16$. But from Mars to Jupiter we come to a departure from this progression previously so exact. Beyond Mars there follows a space of $4+24=28$ such parts; but here we find neither primary planet nor satellite. Can we suppose that the Great Architect has left this space void? We must not doubt that it is occupied; it may be by the hitherto undiscovered satellites of Mars, or Jupiter may have additional satellites that have never yet been seen by any telescope. From this unknown interval (unknown as to that which occupies it) the space to Jupiter is $4+48=52$. Then follows Saturn at the solar distance $4+96=100$ parts—an admirable proportion!" Titius therefore, imagined the interval between Mars and Jupiter to be occupied with several bodies belonging to our system; but he conjectured them to be satellites and not planets. And as far, indeed, as their magnitudes are concerned, they partake more of the nature of the former than of the latter, being all so small that none of them can be seen without the aid of a telescope. Hence they are frequently called *telescopic* planets.

The failure of the law of Titius in the case of the first planet in the solar system, was clearly pointed out by Gauss, in words to the following purport, on the occasion of the discovery of Pallas by Dr. Olbers, in 1802:—"Contrary to the nature of all truths which deserve the name of laws, that of Titius applies only in a very cursory manner to most of the planets, and (which does not appear to have been before remarked) not at all to Mercury. It is clear that the series 4, $4+3$, $4+6$, $4+12$, $4+24$, $4+48$, $4+96$, $4+192$, with which the distances should agree, is not a continuous series. The number preceding $4+3$, ought not to be 4, that is $4+0$, but $4+1\frac{1}{2}$; for in the general expression, which includes all the terms, namely $4+3\times2^{n-2}$, when $n=1$, the result is not 4 but $5\frac{1}{2}$! Attempts to discover such proximate agreements in nature are, however, by no means to be censured; the greatest men of all periods have been fond of such *lusus ingenii*," *jeux d'esprit*, or *plays of the understanding*.

Another fine specimen of the lusus ingenii was given out by Dr. Olbers. On the discovery of the first three telescopic planets, he conjectured that they were the fragments of one large planet, our *supposed Pluto*, which had formerly existed and revolved in the space between Mars and Jupiter, at a distance corresponding exactly, or nearly so, to the law of Titius or Bode; and which had been burst asunder by some tremendous convulsion of nature. He concluded also, that, although the orbits of these planets, were differently inclined to the ecliptic, yet, as they must all have diverged from the same point, they ought to have two common points of union, or two nodes (points of intersection) in opposite regions of the heavens through which all these planetary fragments must sooner or later pass. One of these nodes he found to be in the constellation Virgo, and the other in the Whale, in the latter of which Mr. Harding actually discovered Juno. With the intention, therefore, of detecting other fragments of this supposed planet, Dr. Olbers examined thrice every year all the little stars in these constellations, when his labours were rewarded by the discovery of *Vesta* in the constellation Virgo! Notwithstanding this singular fact, we find Sir John Herschell writing as follows so late as 1834:—"It has been conjectured that the ultra-zodiacal planets are fragments of some greater planet, which formerly circulated in that interval [between Mars and Jupiter], but has been blown to atoms by an explosion; and that *more such fragments exist, and may hereafter be discovered*. This may serve as a specimen of the dreams in which astronomers, like other speculators, occasionally and harmlessly indulge!" Dr. Olbers did say that "we might expect to discover in the same region more such fragments describing an elliptic orbit round the sun;" but the ridicule, not to say the supposed profanity, which was attached to such a conjecture, no doubt prevented other astronomers from attempting to verify it by new discoveries; for a period of no less than thirty-eight years elapsed before any addition was made to these fragmentary planets in the solar system. At last the idea was again revived by the discovery of *Astræa*, on the 8th of December, 1845; and from that period to the moment at which we now write, 18th of October, 1852, no less than TWELVE NEW PLANETS, fragments of our *supposed Pluto*, have been discovered revolving all in the same region of space, and having their orbits all intersecting one another, nearly at the same distances from the sun. We say *twelve new planets*, for although we inserted only *eleven* in the table of the solar system in our last lesson, we have since found that Mr. Hind has discovered in the same region a new planet, which he calls *Fortuna*, and which is supposed by some to be the same with a new planet, said to be very recently discovered at Marseilles, and hence called Massilia. Attempts, indeed, have been made to prove the truth of the hypothesis of Dr. Olbers regarding the origin of these planets by a Mr. Kirkwood, in America, who has imagined it possible to undertake the restoration of the original shattered planet from the surviving fragments, after the manner followed in regard to the remains of extinct animals. He assigns to the planet—our *supposed Pluto*—a diameter larger than Mars (about 4,320 miles), and a rotation slower than that of any other planet, making the length of its day 57 hours and a-half. Thus we see that, both in earth and in heaven, both underground and above it, there are phenomena daily and hourly taking place, if we would but observe them, which are calculated to strike the mind with awe, and even with fear, at the wonderful arrangements of the Great Creator. Geology teaches us that underground there is a great central fire which occasions frequent disruptions of the earth's crust in different parts of the world; and we know that the power of this fire or central heat is only restrained by *His word* from producing effects of the most disastrous kind to the numerous tribes of living creatures which dwell on the surface of the globe, and to man himself, the lord of the lower creation. Astronomy teaches us that such events have taken place above ground in the regions of the solar system; and that there some vast central fire has created an explosion which shattered in pieces a planet like our earth, and sent the fragments revolving in space around the sun, a series of shapeless masses, telling their tale of disaster to all the other planets which revolve like them around that great central luminary.

In the preceding sentence, we have called the new planets *shapeless*, because they are not, like most of the other planets; round or globular, a form which they have acquired from the action of the law of gravity; but they are of an irregular figure, such as they might naturally be supposed to have as fragments of a disrupted planet. If the law of Titius, of which there can be little doubt, led in any way to these remarkable planetary discoveries in one region of the heavens, another discovery has been made on the confines of the planetary or solar system, which tends completely to overthrow it, or, at least, to render its application as great a failure towards the end of the series as at the beginning. We have seen that, according to the general expression for the law in question, the distance of Mercury, instead of being represented by the number 4, ought to have been represented by the number 5·5; and we know, in fact, that it is most truly represented by the number 3 87, which is the real proportional distance given by all astronomers. Now, the discovery of a new planet, *not supposed*, but actually called *Neptune*, in September, 1846, considerably beyond Uranus, has failed to verify the law of Titius in a very remarkable degree; insomuch that its proportional distance, which, according to that law, as seen in the above table, ought to be 388, is found only to be 300; and, instead of having the *seventh power* of 2 in the expression for this distance, the number which we should expect to find, it has only a power denoted by the mixed number 6½. Whether a planet may yet be found revolving at the supposed proportional distance of 388, in order to confirm the Titian law, can only be decided by the future fact; at present we must remain in doubt; but it would be rash to conclude that, because this law has failed in the case of Neptune, therefore it has no real foundation in nature. The whole series may possibly be included in some greater or more comprehensive series which follows a different law, and which may yet include that which we believe has led to so many remarkable discoveries in our own times.

In page 61 we have given an approximate representation of the solar system, which might be supposed to be visible from the lofty eminence imagined in a former lesson; but from the necessary smallness of its size, it fails to give so accurate an idea of the actual forms of the orbits as could be wished. It is well known that these orbits are all oval-shaped or elliptical, and that they are all inclined to the plane of the ecliptic (the earth's orbit) at different angles. These circumstances would occasion the orbits to have different appearances according to the nature of the inclinations. This cannot be represented in a bird's-eye view like the present; all that can be seen in such a representation, is the comparative or proportionate distances of the planets from the sun; and even in this respect, owing to the immensity of the distances of Uranus and Neptune, the representation is not exact. We have endeavoured to make it very nearly exact as far as concerns all the planets up to Saturn, but beyond this point, the distance between the orbits of Saturn and Uranus ought to be nearly equal to the distance of Saturn's orbit from the Sun; and the distance between the orbits of Uranus and Neptune ought to be somewhat more than the distance between those of Saturn and Uranus. The planets, with their astronomical marks, are of course not arranged according to any actual configuration of the solar system, but simply in a line, so that their relative distances and orbits may be readily recognised. Neither, of course, can the orbits of their satellites be supposed to be arranged in scientific order; but only in a popular manner, to convey some idea of the actual facts of the case. As to the asteroids or new planets, it was literally impossible to exhibit their orbits on so small a scale, we have therefore only exhibited a sort of mean orbit of the whole, such as might be supposed to be that of our imaginary planet, *Pluto*.

The planet Uranus was considered by its discoverer, Sir William Herschell, to have six satellites; but as only two have been considered as decidedly observed by other astronomers, we have only marked that number on our diagram. Sir John Herschell says, in the treatise on astronomy above cited:—"These anomalous peculiarities have hitherto rested on the sole testimony of their discoverer, who alone had ever obtained a view of them. I am happy to be able, from my own observations from 1828 to the present time [1834], to confirm in the amplest manner my father's results." It is but justice to add the remarks of Humboldt in his "Cosmos" upon this subject: "In the course of the 56 years which have elapsed since the latest discovery (that of the 3rd satellite) the existence of so many as six satellites has been often, but unduly, *doubted*. Hitherto the satellites of Uranus which have been seen again are the 1st, 2nd, 4th, and 6th, to which may perhaps be added the 3rd according to Lassell's observations of the 6th November, 1848. The 2nd and 4th satellites are those which have been seen again earliest, most certainly, and most frequently; in Europe and at the Cape of Good Hope by Sir John Herschell, and subsequently by Lamont at Munich, and Lassell at Liverpool. The 1st satellite of Uranus was rediscovered and observed by Lassell from the 14th of September to the 9th of November, 1847, and by Otto Struve, from the 8th of October to the 10th of December, 1847; and the outermost or 6th satellite by Lamont, on the 1st October, 1837. The 5th satellite does not appear to have been seen again at all; and the 3rd not with sufficient certainty. By a kind communication from Sir John Herschell, dated 8th November, 1851, I learn that Mr. Lassell observed distinctly on the 24th, 28th, and 30th October, and 2nd November, 1851, two satellites of Uranus which appear to be still nearer to the planet than the 1st satellite of Sir W. Herschell."

The following table, constructed on the additional information obtained from Humboldt's "Cosmos," particularly a table of the "Elements of the 14 [now 16] small planets for their times of opposition in or near the year 1851," will be still more acceptable to many of our readers:—

ADDITIONAL TABLE OF THE SOLAR SYSTEM.

PLANETS.	Inclination of their orbits to the ecliptic.	Declination of their orbits to the equator.	Inclination of their axes to their orbits.	Excentricities of their orbits in parts of their mean distance.	Mean distance from the Sun, the Earth being unity.	Sidereal periods of revolution. Days.
Mercury...	7° 0′	28° 45′		0·20562	0·38709	87·96928
Venus... ..	3° 23′	24° 33′		0·00686	0·72333	224 70078
The Earth	0° 0′	23° 28′	66° 32′	0·01679	1·00000	365·25637
Mars	1° 51′	24° 44′	61° 18′	0 09322	1 52369	686·97964
Flora	5° 53′			0·15679	2·2018	1193·
Victoria ...	8° 23′			0·21792	2 3349	1303·
Vesta	7° 8′			0·08892	2·3612	1325·
Iris	5° 28′			0·23239	2 3855	1346·
Metis	5° 36′			0·12229	2 3862	1346·
Hebe	14° 47′			0 20186	2 4249	1379·
Fortuna ...					2·4409	1393·
Parthenope	4° 37′			0·09789	2·4483	1399·
Astræa ...	5° 19′			0 18875	2 5774	1511·
Egeria ...	16° 33′			0·08627	2·5825	1516·
Irene	9° 6′			0·16786	2·5849	1518·
Eunomia	11° 44′			0·18840	2·6476	1574·
Juno	13° 3′			0 25586	2·6687	1592·
Ceres	10° 37′			0 07647	2 7673	1681·
Pallas	34° 37′			0.23956	2·7729	1687·
Hygeia ...	3° 47′			0·10092	3·1614	2043·
Jupiter ..	1° 19′	23° 18′	86° 54′	0·04816	5·20277	4332·58480
Saturn ...	2° 30′	22° 39′		0·05615	9 53885	10759·21981
Uranus ...	0° 46′	23° 41′		0·04661	19·18239	30686·82051
Neptune...	1° 47′	22° 21′		0·00872	30 03628	60126 7

We shall now close this astronomical information, which has extended to a greater length than we intended, by inserting some particulars relating to the satellites of Jupiter, taken from the same source as above-mentioned:—

SATELLITES OF JUPITER.

No. of Satellites.	Period of Revolution.			Distances from Jupiter in his semidiameters.	Diameters in geograph. miles.	Masses compared with Jupiter.
	days.	hr.	min.			
1	1	18	28	6·049	2116	0·000017328
2	3	13	14	9 623	1900	0 000023236
3	7	3	43	15·350	3104	0·000088497
4	16	16	32	26 998	2656	0·000042469

LESSONS IN FRENCH.—No. XXX.

By Professor Louis Fasquelle, LL.D.

Section LXIII.

1. Faire connaissance, *to become* or *get acquainted*, takes the preposition *avec* before its object. Faire un mille, faire un voyage, faire un tour de promenade, mean *to go*, or *travel a mile, to go on a journey, to take a walk*:—

Nous avons fait vingt milles à cheval.	*We travelled twenty miles on horseback.*

2. Faire ses adieux, faire des emplettes, faire des progrès, faire des questions, faire du feu, correspond in signification to the English expressions, *to bid farewell, to make purchases, to improve* or *to ask questions, to make a fire*:—

J'ai fait mes adieux à mes parents.	*I bid farewell to my relations.*
Avez-vous fait du feu dans ma chambre?	*Have you made a fire in my room?*

3. Faire sortir means, *to send out*, or *to order out*; faire entrer, *to let in, to bid come in*; faire attendre, *to keep waiting*:—

Vous les avez fait entrer dans ma chambre.	*You made them come into my room.*
Vous avez fait attendre mon père.	*You made my father wait.*

4. Faire son possible, *to do one's best*, takes the preposition *pour*. Faire semblant, *to pretend*, faire usage, *to make use*, are followed by *de*:—

Nous avons fait notre possible.	*We have done our best.*

Résumé of Examples.

Nous avons fait connaissance avec eux.	*We became acquainted with them.*
Vous avez fait vingt lieues en dix heures.	*You travelled twenty miles in ten hours.*
Nous ferons un tour de promenade.	*We shall take a walk.*
Je lui ai fait plusieurs questions.	*I asked him several questions.*
Ils nous ont fait leurs adieux.	*They have bid us farewell.*
Vous nous avez fait attendre.	*You have made us wait.*
Cet enfant fait semblant de dormir.	*That child pretends to be asleep.*
Vous faites semblant de lire.	*You pretend to be reading*, or *do as if you were reading.*
Nous ferons notre possible pour le voir.	*We will do our best to see him.*

Exercise 125.

Aise, *glad.*	Se fâch-er, 1. *ref. to become angry.*	Négociant, m. *merchant.*
Aliment, m. *food.*		Quart, m. *quarter.*
Crédit, m. *credit.*	Faire l'aumône, *to give alms.*	Rarement, *seldom.*
Demand-er, 1. *to ask.*		Réuss-ir, 2. *to succeed.*
Dorm-ir, 2. ir. *to sleep.*	Laiss-er, 1. *to leave, let.*	Riz, m. *rice.*
Etude, f. *study.*	Mendiant, m. *beggar.*	

1. Seriez-vous bien aise de faire connaissance avec ce monsieur? 2. J'en serais bien aise. 3. Ce cheval fait-il une lieue et un quart d'heure? 4. Il a fait ce matin une lieue en douze minutes. 5. Leur avez-vous fait des questions? 6. Je leur en ai fait.* 7. Quelles questions leur avez-vous faites? 8. Je leur ai demandé s'ils avaient fait des emplettes? 9. Vos élèves font-ils des progrès dans leurs études? 10. Ils n'en font pas beaucoup, ils viennent rarement à l'école. 11. Si vous étiez chez vous, feriez-vous semblant de dormir? 12. Je ne ferais certainement pas semblant de dormir. 13. Pourquoi ne faites-vous pas entrer ce mendiant? 14. Ma mère vient de lui faire l'aumône. 15. Le négociant fait-il usage de son crédit. 16. Il en fait usage. 17. De quels aliments ce malade fait-il usage? 18. Il fait usage de riz et de bouillon. 19. Faites-vous votre possible pour réussir? 20. Je fais tout mon possible. 21. Avez-vous fait entrer ces enfants, ou les avez-vous fait sortir? 22. Je les ai laissés où ils étaient. 23. Vous avons-nous fait attendre? 24. Vous nous avez fait attendre plusieurs heures. 25. Si vous faisiez attendre ces dames, elles se fâcheraient.

Exercise 126.

1. Does that child pretend to read? 2. He pretends to read. 3. Does not that gentleman pretend to sleep? 4. He does not pretend to sleep, he sleeps really (*réellement*). 5. Will you take a walk this morning? 6. I would do so with pleasure, if I had time. 7. Have you become acquainted with the physician? 8. I have not yet become acquainted with him. 9. How many questions have you asked (*à*) the child? 10. I asked him many questions. 11. Have you asked him if he had studied his lesson? 12. I did not ask him. 13. Will not that little girl do her best to learn her lesson? 14. She will do her best to learn it. 15. Of what food do you make use when you are sick? 16. We make use of bread and rice. 17. Have you forgotten to bid farewell to your mother? 18. I had not forgotten it; I intended to go to her house this afternoon. 19. With whom have you become acquainted? 20. With the bookseller. 21. Do you not keep those ladies waiting? 22. I do not keep them waiting, they are not ready (*prêtes*). 23. Do I make you wait? 24. You do not make me wait. 25. Have you left your children in your room? 26. I have not done so (*le*). 27. Have you sent them out? 28. I have not sent them out, I have let them remain where they were. 29. Have you made purchases this morning? 30. I have made none, I have no money. 31. Has the servant made a fire in my room? 32. He has made one. 33. Will you do your best to come to-morrow? 34. I will do my best to come early. 35. We travelled yesterday forty leagues in sixteen hours.

* See Sect. 41, 11, and § 135 (7).

Section LXIV.

1. Faire is also used in the sense of *playing the part of*, or *pretending to be*:—

Il fait le grand seigneur.	*He plays the great lord.*

2. Faire also means *to matter, to concern, to help*:—

Cela ne fait rien.	*That is no matter.*
Cela ne vous fait rien.	*That is nothing to you, does not concern you.*
Qu'est-ce-que cela nous fait?	*What is that to us?*
Je ne puis qu'y faire.	*I cannot help it.*

3. Se faire mal conjugated reflectively, means *to hurt one's self*. Se faire is used reflectively in the sense of the English verbs, *to become, to turn*. It is, also, used with the signification of the words *cause, have, get*, &c. Se faire takes *être* as its auxiliary [§ 46, Sect. 44]:—

Je me suis fait médecin.	*I have become a physician.*
Je me suis fait faire une paire de bottes.	*I have had a pair of boots made for me.*
Je me suis fait raser.	*I have had my beard shaved.*
Nous nous sommes fait couper les cheveux.	*We have had our hair cut.*
Je me suis fait mal au doigt.	*I have hurt my finger.*

4. Besides the instances mentioned [Sect. 32, R. 5], faire is used unipersonally in many idiomatic expressions:—

Il fait jour, il fait nuit.	*It is daylight, it is night.*
Il fait de la boue, il fait de la poussière.	*It is muddy, it is dusty.*
Il fait clair de lune, il fait obscur.	*It is moonlight, it is dark.*
Il fait bon ici, il fait cher ici.	*It is comfortable here, it is dear here.*

Résumé of Examples.

Ce jeune homme fait le savant.	*That young man plays the learned man.*
Cela ne me fait rien.	*That is nothing to me.*
Que pouvons-nous y faire?	*What can we do to it?*
Mon frère s'est fait orfèvre.	*My brother has turned goldsmith.*
Pourquoi vous faites-vous raser?	*Why do you get shaved?*
Je me ferai couper les cheveux.	*I will have my hair cut.*
Je me suis fait bâtir une maison.	*I have had a house built for me.*
Nous nous sommes fait mal à la tête.	*We have hurt our heads.*
Il commence à se faire tard.	*It is beginning to grow late.*
Fait-il cher vivre à Paris?	*Is it dear living in Paris?*
Il fait beaucoup de boue.	*It is very muddy.*

Exercise 127.

Absolument, *absolutely.*	Etudiant, m. *student.*	Peintre, m. *painter.*
Artisan, m. *mechanic.*	Fou, folle, *fool, simpleton.*	Personne, m. *nobody.*
Bijoutier, m. *jeweller.*		Tanneur, m. *tanner.*
Bon marché, *cheap.*	Impertinent, e, *impertinent.*	Vigneron, m. *vine-dresser.*
Chagriné, e, *vexed.*		
Denrées, f. p. *provisions.*	Ouvrier, m. *workman.*	Vitrier, m. *glazier.*

1. Pourquoi cet ouvrier fait-il le malade? 2. Il fait le malade parcequ'il n'a pas envie de travailler. 3. Cet étudiant ne fait-il pas le savant? 4. Il ne fait pas le savant, il fait le fou. 5. Sied-il à ce jeune homme de faire le maître ici? 6. Il ne sied à personne de faire l'impertinent. 7. Cela fait-il quelque chose? [R. 2.] 8. Cela ne fait absolument rien. 9. Cela peut-il faire quelque chose à ces vignerons? 10. Cela ne

leur fait rien du tout. 11. N'êtes-vous pas bien chagrinés de cela? 12. Nous en sommes bien fâchés, mais nous ne pouvons qu'y faire. 13. Votre associé ne s'est-il pas fait bijoutier? 14. Non, Monsieur, il s'est fait peintre. 15. Cet artisan ne s'est-il pas fait vitrier? 16. Il s'est fait tanneur, et son frère s'est fait soldat. 17. La modiste ne s'est-elle pas fait couper les cheveux? 18. Elle se les est fait couper. 19. Ne vous levez-vous pas aussitôt qu'il fait jour? 20. Oui, Monsieur, je me lève de très bonne heure. 21. Ne fait-il pas clair de lune? 22. Il fait très clair, mais il ne fait pas clair de lune. 23. Fait-il bon vivre en Amérique? 24. Il fait très bon vivre en Amérique, les denrées y sont à bon marché.

Exercise 128.

1. Does not that gentleman play the learned man? 2. He plays the lord and fool at the same time (*à la fois*). 3. Does not that boy pretend to be sick? 4. He pretends to be sick, he does not wish to study his lessons. 5. When you have no wish to work do you pretend to be sick? 6. I never pretend to be sick. 7. Is it muddy to-day? 8. It is not muddy, it is dusty. 9. Will it be moonlight this evening? 10. It will not be moonlight, it will be very dark. 11. Is it comfortable here? 12. It is very comfortable. 13. Is it too warm or too cold? 14. It is neither too warm nor too cold here. 15. Will you have your hair cut? 16. I had my hair cut yesterday morning. 17. Will you not go home, it is beginning to grow late? 18. Is it not very dark out? (*dehors.*) 19. It is not dark, it is moonlight. 20. Has not the glazier turned goldsmith? 21. He has not turned goldsmith, he has turned soldier. 22. Does that concern your brother? 23. That does not concern him. 24. Are you not sorry for that? 25. I am sorry for it, but I cannot help it. 26. Why do you get shaved? 27. Because I cannot shave myself. 28. Have you not hurt those children? 29. I have not hurt them. 30. Have you hurt your arm? 31. No, Sir, but I have hurt my head. 32. Has not your sister hurt her hand? 33. She has hurt her hand, and my mother has hurt her elbow. 34. Have you not hurt your head? 35. I have not hurt my head, but I have hurt my hand.

Section LXV.

1. Avoir mal means *to have a pain or ache, a sore.* When used in relation to one of the limbs, it means generally, *to have a sore, a bruise, a cut,* &c. The name of the part of the body is preceded by the preposition *à* and the article [*See* Sect. 62, R. 5, § 77 (9)]:—

N'avez-vous pas mal au doigt?	*Have you not a sore finger?*
Je n'ai pas mal à la tête.	*My head does not ache.*

2. Avoir une douleur, or des douleurs, corresponds to the English *to have a pain* or *pains*:—

J'ai une douleur au bras.	*I have a pain in my arm.*

3. The construction mentioned in Rule 1 is used after avoir, taken in the sense of tenir, *to hold*, and after avoir froid and avoir chaud [Sect. 62, R. 5]:—

Vous avez les armes à la main.	*You have your arms in your hands.*
J'ai chaud aux mains et aux pieds.	*My hands and feet are warm.*

4. The article *le*, &c., is used before words indicating moral and physical properties, in cases where the English use *a* or *an*, or omit the article. When, however, an adjective precedes the noun, *un*, *une*, or *de*, *des*, are at times used:—

Cette dame a l'esprit juste.	*That lady has a correct mind.*
Votre sœur a les yeux noirs.	*Your sister has black eyes.*

5. A moral or physical property, which, in the individual is single, is not put in the plural in French, though the reference be to a number of individuals:—

Ces dames ont l'esprit juste.	*Those ladies have correct minds.*
Ces garçons se sont fait mal à la tête.	*Those boys have hurt their heads.*

Resumé of Examples.

N'avez-vous pas mal au pied?	*Have you not a sore foot?*
Cette demoiselle a le mal de tête.	*That young lady has the headache.*
N'avez-vous pas mal aux dents?	*Do not your teeth ache?*
Mon frère a le mal de dents.	*My brother has the toothache.*
Mon cousin a mal au côté.	*My cousin has a pain in his side.*
Il a des douleurs de poitrine.	*He has pains in his chest.*
Qu'avez-vous à la main?	*What have you in your hand?* / *What is the matter with your hand?*
Je n'ai rien à la main.	*I have nothing in my hand.* / *Nothing is the matter with my hand.*
J'ai chaud aux mains et froid aux pieds.	*My hands are warm and my feet cold.*
Vos sœurs ont le goût délicat.	*Your sisters have a delicate taste.*
Ces messieurs ont le nez aquilin.	*Those gentlemen have Roman noses.*

Exercise 129.

Bleu, e, *blue.*	Mal de gorge, m. *sore throat.*	Pied, m. *foot.*
Bouche, f. *mouth.*	Mal d'oreille, m. *ear-ache.*	Presque, *almost.*
Dent, f. *tooth.*	Nièce, f. *niece.*	Teint, m. *complexion.*
Doigt, m. *finger.*	Noir, e, *black.*	Visage, m. *face.*
Gorge, f. *throat.*		Yeux, *from* œil, *eyes.*
Mémoire, f. *memory.*		

1. Ce jeune homme a-t-il mal à la gorge? 2. Oui, Monsieur, il y a deux jours qu'il a le mal de gorge. 3. Avez-vous souvent mal à la tête? 4. J'ai le mal de tête presque tous les jours. 5. N'avez-vous pas mal au bras? 6. J'ai mal au bras et à la main. 7. Votre sœur a-t-elle le mal d'oreille. 8. Oui, Madame, elle a le mal d'oreille et le mal de dents. 9. N'avez-vous pas froid à la tête. 10. Non, Monsieur, mais j'ai froid aux doigts. 11. N'avez-vous point froid au visage? 12 Non, Monsieur, je n'y ai point froid. 13. Ce monsieur a-t-il le nez aquilin? 14. Il a le nez aquilin et la bouche grande. 15. Cette demoiselle a-t-elle de belles dents? 16. Elle a de belles dents et de beaux yeux. 17. Ce petit garçon a-t-il les pieds petits? 18. Il a les pieds petits et les mains grandes. 19. Votre nièce n'a-t-elle pas les yeux bleus? 20. Non, Monsieur, elle a les yeux noirs. 21. Vos écoliers se sont-ils fait mal au visage? 22. Ils se sont fait mal à la poitrine. 23. Vos filles ont-elles une bonne mémoire? 24. Elles ont la mémoire excellente. 25. Ces Italiennes n'ont pas le teint frais.

Exercise 130.

1. What is the matter with your hand? 2. I have had a sore hand these ten days. 3. Has your brother sore fingers? 4. He has sore fingers and a sore hand. 5. What has your brother in his hand? 6. He has a pen in his hand. 7. Has your little boy a sore throat? 8. He has a sore throat. 9. Has not your eldest sister the toothache? 10. She has not the toothache, but she has a sore finger. 11. Why does not the soldier walk? 12. He cannot walk, he has a sore foot. 13. Have you not sore feet? 14. My feet are not sore. 15. If your finger were sore would you write? 16. If I had sore fingers I should not write. 17. If your brother had the headache would he study his lesson? 18. He could not study his lesson if he had the headache. 19. Has not that gentleman pains in his chest? 20. He has pains in his chest and in his side. 21. Has your little girl black eyes or blue eyes? 22. She has black eyes and a fresh complexion. 23. Has not your daughter the toothache? 24. She has the toothache and the ear-ache. 25. Are not your hands and feet cold? 26. My hands are cold, but my feet are warm. 27. Have not those ladies aquiline noses? 28. They have aquiline noses and a fair complexion (*le teint beau*). 29. Has your sister large hands? 30. No, Sir, my sister has small hands. 31. Have not those little girls hurt their heads? 32. They have not hurt their heads, they have hurt their faces. 33. That little boy has black hair (*cheveux*).

LESSONS IN GEOLOGY.—No. XVII.

By Thomas W. Jenkyn, D.D., F.G.S., &c.

CHAPTER II.

ON THE ACTION OF WATER ON THE EARTH'S CRUST.

SECTION I.

ON THE ACTION OF RAIN UPON ROCKS.

In the whole course of our preceding lessons, we have assumed that the first form of our earth's crust was that of an incandescent globe in the process of cooling, and represented to you by the ashy covering of a cooling cinder. In these circumstances of starting into existence as a planet, there could have been no water, and consequently no sea, and no rain.

The origin of rain is a subject that belongs rather to Chemistry than to Geology. One of the demonstrations of modern

chemistry is, that water is produced by the combination of different gases, which can be proved to have been co-existent with the origin of the earth.

This demonstration of chemistry does not in the least exclude the agency of the Almighty Creator as the Intelligent Maker of all things. These powerful gases may be literally one class of "the things which do not appear," but by the combination of which, "the things which are seen" were framed by the word of God. No reasoning can prove more triumphantly than those of the inductive sciences, that these gases did not originate themselves, endow themselves with given tendencies, or fix laws for their own energies. They had a Maker, and their Maker is God. It is He that called them into existence. It is He that gave them their separate energies and adaptations. It is He that endowed them with fixed laws for their respective combinations. Their elementary properties came from His creative power, and the laws of their combinations have been ordained by His legislative will.

The revelations of natural philosophy teach us that the various elements of the universe are found in combinations called compound bodies; and the investigations of natural theology prove that, when the properties of these compounds are compared with the elements employed in composing them, the object of the Great Designer contemplated, at their origin, rather the properties of the compounds, than the properties of the separate elements themselves. The simple elements were created not for their own sakes, but for the sake of the compound bodies which their combination would produce. This argument might be illustrated by the properties of hydrogen in water, were this the place and time to enter upon it. The geologist, as such, assumes the existence of water without troubling himself to account for its origin, or to introduce it as a proof of design.

It is well known that water exists in the different forms of a solid, a liquid, and a vapour. It is probable that the first or primordial appearance of water upon the cooling surface of the earth's crust was in the form of vapour, which, with the decrease of temperature, condensed at last into rain. Try to form for yourself distinct and well-defined conceptions of the facts of this case, for otherwise you will always be hesitating and doubting in your future lessons. Imagine that from some cause, which Geologists do not profess to understand, the heat of our ignited and burning globe began to decrease, and that a portion of this heat so radiated into space as to allow a crust to form upon its surface, just as you now see crust forming over molten metal or glass as the fused materials cool down. Imagine again that this cooling process continues, it may be for thousands or myriads of years, until at last the surface of the earth grew so cool that the watery elements, which during its ignited and fused state must have floated along with many other volatile constituents in the atmosphere around it, condensed into vapour, and then into drops. This water would be deposited on the surface of the earth in the forms of lakes, seas, and oceans. After a time portions of this water would be taken up by evaporation, descend again in the form of rain, which in its turn would produce streams, torrents, and rivers. This outline of the ignited and cooling conditions of the globe must be accepted in order to arrive at any consistent explanation of the present state of the earth, as evidenced by the structure of its rocks, and by the fossils, which are monuments of its ancient history.

I must now refer you to the latter part of our second lesson, especially to the paragraphs on page 198. I there showed that when the process of cooling commenced on the earth's surface, there was not as yet any water. It was next remarked that, as soon as it was practicable, according to the laws fixed by the Great Maker, for the gaseous elements of water to combine and to form that liquid, water began immediately to act destructively upon the outward surface of the earth's crust.

As soon as water came into contact with the surface-rocks, the entire tendency of its action upon them would be to wear them away, either by dissolving them chemically, or by carrying away mechanically the loosened portions, and depositing them in another place.

The outer lines of our first diagram in page 197, are intended to represent that the first crust of the earth was not quite round and even, but broken, dented, and rugged. Its whole circumference is diversified with hollows and elevations, depressions, swellings, and peaks. Suppose any dent or depression in fig. 1 on that page, to designate some hollow of many miles in extent, sufficient to form the bed of an inland sea, or it might be what is called the "basin" of a large river, into which streams and torrents are flowing from all sides.

After having referred yourself to that figure, imagine that the annexed diagram, fig. 38, represents any one of the depressions which were originally formed in the crust at the time of the earth's first cooling. As the rain would wear away, or, speaking geologically, would disintegrate the upper parts or edges of the hollows, the water would run downwards to the bottom, and there settle, and when in a state of rest it would deposit the loosened materials or detritus which it had dislodged from the higher portions of the rock. This detritus would necessarily consist of pebbles, gravel, sand, and mud or silt.

Every fresh shower would effect a fresh disintegration of the rock, and would also produce fresh currents and streams that would carry away more pebbles, sand, and silt, and deposit them in a fresh layer or bed over the surface of the first. Upon every repetition of shower and floods two results would take place; first, the lake or inland sea would, by the accession and rise of its unexhaled waters, become deeper and deeper; and secondly, with every fresh deposit of detritus, the bottom would come up higher and higher, and the water shallower and shallower, until, at last, the upper layer of the detritus would become visible as dry land. You at once see that as these layers or beds rise in thickness, they would elevate the waters of the lake or inland sea in the depression, and eventually drive the water off to seek its level in other hollows, until finally sea would join sea and form the ocean.

Fig. 38.

The Results of Rain-floods on a Depression in the Earth's Crust.

It is evident that all the loosened materials, disintegrated by the different showers and borne away into the hollows by the different floods, will be deposited in layers one on the surface of another. The materials thus loosened and worn down by the water have, in geology, different names, according to the size of the ingredients of the detritus. Fragments of the larger size are called pebbles, the next gravel, the next sand, and the smallest mud or silt.

If you have ever observed the materials of the bed of a river from its source to its entrance into the sea, you will remember the facts which have been just stated. When you have been on the summit of some rocky mountain, you have seen a well of water springing up amid its rugged crags. In the immediate neighbourhood, there is not a single rounded stone or pebble to be found any where. All the stones are rough and angular, for as yet the water has had no opportunity to roll any of the looser stones in its bed. As you descend lower into the glen or ravine, you find that the stones have been rubbed and partly rounded, by the friction of the water, and by being rolled against each other. When you come to the great valley, the valley where all the rivulets form one stream, there you find, first large rounded stones, which might almost be called boulders; lower down you have large pebbles; lower still, gravel; until, as you approach the sea, the bed of the river is mere sand or mud, totally destitute of gravel or pebbles.

As you recollect these facts you must try to account for them. We know that the power of water to carry heavy bodies is very great and extraordinary, or rather we know that bodies lose much of their weight or gravity when they are suspended or borne in water. We also know that the force of currents cannot carry boulders as far as it can carry pebbles, or carry gravel as far as sand or mud. You are now to apply these statements

and your own recollections of what you have seen in the bed of a river, to the phenomena which are likely to occur under the action of rain or torrents in our supposed hollow of the earth's crust, as represented in fig. 38.

Let A B be one of the depressions found in the crust of the earth as represented in fig. 1, page 197, vol. I. Imagine several repetitions of showers and floods to take place at different periods, and the water to affect mechanically the surface rock at both the points A B. The water, in running down each side of the declivity, would bear away the larger or finer materials to different distances, according to the velocity of the current. The stream would leave the heavier materials early on in its own side of the curve, carry the pebbles and gravel towards the bottom of the hollow, and bear the sand and silt to some distance on the opposite side.

At the first period, a heavy shower falling on the point B would carry down loose stone and pebbles but a short distance, the sand farther, and the silt farther still, say as far as *x*. At the second period, a similar shower and flood from the point A would produce similar results, and form a layer that would cover a part of the first bed of detritus, say as far as the point above *y*. At a third period, another rain season produced a flood from B, which carried down more detritus and formed a third layer. At a fourth period, like showers and torrents from A would repeat the preceding phenomena. Each repetition of rain and flood would produce fresh disintegration, and form new layers of pebbles, gravel, sand, and silt.

Let us suppose that in the progress of centuries or ages, the lake A B would, by some means, become dry, and that a section of the beds were made. It is evident that a rock, or what is geologically called, a formation, of a very complex character would appear. There would be pebbles, gravel, sand, and silt. Different portions of such beds are called by different names, according as they have been cemented or hardened together. The bed of cemented pebbles is called a conglomerate; that of gravel and sand, free sandstone; that of mud or silt, laminated shale, or slaty clay.

As this lesson is intended to be chiefly an introduction to the doctrines of Geology concerning the action of water, I have thought it right, to help you, to begin at the beginning. I have already endeavoured to explain to you the action of fire in the formation of the earth's crust; I shall now proceed to a class of lessons which will make you acquainted with the influence of water, as developed in the disintegration of early rocks on the earth's crust, and in the construction of sedimentary strata.

The influence of water upon rocks is manifested in three different ways. First, it decomposes their substances chemically, and dissolves their combined elements, as is seen in the action of tea upon a lump of sugar. Secondly, it loosens the particles of which they are formed, by getting between the grains or ingredients which compose them, by forcing them asunder, and thus destroying their cohesion or their power to stick together, as is instanced in the action of water upon slaked lime, or rather on a ball of sand. Thirdly, it acts mechanically upon them, by removing their loosened fragments from one place to another, rolling and rubbing them against each other, giving them a shape different from their original form, and depositing them at a lower level, as may be seen in the effect of rain in leaving mud in the roads and streets.

Even when water is in the form of atmospheric vapour, and before it has condensed into liquid rain, it has a powerful influence upon rocks. It has a power to make its way, as you have seen, into the smallest interstices or cleavages between the minutest particles. Its destructive action is made most manifest in the disintegration of exposed rocks and of high peaks, amid whose materials a great quantity of moisture penetrates, decomposes the particles, and severs even granite.

The mechanical influence of water is very diversified. It affects some rocks by the mere force of its weight and pressure. It disintegrates others by friction over an exposed surface, as in rivers. It destroys some by its velocity or acquired momentum, as is instanced in what are called waves of translation seen in a sudden river flood, in tidal action, and in the powerful currents found in the sea. In some cases it wears away rocks by falling upon them from a height, as in waterfalls and cataracts. In other instances, it destroys a whole formation of rocks by undermining them. This it does by eating away some soft bed which supports the overhanging strata; which, upon the removal of their support, fall down in confused fragments.

Some of the effects of aqueous agency deserve to be classed among the grandest phenomena on the globe. They are vast and magnificent in the deep and beautiful excavations which, amid lofty rocks and sloping hills, form many of our valleys. But its most stupendous operations are indicated by the denudation, which it has accomplished in sweeping away enormous masses of rocks and strata which, for hundreds of square miles, once covered many of our present plains and mountains. These marvellous phenomena are not only calculated to awaken your interest in Geology, but they will also increase it and ennoble it, by giving expansion to your mind, loftiness to your philosophy, and depth to your adoration of the God that worketh all things.

LESSONS IN PENMANSHIP.—No. III.

In our last lesson we were obliged to postpone the description of the following capital letters of the writing alphabet.

The letter *W* is like the letter *M* inverted; or rather it consists of two tapering black-strokes, joined by a hair-stroke, and commencing and ending with peculiarly curved hair-strokes; originally the letter *W* was just like two *V's* put together, and frequently this letter is still made like the latter half of the letter *W*. The letter *X* is formed very like the printed *X*, only that it begins and ends with a scroll. The letter *Y* is like the letter *U* with the second black-stroke drawn below the line and terminated in a hair-stroke loop. The letter *Z* is like the same letter in the small alphabet, but it begins and ends with a scroll; sometimes the latter scroll is formed into a loop below the line.

Thus we have described the formation of both the alphabets in Penmanship; considerable varieties, however, exist in practice; these can only be learned by experience. The two pages in our last number exhibited writing lessons in *round hand* or *text*, in *smaller hand* or *half-text*, and in the *smallest* or *running hand*, used in business, called the *court hand*. The words of these lessons were as follows:—Text: *Alexandria*; *Birmingham*; *Cumberland*; and *Darlington*. Half-text: *Amendment of manners is commendable*; *Benevolence is an amiable endowment*; *Contentment is better than a kingdom*; *Decency is respected and commended*. Court hand: *A man's manners most commonly make his fortune; Be constantly in some commendable employment; Commendation most commonly encourages the ingenious; Diligence most commonly overcomes all difficulties.*

The middle pages of this number exhibit an equal number of writing lessons in the three different hands, of which the words are as follows:—Text: *Easingwold*, *Formentera*, *Guadaloupe*, and *Huntingdon*. Half-text: *Encourage all honest and virtuous actions*; *Fame commonly accompanies merit*; *Goodness most commonly transcends beauty*; *Humility most commonly leads to honour*. Court hand: *Encouragement most commonly animates the mind*; *Fear is commonly the companion of guilty actions*; *Goodness and mercy are the attributes of the Divinity*; *Humanity and magnanimity are noble endowments*. We strongly recommend learners to write the copies or words of the round-hand or *text* alphabet *first*, say three or four times over, till they are well acquainted with the shapes of the letters, and can make them with great ease; they may then proceed to the copies of the *half-text* alphabet, and write them as often; and lastly, to the copies of the *court* or *running-hand*, and write them most frequently of all, as this is the hand in which all letters and manuscripts should be written. Those of our students who wish us to give them advice as to what hand or style of writing we would recommend, have at last got it embodied in the court-hand copies; this is the plain and easy style which we admire, and which we consider as far before the wiry angular system in common use. The grand object of all good penmanship should be to write so as to easily be read; and whenever any style of writing loses this character, it loses half its value.

With regard to the copies given to the learner in these different hands, nothing could be expected in the *text* but a single word; this is always geographical; in the half-text and court-hand, an attempt is made, as usual, to convey moral lessons; and the qualifying terms *commonly* and *most commonly*, are only introduced to make the line the proper length.

Easingwold

Encourage all honest and virtuous actions.

Encouragement most commonly animates the maid.

Formentera

Fame most commonly accompanies merit.

Fear is commonly the companion of guilty actions.

Guadaloupe

Goodneſs most commonly transcends beauty.

Goodness and mercy are the attributes of the Divinity.

Huntingdon

Humility most commonly leads to honour.

Humanity and magnanimity are noble endowments.

LESSONS IN LATIN.—No. XXIX.

By JOHN R. BEARD, D. D.

DEVIATIONS FROM THE MODEL-CONJUGATIONS.

THE four conjugations are only so many classes into which Latin verbs are put. These classes are determined by the tokens already stated, and the verbs in them are formed according to the models already given. But the verbs which make up these classes, do not exhaust the whole stock of Latin verbs. There are others that more or less depart from the models. The verbs that depart from the models may, in general, be ranked under three descriptions. i. They differ from the model-verbs in the perfect and the supine. ii. They differ from the model-verbs in other parts. iii. They lack several parts which are possessed by the model-verbs. As these three classes do not conform to the rule or standard afforded in the four conjugations, they might all be termed irregular. The epithet irregular, however, is commonly applied only to the second class, and as no good reason compels us to depart from the ordinary usage in this case, we shall specially apply the denomination of "the irregular verbs" to those verbs which differ from the models in other parts than the perfect and the supine. The verbs which differ in the perfect and the supine may be callad deviational, as in a marked way deviating (de, *from*, and via, *a way*) from the ordinary forms, and those that are without certain parts may be termed defective (de, *from*, and facio, *I make*). Thus we obtain four classes of verbs. i. The regular, or those which mainly follow the paradigms of the four conjugations. ii. The deviational, those that depart from those paradigms in the perfect tense and the supine. iii. The irregular, those that depart from the paradigms in other parts. iv. The defective, those that are wanting in mood, tense, and person. The verbs that follow the forms of the four conjugations are dignified with the term regular, because such verbs exist in greater number than any other class. The same facts may be set forth in this

VIEW OF THE LATIN VERBS.

	Regular.	*Irregular.*
The Four Conjugations.	I. Deviational.	II. Irregular. III. Defective.

The departure from the models would be very much lessened, were we at liberty to enter at length into the processes by which the present tenses now in use were formed, and exhibit the real roots or stems of the several verbs. In the restricted space, however, here at our disposal, we can only give one or two instances. Take sino, *I suffer* or *allow*. You think the stem to be *sin*. It is not so; the n is introduced into the present merely for the sake of strength in pronunciation. The stem is *si*. Sio would be a weak sound, two vowels coming together; and the Latins preferred saying sino. From si, however, is regularly formed both the perfect and the supine, thus: si, si-vi, si-tum. Take rumpo. Here, to obtain the stem, you must elide the m (that is, n which before p becomes m), and you have rup, from which are regularly formed rup-i and rup-tum. In cresco, you must in the same way leave out sc, and thus getting as the stem cre, you form the perfect by adding vi; e. g., cre-vi. I subjoin similar instances; sue-sc-o, sue-vi; pa-sc-o, pa-vi, no-sc-o, no-vi; so the supines, cre-tum, sue-tum, pa-stum (the s of the present is retained before the t), no-tum. Disco represents a peculiar class of verbs; namely, those that form the perfect by what is called reduplication; that is, the repetition of the initial consonant with a connecting vowel, thus: disco, dis-cere, *di*dici; the root is properly dic; di(c)-sc-o, di-dic-i. Having given these intimations, and inviting our pupils in due time to follow the thread, we now resume the order of the four conjugations, and shall set forth the principal deviations from the model forms.

I. DEVIATIONS IN THE FIRST CONJUGATION.

1. *The Perfect with Reduplication.*

i. Do, dĕdi, dăre, dătum, *to give*; the *a* is short in the stems as dăbam, dăbo, dărem, except das and dă. According to do form the compounds of do, of which the first part is a dissyllable, as circumdo, circumdĕdi, circumdătum, circumdăre. The compounds of do having monosyllables as prefixes follow the third conjugation, as addo, addĕre, addidi, additum. It is not uncommon for a verb of one conjugation thus to pass into another conjugation.

ii. Sto, stĕti, stāre, stātum, *to stand* (with abl. *to cost*). The compounds with monosyllables have in the perfect stiti, as consto (*I consist of*), constiti, constare; participle future active, praestaturus, constaturus, obstaturus, &c. The compounds with dissyllables retain stĕti, and have neither supine nor participle future active; also circumsto (*I stand around*), circumstĕti.

VOCABULARY.

Circumdo, circumdĕdi, circumdăre, circumdă'um (dat. and acc or acc. and abl.), *to surround (some one with something) or to put something round some one*; cónsto, constĕ·i, constare, constātum (abl.), *to consist of, to cost*; persto, perstĭti, perstare, perstātum, *to continue*; praesto, praestiti, praestare, praestĭtum and praestātum, *to stand before, to be distinguished* (with dat. *to surpass*); praestare se fortem, *to show oneself brave*; obsto, *I stand in the way of, hinder*; forum, i, n, *a market*; stipendium, i, n, *pay*; interfector, óris, m, *a slayer, murderer*; propugnator, óris, m, *a defender*; classis, is, f. *a fleet*; vestis, is, f. *a garment*; conservatio, ónis, f. *preservation*; invītus, a, um, *unwilling*; insperans, antis, *hoping nothing, against hope*, uber, uběris, *rich*; certo, *certainly*; extrinsĕcus, adv., *outwardly*.

Observe that a noun or pronoun may be governed in the ablative case by an adjective in the comparative degree; example:

Noun. Aurum est gravius argento.
Gold is *heavier than silver*.

Pronoun. Lux quâ nihil est carius.
Light *than which* nothing is *dearer*.

This is a kind of abbreviated comparison. If the fuller form with quam were used, then the noun after the quam would be in the same case as that before quam; e. g:

Full form. Nihil est divinius quam clementia.
Nothing is *more divine than mercy*.

EXERCISES.—LATIN-ENGLISH.

Deus nobis dedit animum, quo nihil est praestantius; multo sanguine nobis victoria stetit (cost, so we say *stood us*) mater omnium bonarum artium sapientia est, quâ nihil a Deo immortali uberius, nihil praestabilius hominum vitae datum est; Deus corpus, ut quandem vestem, animo circumdĕdit, et vestivit extrinsĕcus; quorum patres aut majores aliquâ gloriâ praestiterunt, (ii) student plerumque eodem in genere laudis excellere; parentes carissimos habere debemus, quod ab iis nobis vita tradita est; non dedit beneficium, qui invītus profuit; quinam magis sunt tui quam (ii) quibus tu salútem insperantibus reddĭdisti? cives acerrimos propugnatores libertatis se praestiterunt; ingens hominum multitudo oratorem in foro circumstetit; eloquentia ad salutem hominum data est a naturâ; eloquentia ad conservationem hominum data est a naturâ; malus orator eloquentiam ad bonorum pestem, perniciemque convertit; quid est tam inhumanum quam eloquentiam, a naturâ ad salutem hominum et ad conservationem datam, ad bonorum pestem, perniciemque convertĕre; stipendium ex longo tempore militibus non erat datum; seditio inter milites orta est; quum stipendium ex longo tempore non esset datum, seditio inter milites orta est; tu mi amice, mihi fidem praestaturus es; certo scio te mi amice, mihi fidem praestaturum esse; nihil nobis obstat; nihil nobis obstaturum est; victoriam adipiscamur; credo, nihil nobis obstaturum esse, quominus victoriam adipiscamur; victoria constitit multorum fortium virorum morte; non dubitabamus quin multorum virorum fortium morte victoria constatura esset; perstaturus ne es in sententiâ tuâ? Nescio perstaturus ne sis in sententiâ tuâ.

ENGLISH-LATIN.

He gave the general a fleet; he will give thee a fleet; dost thou think that he is about to give a fleet to my brother? nothing has cost men more (pluris) than avarice; God has given me a sister than whom nothing is dearer to me; my sister will show herself loving to me all her life (acc. with per); the soldiers showed themselves very brave, but the victory cost the death of many brave men; nothing hinders our gaining the victory (hinders, lest we should gain, stands in the way to prevent our gaining the victory); I believe we shall gain the victory; Socrates surpassed all philosophers; who does not know that Socrates surpassed all philosophers? dost thou believe that thy son will surpass all his equals? a great multitude surrounds the orator; pay has not been given to the soldiers; I will give pay to the soldiers; take care lest sedition arise among the soldiers; will thou persist in thy opinion? I do not know whether I shall persist in my opinion.

It may be desirable to illustrate more fully the construction of circumdare and quominus.

Construction of Circumdo.

1. Aliquid alicui rei, that is, a nominative or accusative of the thing with a dative of the thing. 2. Aliquem or aliquid aliquâ re, that an accusative of the person or thing, with an ablative of the thing.

1. "Aer omnibus est rebus circumdatus."—*Lucretius.*
Lit. Trans.:—*The air to all is to things surrounded.*
Id. Trans.:—*All things are surrounded with air.*

1. "Tectis ignes circumdatos restinximus"—*Cicero.*
Lit. Trans.:—*To the roof fires put round we extinguished.*
Id. Trans.:—*We extinguished the fires which had been set to the houses.*

2. "Oppidum vallo et fossâ circumdedi."—*Cicero.*
Lit. Trans.:—*The town with a rampart and ditch I have surrounded.*
Id. Trans.:—*I have surrounded the town with a rampart and ditch.*

2. "Circumdato me brachiis."—*Plautus.*
Lit. Trans.:—*Surround me with arms.*
Id. Trans.:—*Put thy arms round me.*

Construction of Quominus.

Quominus is made up of quo, *in order that* or *so that*; and minus, *less* (least, lest) or *not*; consequently quominus is equivalent to *so that not*; a more simple way is to render it by, *to prevent*. Quominus takes a subjunctive mood. If you use "to prevent" you must in English use also the idiomatic construction of "to prevent," but in putting that construction back into Latin and so employing quominus, you must employ, of course, the proper Latin construction; e. g.:

"Nihil de me tulistis quominus in civium essem numero."—*Cicero.*
Lit. Trans.:—*Nothing from me you bore so that not in of the citizens number I should be.*
Id. Trans.:—*You got nothing from me to prevent my being in the number of the citizens.*

Vocabulary.

Impedio 4, *I hinder*; repugno 1, *I fight against* (E. R. *repugnant*); interpello 1, *to question*; latus, a, um, *broad*; lectus, i, m, *a bed*; collum, i, n, *the neck*; brachium, i, n, *the arm*; cancelli (cancorum, m, *limits* (E. R. *chancel, chancellor, chancery*); fautor, ôris, ..., *a patron, favourer.*

Exercises.—Latin-English.

Nihil impedit quominus id quod maxime placeat facere possimus; non repugnabo quominus omnia legat; mors non deterret sapientem quominus reipublicae consulat; interpellent me quominus honoratus sim; dum ne interpellent quominus respublica a me commôde administrari possit; nemini civi ulla, quominus adesset, satis justa excusatio est visa (*no pretext appeared sufficient to excuse any citizen from being present*); fossam latam lecto circumdedit; exercitum circumdat hostium castris; circumdat sibi milites; circumdabit brachia collo tuo; circumdedit urbem tumulo; extra hos cancellos egredi conabor quos mihi ipse circumdedi; egregiam famam paci circumdedit (*gave to, invested with*); fautores illi hanc famam circumdederunt.

English-Latin.

Nothing hinders you from being a good boy; I will surround thee with fame; he will put a garment round me; he has surrounded his sister with honour; surround the city with fire to prevent the citizens from going out; that is no excuse for your absence.

LESSONS IN GEOMETRY.—No. XII.

LECTURES ON EUCLID.

Definitions. Book I. From XIX. to XXXV. inclusive.

XIX.

[*A segment of a circle is the figure contained by a straight line, and the part of the circumference it cuts off.*] This definition is repeated in Book III. Definition VI.

XX.

Rectilineal [*or, rectilinear, that is, formed of straight lines*] *figures are those which are contained* [*or, bounded*] *by straight lines.*

XXI.

Trilateral [*that is, three-sided*] *figures, or triangles,* [*that is, three-angled, are those which are contained*] *by three straight lines.*

XXII.

Quadrilateral, [*that is, four-sided; or, quadrangles, that is, four-angled, are those which are contained*] *by four straight lines.*

XXIII.

Multilateral [*that is, many-sided*] *figures, or polygons,* [*that is, many-angled, are those which are contained*] *by four straight lines.*

XXIV.

Of three-sided figures, an equilateral, [*that is, equal-sided*] *triangle is that which has three equal sides.*

XXV.

An isosceles [*that is, equal-legged*] *triangle is that which has only two sides equal.*

XXVI.

A scalene [*that is, unequal*] *triangle is that which has three unequal sides*

XXVII.

A right-angled triangle is that which has a right angle.

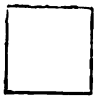
XXVIII.

An obtuse-angled triangle is that which has an obtuse angle.

XXIX.

An acute-angled triangle is that which has three acute-angles. The acute angled triangle must have *three* acute angles, because the two preceding species of triangles have each *two* acute angles, as will be shown in the sequel.

XXX.



Of four-sided figures, a square is that which has all its sides equal, and all its angles right angles. This definition is redundant. If the general definition annexed to the 34th Prop. of this book be considered, the square is only a species of parallelogram, viz, that which has one angle a right angle and the sides which contain it equal to one another.

XXXI.

An oblong is that which has all its angles right angles, but has not all its sides equal. This definition is also redundant; for an oblong [or rectangle, that is a right-angled parallelogram] is that which has one angle a right angle, and the sides which contain it unequal.

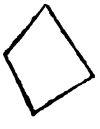
XXXII.

A rhombus is that which has all its sides equal, but its angles are not right angles This is also redundant; for a rhombus is that which has one angle oblique, and the sides which contain it unequal.

XXXIII.

A rhomboid is that which has its opposite sides equal to one another, but all its sides are not equal, nor its angles right angles. This definition may be replaced by that of a parallelogram above mentioned.

XXXIV.



All other four-sided figures besides these, are called trapeziums. Quadrilateral figures whose opposite sides are not parallel, are called trapeziums; but if one opposite pair be parallel and the other pair not, the figure is called a trapezoid.

XXXV.

Parallel straight lines are such as are in the same plane, and which being produced ever so far both ways do not meet. The meaning of this definition is, that the space between the lines is always of the same breadth.

Rectilineal figures, as above described, are those that are supposed to be drawn on a plane or flat surface, and are divided into three different kinds: 1st, trilateral or triangular; 2nd, quadrilateral or quadrangular; and 3rd, multilateral, multangular (many-angled) or polygonal. The first kind, the triangular, are divided into *six* species,—viz., *three*, according to *their sides*; and *three*, according to *their angles*. Triangles are divided according to *their sides*, into *equilateral*, or such as have *three equal sides*; *isosceles*, or such as have *two equal sides*; and *scalene*, or such as have *no equal sides*; that is, whose sides are all unequal to one another. Triangles are divided according to their angles, into *right-angled*,

or such as have *one right angle; obtuse-angled*, or such as have *one obtuse angle;* and *acute-angled*, or such as have neither *a right angle* nor an *obtuse angle;* that is, which have *three acute angles.*

Quadrilateral figures are divided into *five* different species: squares, oblongs, rhombuses, rhomboids, and trapeziums. Taking in the definition of parallel straight lines, before the 30th definition, it is better to divide quadilateral figures first into two kinds. 1st, those whose opposite sides are *parallel*; and 2nd, those whose sides are *not parallel*; there is also a *third* species, viz., those which have *two* opposite sides *parallel*, and *two* opposite sides *not parallel.* Those quadrilateral figures whose opposite sides are *parallel*, are, according to definition 36, attached to Prop. 34, Book I., called *parallelograms*, that is, a parallel diagram or drawing; and of these there are two species, those which have *one right angle*, and those which have *one oblique angle*; of the former species, those which have the *legs of the right angle equal* are called *squares*, and those which have the *legs of the right angle unequal* are called *oblongs* or *rectangles.* Of the other species, those which have the *legs of the oblique angle equal* are called *rhombuses* or *lozenges*; and those which have the *legs of the oblique angle unequal* are called *rhomboids.* Those quadrilateral figures whose opposite sides *not parallel*, are called *trapeziums*, that is, literally, *small tables*, or *tablets*, their tops being of this form; but "unluckily," say the authors of the best Greek dictionary extant, "in spite of Horace, we do not know whether the earliest tables had three or four legs." Certainly the *tripod* is very ancient, but the *tetrapod* must have been more so, as human inventions generally become more simple in the progress of improvement. Those quadrilateral figures which have only *two sides parallel*, are called *trapezoids.*

In our last Lesson, vol. I., p. 406, we gave some account of the ratio of the diameter of a circle to its circumference, and the endless attempts that have been made, from the days of Archimedes until now, to find an exact expression for this ratio in ordinary arithmetical terms. We there gave a beautiful expression for this ratio, discovered by Dr. Wallis, which is complete in itself, and which is frequently demonstrated by writers on trigonometry; as it does not, however, approximate very rapidly to the ratios in common use we insert the following ratio, lately discovered, which is one of very great convergency; viz., $1 : 16\left\{\frac{1}{5}-\frac{1}{3}\cdot\frac{1}{5^3}+\frac{1}{5}\cdot\frac{1}{5^5}-\frac{1}{7}\cdot\frac{1}{5^7}+\text{ \&c.}\right\}-4\left\{\frac{1}{70}-\frac{1}{3}\cdot\frac{1}{70^3}+\frac{1}{5}\cdot\frac{1}{70^5}-\text{ \&c.}\right\}+4\left\{\frac{1}{99}-\frac{1}{3}\cdot\frac{1}{99^3}+\frac{1}{5}\cdot\frac{1}{99^5}-\text{ \&c.}\right\}$; and we refer our readers to another of an older date, at p. 28, No. 28, col. 2, line 7 from the bottom, which also converges with great rapidity. Persons who are acquainted with vulgar and decimal fractions, as laid down in Cassell's Arithmetic, will be able to put these expressions into ordinary figures with the greatest ease. Well, after having obtained the ratio of the diameter to the circumference, or what is called in the language of mathematicians the *rectification of the circle;* that is, the *making a straight line equal to the circumference;* the next question which has puzzled mankind for at least two thousand years, is the *quadrature of the circle;* that is, the *making of a square equal in area to the circle.* Now Archimedes demonstrated the following simple and important proposition, that *the area of a circle is equal to the rectangle contained by the semidiameter of the circle, and a straight line equal to half the circumference.* We have shown at p. 173, vol. I., Problem 2, that the area of a rectangle is equal to its length multiplied by its breadth; and in the case of the rectangle which is equal to a circle, the length is half the circumference, and the breadth is the semidiameter or radius; therefore, *the area of a circle is found by multiplying half the circumference by half the diameter.* In the case where the diameter of the circle is 1, it is plain from the former lesson that the circumference is nearly 3·1416; therefore the area of a circle whose diameter is 1, is $\frac{1}{4}$ of 3·1416 multiplied by $\frac{1}{4}$ of 1; that is, 1·5708 multiplied by $\frac{1}{4}$, which is ·7854, an expression with which many of our readers are familiar, but of which we believe they never understood the origin. This we have now given, we hope to their satisfaction. As Euclid has demonstrated in Book XII., Prop. II. (see Cassell's Euclid, p. 191), that *circles are to one another as the squares of their diameters;* it is plain that if the area of any circle whose diameter is greater than one be required, we have only to *multiply the square of the diameter by the decimal* ·7854 *given above, and we have the answer;* for the square of 1, is to the square of the given diameter, as the decimal ·7854, is to the answer required. This, of course, will only give the *approximate* answer; that is, the answer *nearly;* because the ratio of the diameter of a circle to its circumference above assumed is only *approximate*, as may be seen by consulting the last Lesson in Geometry. But if we take a nearer approximation to the exact ratio, we shall accordingly obtain a nearer approximation to the exact area of the circle. Hence, if we take the numbers obtained from Dr. Wallis's ratio,—viz., 1 to 3·141592653589+, we shall have $\frac{1}{2}$ of 1 multiplied by $\frac{1}{4}$ of the latter number, or $\frac{1}{4}$ of 3·141592653589 = ·785398163397+ as the more correct number to be employed in finding the area of the circle, this being true to the twelfth decimal place of figures; the first six, however,—viz., ·785398 are sufficient for ordinary practice, being true to the sixth or millionth decimal place. For those who are content with approximations to the truth in whole numbers, it may be useful to state that the ratio of the square of the diameter of a circle to the area of the circle itself, is *nearly* as 14 to 11; or than the area of a circle is nearly $\frac{11}{14}$ of the square of its diameter, being more than the truth, by about one twenty-six thousandth part of itself.

LESSONS IN GERMAN.—No. XX.

Section XXXV.

Werden is used as an auxiliary in forming the future of all German verbs; and, in this use, is translated by our auxiliary, "shall" or "will" (§ 70. 6.).

I. As an independent verb werden signifies, "to become, to grow, to get," &c. Ex.: Er wird alt; he *is growing* old. Das Wetter wird kälter; the weather *is growing* colder. Es wird dunkel, it *is getting* dark. Der Rabe wird sehr alt; the raven *becomes* very old (lives or attains to a great age).

II. Werden with the dative often denotes possession. Ex.: Mir wird immer das Meinige; I always obtain my own, (to me comes [*becomes*] always my own). Meinen armen Unterthanen muß das Ihrige werden; my poor subjects must have their own (property).

CONJUGATION OF THE VERB Werden IN THE INDICATIVE

Infinitive.	*Participles*
PRES. Werden, to become;	PRES. Werdend, becoming;
PERF. Geworden sein, to have become;	PERF. Geworden, become.

PRESENT.

Singular	*Plural.*
Ich werde, I become;	wir werden, we become;
Du wirst, thou becomest;	ihr werdet, you become;
Er wird, he becomes;	sie werden, they become.

IMPERFECT

Ich wurde or ward, I became;	wir wurden, we became;
Du wurdest or wardst, thou becamest;	ihr wurdet, you became;
Er wurde or ward, he became;	sie wurden, they became

PERFECT.

Ich bin geworden, I have become;	wir sind geworden, we have become;
Du bist geworden, thou hast become;	ihr seid geworden, you have become;
Er ist geworden, he has become;	sie sind geworden, they have become.

PLUPERFECT

Ich war geworden, I had become;	wir waren geworden, we had become;
Du warst geworden, thou hadst become;	ihr waret geworden, you had become;
Er war geworden, he had become;	sie waren geworden, they had become.

FIRST FUTURE.

Ich werde werden, I shall become;	wir werden werden, we shall become;
Du wirst werden, thou wilt become;	ihr werdet werden, you will become;
Er wird werden, he will become;	sie werden werden, they will become.

SECOND FUTURE.

Ich werde geworden ſein, I shall have become;	wir werden geworden ſein, we shall have become;
Du wirſt geworden ſein, thou wilt have become;	ihr werdet geworden ſein, you will have become;
Er wird geworden ſein, he will have become;	ſie werden geworden ſein, they will have become.

IMPERATIVE.

Werde du, become thou;	werdet ihr, become you;
Werde er, let him become;	werden ſie, let them become.

III. Often, when repeated or customary action is implied, the genitive of a noun is made to supply the place of an adverb. Ex.: Des Morgens ſchläft, des Mittags lieſt, und des Abends ſpielt er; he sleeps in the morning, reads at noun, and plays in the evening. (§ 101.)

IV. *Als*, (as) after ſobald, ſo viel, ſo weit, &c., is frequently omitted, but must be supplied in translating. Ex.: So viel ich weiß, so far as I know. So gut ich kann; as well as I can. Sobald er kommt; as soon as he comes, &c. For other uses of als See Sect. 61.

EXERCISE 39.

Auge, *n.* eye;	Finſter, dark;	Sinken, to sink;
Aus'wandern, to emigrate;	Fühlen, to feel;	Sobald', as soon as;
Been'digen, to end, finish;	Heiß, hot;	Tag'löhner, *m.* day-laborer;
Camerad', *m.* comrade;	Hoffen, to hope;	Tauſend, thousand (§ 44.);
Daraus', thereout, therefrom;	Hundert, hundred;	Vermö'gen, to be able;
Druck, *m.* pressure;	Jahr, *n.* year;	Vor'haben, to intend;
Dürfen, to permit (Sect. 25.);	Krieger, *m.* warrior;	Werden, to become, &c. (See I.);
Erbli'cken, to descry, see;	Lager, *n.* coach;	Ziel, *n.* limit, fixed period;
Erwar'ten, to await;	Längſtens, at the longest;	Ziemlich, tolerably;
Fertig, ready;	Meer, *n.* sea;	Zuvor, previously;
	Plötzlich, suddenly;	Zukünf'tig, future.
	Schlacht, *f.* battle;	
	Republik', *f.* republic;	
	Seufzen, to sigh;	

Sobald' er das hörte, ſtand er auf.	As soon (as) he heard that, he stood up (got up).
So viel ich weiß, iſt er ein ehr'licher Mann.	As much (as) I know (so far as I know) he is an honorable man.
Sobald' die Nachricht von dem Verra'the Görgey's eintraf, ſank der Muth der Ungarn.	As soon as the report of the treachery of Görgey arrived, the courage of the Hungarians sank.
Sobald' die Sonne unter'geht, wird es Nacht.	As soon as the sun goes down, it (becomes) is night.
Was iſt aus ihm geworden?	What has become of him?
Die Stunden werden zu Tagen, die Tage zu Wochen, die Wochen zu Mo'naten, und die Mo'nate zu Jahren.	The hours (become) grow to days, the days to weeks, the weeks to months, and the months to years.

1. Wir werden alt und älter, und ſind eher am Ziele, als uns angenehm iſt. 2. Es ward ſo finſter, daß wir unſere Hände nicht vor den Augen zu erblicken vermochten. 3. Um fünf Uhr wird es dunkel. 4. Stehen Sie des Morgens früh auf? 5. Sobald es Tag wird, verlaſſe ich mein Lager. 6. Wollen Sie dieſes Jahr noch nach Amerika auswandern? 7. Ich habe es vor, aber ich glaube nicht, daß etwas daraus werden wird. 8. Frankreich wurde im Jahre eintauſend achthundert acht und vierzig eine Republik. 9. Gott ſprach: es werde, und es ward. 10. Iſt Ihre neue Gramatik ſchon beendigt? 11. Noch nicht, aber ich hoffe, daß ſie in längſtens vierzehn Tagen fertig werden wird. 12. Was ſoll aus mir werden? 13. Es wird ein heißer Tag werden, ſprach ein alter Krieger, wenige Stunden vor der Schlacht, zu ſeinen Cameraden. 14. Die Sonne ſank in das Meer und es ward Nacht. 15. Der Kranke ſeufzet auf ſeinem Lager: „will es denn nie Tag werden?“ und der Taglöhner unter dem Drucke ſeiner Arbeit: „wird es denn nicht bald Nacht werden?“ 16. Das Wetter iſt ſchon ziemlich kalt geworden.

1. The present[1] we know, the future[2] we know not of, and honour to that man who can quietly await[3] the future. 2. Became your sister suddenly ill? 3. No, she felt a violent head-ache eight days previously. 4. Do you intend to become a learned man? 5. Let us go home before it gets dark. 6. Most people become ill through neglect[4]. 7. Many a one[5] has become quite an other man, after he has received a more careful education. 8. Most people become slaves of wealth instead of masters of it. 9. As soon as it becomes spring, the whole of nature revives again[6].

[1] Gegenwart. [2] Zukunft. [3] ruhig erwarten. [4] durch Vernachläſſigung [5] Mancher. [6] belebt ſich wieder.

SECTION XXXVI.

For "any" and "some," as generally used before a noun the German has no corresponding word. Ex.: Have you *some* bread? haben Sie Brod? Have you *any* silk? haben Sie Seide? I have some books; ich habe Bücher.

I. The indefinite adjective pronoun "some" is expressed in German by welcher, welche, welches. Ex.: Haben Sie Waſſer? Ich habe welches; I have "*some*." For the genitive of welcher, we employ the personal pronoun preceded by "*of*." Ex.: Haben Sie viel Waſſer? have you much water? Ich habe deſſen viel; I have much *of it* (literally, I have of it much). Haben Sie viel Hüte? have you many hats? Ich habe deren viele; I have many *of them* (I have of them many). From these examples it will be seen, that the *partitive* word in German is placed *after* the pronoun, while in English it is placed *before* it. In this use it is declined like the relative welcher.

DECLENSION OF welcher AS A PARTITIVE.

Singular.	*Masculine.*	*Feminine.*	*Neuter.*	*Plural of all genders.*
Nom.	Welcher,	welche,	welches,	welche, who;
Gen.	Deſſen,	deren.	deſſen,	deren, whose;
Dat.	Welchem,	welcher,	welchem,	welchen, to whom;
Acc.	Welchen,	welche,	welches,	welche, whom.

II. Genug, like "enough," is indeclinable and generally follows its noun, or stands independently. Viel and wenig are frequently used without declension. (§ 53.)

III. Das, as also dies (dies being a contraction of the neuter dieſes) is frequently used in referring to nouns of both numbers and all genders. Ex.: Wer iſt das? Who is that? Dies iſt mein Freund; this is my friend. Das ſind Franzoſen; those are French men. Das and dies, however, never precede and qualify a noun except of the neuter gender. (§ 134. I.)

IV. Es, like its English equivalent, may refer to nouns of both numbers and all genders; as, Es iſt mein Freund; it is my friend. When es refers to a noun in a plural, the verb must agree in number with the *noun*, while in English, it agrees with the *pronoun*. Ex.: Es ſind die Ruſſen, die Ungarn überwunden haben; it *is* (German, ſind) the Russians who have overpowered (conquered) Hungary. (§ 57. 8.)

V. Es, sometimes answer to our word "so" or "one." Ex.: Er iſt geſund, oder ſcheint es zu ſein; he is healthy, or appears *so* to be. Er iſt Soldat, aber ich bin es nicht; he is (a) soldier, but I am not one. Es is likewise rendered by "there" (Sect. 37 III.). Ex.: Es ſtand in alten Zeiten ein Schloß ſo hoch und feſt (Uhland); "there" stood in ancient times a castle so lofty and fair. Es war ein König in Thule; "there" was a king in Thule. (§ 57. 8.)

VI. Es is often so used as to have no *equivalent* in English. Ex.: Es reden und träumen die Menſchen viel von beſſern künftigen Tagen (Schiller); men talk and dream much of better future days. Ich weiß es, daß er da war; I know (it) that he was there. Es leben die Freiheitskämpfer; (long) live the champions of liberty. Es lebe die Republik; (long) live the republic.

EXERCISE 40.

Arzt, *m.* physician;	Gram, *m.* grief, affliction, sorrow;	Kurz, short;
Fleiß, *m* diligence;	Klug, prudent, judicious;	Milch, *f.* milk;
Gelehr'ſamkeit, *f.* erudition, learning;	Köchin, *f.* cook;	Nagel, *m.* nail,
Glück, *n.* luck, fortune, happiness;	Kummer, *m.* anxiety, distress;	Pulver, *n.* powder;
		Stahl, *m.* steel;
		Stolz, pride.

Er hat mir Aepfel und Birnen gegeben.	He has given me (some) apples and pears.

Wollen Sie Brod oder Kuchen haben?	Will you have (some) bread or some cake?
Haben Sie feines schwarzes Tuch?	Have you (some, any) fine black cloth?
Hat er Geld genug', oder hat er keines?	Has he money enough, or has he none?
Er hat (deren) genug.	He has enough (of it).
Hat sie Bücher genug'?	Has she books enough?
Sie hat deren genug', aber zu wenig Zeit, dieselben zu lesen.	She has enough of them, but too little time to read them.
Wissen Sie wer das ist?	Do you know what that is?
Es ist mein Vater, meine Mutter, mein Kind.	It is my father, my mother, my child.

1. Wie alt ist dieser Mann? 2. Er ist nicht sehr alt. 3. Hat er viel Geld? 4. Ja, und er hat auch viele Freunde und viele Feinde. 5. Welcher Knabe hat viel (See II.) Aepfel und Birnen? 6. Einer von den Söhnen des Bauern hat viel Aepfel, der andere viel Birnen. 7. Der eine hat viel Glück, der andere hat nur Gram und Kummer. 8. Wie viel Brod hat der Bäcker? 9. Er hat sehr viel Brod, aber nur wenig Mehl. 10. Dieser Mann hat wenig Geld, aber viel Gelehrsamkeit. 11. Diese Stiefeln sind mir viel zu groß, und die Schuhe sind meinem Bruder ein wenig zu kurz. 12. Wird Ihr Oheim viel Pulver kaufen? 13. Er wird nur wenig kaufen, denn er hat zu wenig Geld. 14. Wer ist das? 15. Es ist ein alter Freund des Arztes. 16. Wer hat gutes Wasser? 17. Der Matrose hat welches. 18. Werde ich morgen Bücher haben? 19. Sie werden schon heute welche haben. 20. Hat der Bauer viel Weizen? 21. Er hat dessen nicht viel. 22. Hat der Schmied viel Stahl? 23. Er hat dessen viel. 24. Hat er viel Nägel? 25. Er hat deren viel. 26. Wer hat Milch? 27. Der Bauer hat welche. 28. Hat er deren sehr viel? 29. Er hat genug.

1. We must be cautious in the choise[1] of him, to whom we confide important concerns[2]. 2. They, that (who) speak evil[3] of others are often worse[4] than those, whose failings they lay open[5]. 3. He professed[6] that religion, whose origin is divine[7]. 4. This boy has too much pride and too little diligence. 5. That is the man through whose help he was saved. 6. Which pleased you the most? This or that? Neither. 7. Can those be loved whose vices are detested by everybody[8]. 8. How many hats has that boy? 9. He has three of them. 10. Who will ave good bread? 11. The baker will have some.

[1] vorsichtig in der Wahl. [2] wichtige Angelegenheiten anvertrauen. [3] übel. [4] schlimmer. [5] bloßstellen. [6] bekannte. [7] Ursprung göttlich ist. [8] Jedermann

LESSONS IN ENGLISH.—No. XXI.

By JOHN R. BEARD, D.D.

SUFFIXES (*continued*).

LANGUAGE has many a tale to tell respecting national character and manners. The fact that the English names of animals, when alive, are of Saxon origin, e. g., *bull*, *sheep*, *calf*; and that the English names of animals, when dead, are of French origin, e. g., *beef*, *mutton*, *veal*, in showing that at one period of our history the Saxon population fed the animals, and the French population ate them, shows also that the former were in hard servitude to the latter; in other words, that our Saxon ancestors were serfs, and the forefathers of the present French were masters on this soil of England.

Such a relation was not likely to be durable. A proof of the assertion is found in the words etiquette and coquette, to which reference was made in the last lesson. Etiquette and coquette are both of French origin. Essentially French are the things which the words stand for. Among the French those things had their birth, and on the soil of France they flourished. Hence you learn that lightness, weakness, and vanity are essential features in the character of Frenchmen. Superficial, if pleasing, a true type of the French character may outshine, or for a moment overcome, an Englishman, but he is utterly unable to hold our countryman in permanent subjection.

Equally illustrative of national character is the fact that Pantaloon and Punch come to us from Italy. Pantaloon is from the Italian Pantalone, written in full the word is Piantaleone, signifying, *lion-planter*. Piantaleone was a surname or name of honour, given in the middle ages to a very powerful Venetian, who planted the lion-banner, the symbol of the Venetian republic, on many islands of the Mediterranean. His renown caused Piantaleone to be brought on the stage. Hence Pantaloon, the lion-hearted, who originally bore a nearer resemblance to his prototype than is found in the impudence and hardihood of the modern degenerated specimen. And hence the peculiar dress of Pantaloon (also trowsers called *pantaloons*), which, making due abatement for exaggerations, was the attire of distinguished Italians in former days.

Our Punch owes his birth and his name to Italy. Punch is derived from the Italian Pulcinella; and Pulcinella seems to be made up of Puccio d'Aniello; that is, Puccio, an ill-made, witty clown of the town Aniello, who gained a livelihood by his antics in the market places and public highways. The character being transferred to the stage, Punch came to be the recognised symbol of fun and frolick. The refined wit of the excellent and very useful weekly periodical which delights in the name of "Punch,"[9] is a much later growth.

Ing, in Anglo-Saxon, signifies son, as Edgar Athel*ing*; that is, *Edgar the son of Athel, or Edgar of noble blood*. In English, *ing* forms the ending of our active participles, as sing*ing*, from *to sing*; also a very large class of nouns; thus, sing*ing* itself may be employed as a noun; e. g., *the singing was good*. These nouns, as might be expected from the meaning of the Saxon *ing*, denote existence; thus, to sing is a verb, but sing*ing* is the active of the verb in actual being. When these words in *ing* are used as nouns they should have the government of nouns; thus, *the singing of the birds was delightful*. Almost every English verb may be made into a noun by the suffix *ing*; e. g., to eat, the eat*ing*; to diminish, the diminish*ing*; to run, the runn*ing*. Observe that the idea of activity is connected with nouns ending in *ing*; as, the see*ing*; the hear*ing*; the dance*ing*; the report*ing*; that is, the act, the process of dance*ing*, report*ing*, &c.; wherein those nouns differ from other nouns which express the result of an action; e. g., *sight*, the result of the act of see*ing*; *report*, the result of the act of report*ing*. The former have been called active, the latter class passive nouns, from the analogy they bear to active and passive verbs.

Ion, from the Latin termination *-io*; as, actio, *action*; quaestio, *question*; motio, *motion*; visio, *vision*. Nouns in *ion*, like nouns in *ing*, may be called verbal, seeing they are derived immediately from verbs; as, actio, from Lat. ago, *I do*; motio, from Lat. moveo (motus), *I move*, &c. Nouns in *ion*, again, resemble nouns in *ing*, in having (for the most part) an active signification; but the ending *ion* differs from the termination *ing*, inasmuch as the former can be affixed only to nouns of Latin parentage, thus: we say the communicat*ion*, or the communicat*ing*; but WE CANNOT SAY the run*ion* (runn*ing*), nor the ris*ion* (ris*ing*). Nouns in *ion* are not so purely active as are nouns ending in *ing*. For instance, communicat*ion* may signify either the act of communicat*ing*, or the thing communicat*ed*, the *result* of the act of communicat*ing*. So devot*ion* may denote the act of devot*ing*, or the object devot*ed*.

Ique, from the Latin *iquus*, another form of *icus*; as in antiquus, *antique*. *Antiquus* means *ancient*; but ant*ique* does not mean ancient merely or generally, so much as ancient in relation to the immediate past, the age of the Reformation, the middle ages; not seldom has antique the subordinate notion of *curious*, *singular*, or *odd* connected with it; probably because ant*iques* are rare.

> "Name not these living death-heads unto me,
> For these not ancient but *antique* be." *Donne.*

> "And sooner may a gulling weather-spy
> By drawing forth heaven's scheme, tell certainly
> What fashion'd hats or ruffs, or suits next year,
> Our giddy-headed *antique* South will wear." *Donne.*

The word *antic*, from *antique* (formerly spelt antick), takes its force from this associated notion of singularity.

> "We cannot feast your eyes with masks and revels,
> Or courtly *antics*" *Shakspear.*

> "Within the hollow crown
> That rounds the mortal temples of a king
> Keeps death his court; and there the *antick* sits
> Scoffing his state." *Shakspear.*

> "A work of rich entail and curious mold
> Woven with *anticks* and wild imagery." *Spenser.*

[9] Query,—Is not "Punch" so called because the originators of that work settled the matter over a bowl of punch?—*Printer's Devil.*

Ise, formerly *ize*, of Greek origin, introduced through the New Testament; as in the word baptise, from baptidzo (*I dip frequently*). From the same Greek ending we have dogmatise, methodise, criticise. This termination gives rise to others; as from baptidzo come baptist, baptism, baptistry, baptismal.

"He (the pope) solicited the favour of England by sending Henry a sacred rose, perfumed with musk, and anointed with *chrism*."—*Hume*.

—anointed; that is, with a consecrated unguent or *holy oil*.

The suffix *ise* or *ize*, added to nouns, gives them the force of verbs, thus: to christianise, is to make Christian; to evangelise, is to bring men to the evangel; that is, the Gospel. In the use of this termination, authority must be followed.

The termination *ism* is employed to describe religious or social diversities; it is found in Atheism, Deism, Swedenborgianism, Calvinism, Arminianism, Owenism, &c.

While *ism* describes the sect, *ist* describes the sectary; as, Atheist, Deist, Methodist, &c.

The adherents to particular modes of faith are also designated by *arian*; as, Trinitarian, Unitarian; or *ian*,—e. g., Episcopalian. Sometimes the word *man* holds a similar post; as in Churchman, used in contrast with Dissenter. *Ist*, too, performs the same office; as in Nonconformist. Another form is *ite*; as found in Irvingite, Mormonite, &c. Analogy is a dangerous guide in English, for, while we say Irvingite, we DO NOT say Southcotite, but Southcotian—probably for the sake of euphony. This *ite* comes, we are disposed to think, not from the rare Latin ending *itus* (as auritus, *with pricked-up ears*), but the scriptural *ite*; as in Jebusite.

Ish, probably from the Saxon *ic* and the German *isch* (as in mürrisch, peevish), denotes, as in peevish, quality, and so forms adjectives. *Ish* has sometimes a diminutive force; as, thinnish, thickish. When forming part of verbs, as in punish, publish, *ish* has a different origin, and may be a softened form of the Greek termination *ise* or *ize*.

Ite, a patronymic, or father-name, the name that is expressive of a race, like the Greek *ides*, is very common in the Old Testament; from the language of which it may have come into the English; thus, Israelite is *a descendant of Israel*; so we have Hittites, Hivites, &c.

Ive, of Latin origin, from *ivus*, as seen in captivus, *a captive*; also in fugitive (fugio, Lat. *I flee*); nativus (natus, Lat. *born*), *a native*; votivus (votum, Lat. *a vow*), *votive*. This *ivus* in French becomes *if*, whence we have plaintiff (plaindre, Fr. *to complain*), the *complainant* in a suit in opposition to the defendant. Plaintiff and plaintive are the same words differently employed.

"We were here entertained with an echo repeating a whole verse in a softer and more *plaintive* tone, indeed, but with surprising precision and distinctness."—*Eustace*, "Italy."

Ix, (see *or*.)

Kin, from the Anglo-Saxon cyn, *kin*, *offspring*, *son*, signifies the *son of*; as in Wilkin (Wilkins); seen in another form,—namely, Wilson. Kin, from its signification, has also a diminutive force; as in lambkin (a lamb's child), or *little lamb*. What is little is dear, hence diminutives are terms of endearment. But what is little may be despised. Sometimes, therefore, diminutives imply contempt; as in mannikin.

"This is a dear *mannikin* to you, Sir Toby." *Shakspear*.

Le (see *el*), among the suffixes already given.

Less, from the Anglo-Saxon laes (German los, *destitute of*), has not a comparative but a negative force; as in an laes twentig, *one less twenty*, or, as we should say, twenty *minus one*. Hence it appears that the idea of *less* is privation or negation. Consequently *less*, the comparative of little, is altogether a different word. And thus we are also led to understand the true force of *less* when employed as a suffix; as, motion*less*, or *without motion*; death*less*, *free from death*. Two negatives thus make a positive; death, the privation of life, and *less*, the negation of death, combine to declare the idea of ever-enduring existence, the most positive, the most real, the most permanent of all conceivable things, the very essence of Deity; life itself.

Let, according to Latham, "seems to be double, and to consist of the Gothic diminutive *l*, and the French diminutive *t*."* It is found in streamlet, tartlet, hamlet (ham, Anglo-Saxon, *home*; as in hamstede, *homestead*).

Ling, of Saxon origin, denotes *descent*, and hence offspring; also that which is little, and that which is beloved; e. g., darling (*dear child*); gosling (*little goose*); nestling. Hireling, is properly a child of hire; a person whose services are obtained by hire. "The idea of contempt" ascribed to it by Latham, does not necessarily, for it did not originally, belong to the word.

"I will be a swift witness against those that defraud the *hireling* in his wages.—*Malachi* iii. 5 (compare *Job* vii. 1, 2; xiv. 6).

Stripling, given by Richardson as derived from to strip, may be connected with the Latin stirpes, stirps (in Greek ridz, *a root*), *offshoot*; so that stripling is a *little branch*, a *youngster*.

"He is but an *youngling*,
A tall, worthy *stripling*." *Skelton*.

The last line shows that nothing contemptuous belonged to the word in the olden time. Consult the ensuing.

"Now a *stripling* cherub he appears,
Not of the prime, yet such as in his face
Youth smil'd celestial." *Milton*, "Paradise Lost."

Ly, a termination of Saxon origin, having the force of our *like*, and so forming an adjective or an adverb; as child*like*, *childly*, in German kind*lich*; man*like*, *manly*, mann*lich*. When *ly* is added to a noun, it forms an adjective, as love, love*ly*; when it is added to an adjective, it forms an adverb, as wise, wise*ly*. Such a formation as "holi*ly*" (1 Thes. ii. 10) is to be avoided for the sake of euphony.

Carefully study the following conversation, and having done so, endeavour to imitate it.

CONVERSATIONS ON ENGLISH GRAMMAR AND COMPOSITION.—No. I.

"Well, I have failed again; a packer I am, and a packer I must remain, fond as I am of reading, and desirous as I am of getting an employment more suitable to my tastes. And yet, if I had fair play, I could, I am sure, do the counting-house work as well as some that are there."—"Not quite, William; true you are intelligent and trustworthy; you also write a good hand, and are ready at accounts, but you are a very poor Grammarian."—"Not so poor as you think; though I am, I grant, far behind you, Thomas; but then you have been at college, and ought to know Grammar."—"Yes, and I am willing to teach you, for I am sure you will never get forward as you wish, and as I should like to see, until you can write your mother tongue correctly."—"I know that, and I have studied English Grammar; but it is very difficult."—"Yes, and you still write bad English: for instance, your letter of application for the vacant situation contains not less than three grammatical mistakes, and is enough of itself to prevent your success. How can you expect to rise in the world when you cannot speak and write English? In a counting-house they want their letters written grammatically. It would be a disgrace to a house to send out letters containing errors of Grammar like those which you commit."—"I dare say you are right; and so I must remain a packer."—"That does not follow; learn the English Grammar."—"A very easy precept, but a very hard job."—"Not so hard as you think."—"Excuse me, I have tried, and I have failed."—"Because you tried by yourself."—"By myself I must still try, or give it up."—"No, I will assist you, if you will make one more effort. Let us talk over the matter; I think I can make the study easy to you. Once a-week we will converse together on English Grammar, and if you will only reflect in the intervals on what I say, and follow my guidance, I have no doubt you will, in time, understand the subject thoroughly."—"I agree, and am very much obliged to you for the offer."—"O, never mind the obligation; brothers should assist each other, and I am very desirous to see you in such a position as your character and talents mark you out for."—"Let us begin this evening."—"Very well, and you must come to the parsonage every Tuesday evening at eight o'clock, and we will see what can be done."

"Now, as a fundamental rule, you must observe that Grammar is a science in which authority goes a very long way. At first, you will do well to consider that everything depends on authority."—"What authority?"—"That of the best writers in the language. If you study English Grammar, then you take as your authorities or guides such men as Shakespear, Milton, Dryden, Johnson, Pope, Macaulay. Their practise is your model. As they write so you must write. Grammar then, you see, is, for our purpose, imitation. Those who write English Grammar derive the instructions they offer from the usages of the best English authors, or, as they are termed, the English classics."—"'Classics!' why I thought the term 'classics' was confined to the Greek and Roman authors, such as Homer and Virgil."—"O no, every literature has its 'classics.' The word is derived from 'class,' and denotes those writers who, by common consent, are placed in *the first* class. The practise of such writers sets the fashion in the language in which

* The English Language, p. 285.

they write, and they are followed by all who wish to speak and write that language correctly. Now you are to suppose that I have studied our English classics, and have hence ascertained how I ought to speak and write. In that study I have been preceded by others. Their conclusions afford me aid. Under that aid I have formed a system of rules, and that system of rules is called 'English Grammar.' English Grammar, then, you see, is a science. Science, you know, means knowledge; it is knowledge, the materials of which are systematically arranged; arranged, that is, into a system, arranged in a set order, and with a view to a certain purpose or result; and English Grammar consists of a continued set of rules derived from the practice of well-educated Englishmen, so arranged as to form a complete whole, and communicate useful information to the learner."—"Well, I understand that; but in our house every body says 'they does,' and you told me yesterday that was wrong."—"It is wrong; remember I said that we are guided by the practice of *educated* Englishmen, and educated Englishmen say "they do."—"But what does the word Grammar signify? I thought a Grammar was a book; you say it is a science."—"It is both. Grammar is a word of Greek origin. It comes from *gramma*, which denotes a letter, a letter of the alphabet. Hence Grammar is the the science of letters—letters, that is, employed to express ideas. Listen, letters represent sounds, and form syllables and words; words represent sounds, and the sounds they represent, represent or stand for thoughts or ideas; while those thoughts or states of mind represent things, objects in the inner world or in the outer world. This statement will require thought. Do not trouble yourself too much about it now, you will understand it by and bye. But observe that Grammar is the science by which you learn to express your ideas correctly, that is, according to the usages of the best authors. And a book in which these usages are set forth as rules is also called a Grammar. Every language has rules peculiar to itself. Hence we have 'French Grammar,' 'Greek Grammar,' as well as 'English Grammar.'"

ANSWERS TO CORRESPONDENTS.

J. GUTHRIE, sen. (Kelso): We admit that the *mutability* of matter is not its *annihilation*, but we cannot admit that its *non-annihilation* is any proof of its *existence from eternity*. God having once called *matter* into being, may *change* it from time to time as it pleases Him, and even endow it with *eternal existence after its creation*; but this is certainly no proof of its *pre-existence from eternity*; and this is all we contend for. If matter be changeable or mutable, there must be an immutable or unchangeable being who made it so; and if it be rendered immutable or unchangeable, it can only be according to the will of HIM, who willeth all things, and they are done. It is a glorious statement of His, "I give unto *my sheep* eternal life, and they shall never perish, neither shall any one pluck them out of my hand. * * * *I and the Father are one.*" As to the reference to Psalm lxxviii., verse 69, it is not in point, because it denies the *pre-eternity* of matter by the assertion that "the earth He [that is, God] has established *for ever.*" Neither does this sentence assert the *post eternity* of matter in the original Hebrew; for the phrase *Le Olam* translated *for ever*, signifies only FOR THE HIDDEN PERIOD, for the *time unknown*,—that is, for *the time known only to God*. Otherwise, the following scripture would be contradictory; but with the true translation of the phrase, it is in perfect harmony: "But the day of the Lord shall come as a thief in the night; in which the heavens, [that is, the lower heavens, or atmosphere] shall pass away with a great noise, and the elements shall melt with fervent heat, *the earth also and the works therein shall be burnt up.*" 2 Peter iii. 10.

JAS. CHARLETON (Birmingham): We understand that the system of shorthand used by reporters of the daily press, is not Pitman's, but a modification of Taylor's or Gurney's. A gentleman belonging to this staff in the Metropolis would oblige ourselves very much by informing us more precisely on this point.—WM. JONES (Liverpool): We shall explain all about gravity, and specific gravity, when we come to Natural Philosophy; as to the nature of decimals, and units, and zeros, he should consult Cassell's Arithmetic.—DEUX JEUNES HOMMES (Hollinwood): If *e* be final in *heiress*, and consequently not pronounced, how can *s* be final too? The *s* must be pronounced because it is *not* final. What meandering is this? *eau* is a triphthong, and is pronounced *o* in French.—W. JACKSON (Manchester): His answer is too long.—J. RUSSELL (Kingseavil): His solution is correct. The final *e* is pronounced.—W. G. (Tokenhouse-yard) should study Dr. Beard's Lessons in English first, or along with one of the other languages.—P. E. E. (Ely): We do not know.—ROWBOTHAM (Sutton-in-Ashfield): Tardy's Improved.—G. W. (Holme-lane) proposes to ask Tantamus first, by what power can an irresistible body be SET in motion? He is wrong on the snail, and on the eternity of matter; let him read our answer to J. Guthrie, sen.—WILLIAM TAPSCE (Bradbury): We shall keep Lessons in Agriculture in view.—W. S. (Cheltenham): We have said *Spiers* long ago; we use *Boniface* and find it very good; we do not recollect the price.—S. R. B. (Halsted): There are lessons in Grammar every week, the best that could be got, and they are entitled *Lessons in English*.—LAMARTINE (Rotherithe): We do not know *the best*; but there are some teachers of French in London, who use the P. E. as a *text-book*; if they will send their addresses we will insert them.—GULIELMUS: When you "wonder whose plan it is," you "wish to know the *person* whose plan it is;" the antecedent to *whose*, therefore, is *person*, understood though not expressed.—A. RICHARD (Crowhurst): Correct.—J. W. D. (Lambeth): Thanks.—CELSUS: The same result would happen.—UN IRLANDOIS will find what he wants in Cassell's "Manual of the French language," price 2s., and in books such as "Graham's English Composition;" his letter is well written.—CLASS OF FOUR (London): Answers to query 1, NO; 2, Herodotus, 443 B.C.; 3, in Paris; 4, we cannot find the words referred to; 5, the sentence is right.

W. MURPHY: As we intend to give some Lessons on the Physiology of Food he will learn our opinion as to the diet best adapted to our variable climate. In the meantime he cannot do better than keep to mixed diet.—E. A. M. will be satisfied with the above intimation, since he has thus the prospect of obtaining all the information he now desiderates.—CATHCART: To our friend who writes from that locality we beg to say that we hope to follow up the Lessons on the Physiology of Food with a series of papers on those forms of disease to which we are liable, and their mode of treatment.—X. X.:—We recommend him not to trifle with Hernia. He should beware of extreme exertion—be careful in attending to the state of the bowels, and should by all means wear a TRUSS. There is a society in London which supplies this useful article either gratuitously or at a very reduced price. By no means should he fail to consult an experienced surgeon. We presume he could get the article above-mentioned on similar terms at the Glasgow Royal Infirmary.—ADOLESCENS: There can be no doubt that if an Albino marry an Albinoe, though both of European extraction, their children, according to all the known laws of physical generation, will, more or less, resemble themselves in the peculiar and distinctive characteristics. Even if the female should belong to another species, since the share in the reproductive function, which belongs to the male, essentially consists in the formation and liberation of the reproductive particles, the offspring are more likely to take on the paternal likeness. For example: let a Jew marry a woman who by birth is removed to the greatest possible distance from Jewish connexion, and you will find that their children strikingly exhibit all the characteristics of the Hebrew nation. If our correspondent is an Albino, we would advise him not to marry an Albinoe. The influence of intermarriage with other portions of the race, with change of climate, and other favourable agencies, is such as in progress of time to overcome these peculiarities.

P. T.:

	PREDICATE.	
Subject.	*Copula.*	*Attribute.*
he	is	running
he	is	weeping
he	is	thinking
he	runs	
he	weeps	
he	thinks	

As many of our correspondents are desirous to know where cheap globes may be had, we have pleasure in recommending a "Portable Globe" sold by John Betts, 115, Strand, London, price 3s. 6d. This globe is about sixteen inches in circumference, constructed of pasteboard so contrived that it can be laid perfectly flat, or in less than a minute can be made to form a sphere. It is engraved in a distinct manner, and not overcrowded with names, being chiefly adapted *for beginners*.—E. J. RALPH: Thanks for his information; does he mean a *book* (or box) of instruments; he has written *book!* We are informed by W. W. SNELLING, that the box of instruments announced by the Society of Arts may be obtained at the office of the Society, Adelphi, London, price 2s. 6d. or 6s. each, according to value. The boxes of colours may be obtained at Mr. Rogers', Bunhill-row, St. Luke's, price 1s.—T. GIBBS (Southwark): Thanks for suggestions on the Latin dictionary.—A LEARNER (Bonner's-road): See answers on the same subject to others.—BEATRICE (Manchester): Pitman's is strongly recommended to us by a host of subscribers; but we have two parties to please, those who follow short-hand as an amusement or an aid to private study, and those who follow it as a profession; it is not used by parliamentary reporters. Spanish will come in its turn.—J. ARMITAGE (Bradford): Thanks for his correction. Our readers will please to draw the pen through the word *length*, vol. i., page 309, col. 2, line 26. To improve your spelling write a good deal of English, and whenever you are in doubt consult a dictionary.—J. B. (Forfar) should purchase Cassell's Euclid and Arithmetic, and study the lessons on the same in the P.E.; we do not recommend *the course* he mentions.—W. STEPHENSON (Lancaster): The errors have been corrected.—G. QUAIGH (Manchester) shall have the explanation in the Lessons. We know no better plan than to go to Norway; the next best would be to order a Norwegian grammar and dictionary, if such can be had, from D. Nutt, foreign bookseller, Strand.—J. A. (Hull): See vol. I., p. 176, col. 1, and p. 208, col. 1.

LITERARY NOTICES.

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LESSONS IN BOTANY.—No. XIV.

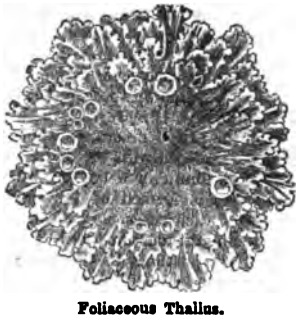
CLASS XXIV. CRYPTOGAMIA.

In this class those plants are ranged which have no apparent flowers, and do not appear to produce seed in the same way as flowering plants. Linnæus gave them the name of *cryptogamia*, formed from two Greek words, meaning *hidden* marriage, from this circumstance. Some light has been cast upon them since the day of that distinguished naturalist, but much still remains to be learned. It is, however, generally admitted that the plants of this class produce a number of small particles called *spores*, each of which contains several minute germs, which spring from it without any particular regularity, and which are not assisted in their growth, by any such store of nutriment as that provided in the seed of others. Of some of these, we shall therefore take a brief survey.

Fig. 1.

Lichen Cups.

Fig. 2.



Foliaceous Thallus.

Among them are the *lichens*, those peculiar looking productions which give so much of the character of age and antiquity to trees, rocks, stones, and walls, by their various shades of grey, brown, black, and yellow. *Thallus* is the term generally applied to that part of a cryptogamia plant which bears the reproductive organs; and in lichens it constitutes the great bulk of the plant. When it resembles a little shrub, it is called *centripetal*, but it is termed *centrifugal*, or *foliaceous*, fig. 2, when it opens like a rosette.

Fig. 3.

Mushroom.

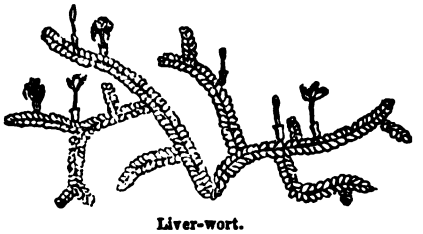
Fig. 5.

Frullania Hutchinsiæ.

Several of the species are valuable, supplying us with dyeing materials. One of them is scraped from the rocks, and sold to the manufacturer by the people of Auvergne. It yields a rich purple dye, called *litmus*, which is used very extensively in France, either alone, or mixed with similar lichens. Another species is the celebrated *Cudbear* of commerce. This plant was long used by the Welsh and Scots, for dyeing linen cloths of a dull brown tint, but was brought into general use as a purple dye by Dr. Cuthbert Gordon, who took out a patent for the dye, and changing his own name to Cudbear, gave this also to the substance which he had procured from the lichen. This plant is imported largely from Norway, but it thrives well on the rocks in the Highlands.

One of the *fungi*, the edible mushroom, fig. 3, is known to everybody. The gills are of a pale-pink colour, becoming by age, of a dark chocolate brown. According to M. Dutrochet, what we commonly regard as the whole plant, namely, the *bonnet* and the *stem*, are nothing more than the fruit, the plant itself being wholly concealed under ground, and consisting of the small delicate white substances which gardeners term the spawn, and which is well known to be indispensable when mushrooms are cultivated artificially. It ought to be known to all who gather mushrooms for the table, that the funguses similar to them in form, which grow in woods, and

Fig. 4.



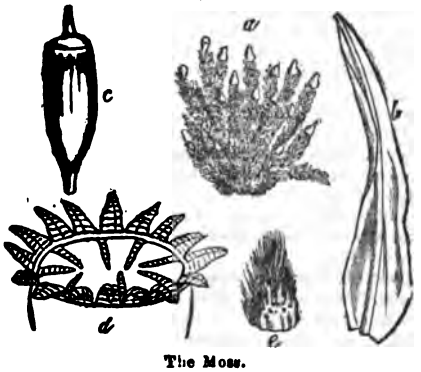
Liver-wort.

are of bright colours, or have warts on the bonnets, are more or less poisonous or dangerous.

The truffle used like the mushroom for food, has no root, but grows beneath the surface of the ground. It is round and solid, and the outside is rough. The method of finding this subterranean delicacy is by dogs, which are taught to hunt for it by the scent. As soon as they discover it, they begin to bark and scratch up the ground, a sure indication to their employers that the truffle of which they are in search is at hand.

The *liver-wort*, fig. 4, besides its regular fructification, which con-

Fig. 6.



The Moss.

sists of little bodies forming, as it were, the spokes of a wheel, and which are cases containing *spores*, has a very curious apparatus. For the spores, when mature, are scattered by a set of elastic spiral filaments, which lie among them. When it begins to develop itself, the spore does not altogether burst and emit the grains it contains, but its outer coat only ruptures, and a long tube projects from its interior, within which new cells are seen to grow, taking their origin from the minute grains which the spore contained. These cells

gradually increase into a leafy expansion, from the lower part of which root-fibres proceed; and this, in due time, acquires the appearance of the original plant, and forms its own organs of fructification.

Of the *Jungermania* we have about seventy species, some of them being so small as to be scarcely visible, yet every part is highly curious. In the shape of the leaves there is a marvellous diversity, and the fruit vessel is very remarkable. Before it opens it is round, fig. 5, *a*, and when ripe it splits into a perfect cross, letting out its little round seeds, attended by a number of thread-like springs, which, flying out suddenly, scatter the seeds around.

Mosses, though apparently insignificant, are not useless. They protect the roots of tender plants from the extremes of cold and heat, and many kinds of them, by vegetating in the shallow parts of pools and marshes, in the course of a long period of time, convert the space which was before only water and bog into useful land and fertile pastures.

The mosses have stalks and leaves, fig. 6, *a*; they are also provided with one or two nervures, *b*, which are wanting in the liverworts—for what is called the nervure in the membranous or leafy species is nothing more than the stalk itself, on the edges of which the leaves are fastened together in such a manner as to form, apparently, a continuous whole. In the figure 6, *c* represents the vessel containing the spores, *d* the capsule, and *e* the hood

Fig. 7.

Hooker's Shining Moss.

In fig. 7 we give one of the beautiful mosses which send forth their delicate capsules at the close of the year to direct our readers to the flowering, which thousands pass altogether unnoticed.

On the damp banks of ditches, and similar places, there are often vacant spots of earth left, after the other portions of the soil, especially where it is exposed to the sun, are clothed with grass and other herbage. On the bank least exposed to the sun, and even in spots where its rays never come, Hooker's shining moss (fig. 6) and Necker's curled moss appear, and grow most luxuriantly. In like manner the proliferous feather moss grows in broad patches in woods and groves, covering much ground, which, but for it and its congeners, would exhibit nothing but the naked surface of the earth, and would, of course, expose the trees to the drought of summer, and the frost of winter, which are by this means effectually prevented.

With one of these little plants an interesting circumstance stands connected. Mungo Park, when in the interior of Africa, describes himself as cruelly stripped by banditti, and thus proceeds:—"In this forlorn and almost helpless condition, when the robbers had left me, I sat for some time looking around me with amazement and terror; whatever way I turned nothing appeared but danger and difficulty. I found myself in the midst of a vast wilderness, in the [illegible] of the rainy season, naked and alone, surrounded by savage animals, and by men still more savage. I was five hundred miles from any European settlement. All these circumstances crowded [illegible] on my recollection, and I confess that my spirits began to fail me, I considered my fate as certain, and that I had no alternative left to lie down and perish.

"The influence of religion, however, aided and supported me. I reflected that no human prudence or foresight could possibly have averted my present sufferings, I was indeed a stranger in a strange land, yet I was still under the protecting eye of that God who has condescended to call himself the stranger's friend. At this moment, painful as my reflections were, the extraordinary beauty of a small moss caught my eye; and though the whole plant was not larger than the top of one of my fingers, I could not contemplate the delicate conformation of its roots, leaves, and fruit without admiration. Can that Being, thought I, who planted, watered, and brought to perfection, in this obscure part of the world, a thing which appears of so small importance, look with unconcern upon the situation and sufferings of creatures formed after his own image? Surely not! Reflections like these would not allow me to despair. I started up, and disregarding both hunger and fatigue, travelled onwards, assured that relief was at hand, and I was not disappointed."

Of all the CRYPTOGAMIA, the ferns approach most nearly to flowering plants. They present a small number of leaves, generally much divided into leaflets, and these again often minutely subdivided, each arising from the ground by a woody stalk, which is commonly regarded as the stem of the plant. The true stem, however, is buried beneath the ground, or sometimes creeps along its surface, and the branches it sends upwards into the air are really the leaf stalks. In several parts of the earth, ferns assume the form and magnitude of trees, and at the southern extremity of Van Dieman's Land, a species has been seen whose trunk was from twelve to sixteen feet high.

Nothing like a flower is ever seen in the ferns. The spore-cases are here developed on the backs or at the edges of the leaves. When the fructification is matured, which may be known by the brownish tinge of the yellow or orange spots or ridges on its leaves, if one of them is placed with its under-side upon a piece of white paper this will be found in a day or two covered with a very fine brown dust. This is formed of the spores which are scattered by the bursting of their cases. In most ferns all the leaves are concerned in producing the fructification. The term frond is generally applied to the leafy portions of the Cryptogamia, as distinguishing them from the true leaves of flowering plants.

LESSONS IN FRENCH.—No. XXXI.

By Professor LOUIS FASQUELLE, LL.D.

SECTION LXVI.

1. Avoir beau—Vous avez beau, corresponds in signification to the English expression, *it is in vain for you to*. It must be followed by the infinitive:—

Vous avez beau dire, il ne viendra pas.	*It is in vain for you to think, he will not come.*

2. Epouser, marier, *to marry*, have, in French, a different meaning. *Marier*, conjugated actively, can only have as its nominative the person performing the ceremony, or giving one or both of the parties in marriage; *épouser* takes, as its nominative, the contracting parties only, and must always be followed by a direct regimen. Se marier, *to get married*, and marier, conjugated passively, take the same nominative as *épouser*:—

M. L. a marié sa fille avec M. G.	*Mr. L. has married his daughter to Mr. G.*
M. G. a épousé la fille de M. L.	*Mr. G. has married Mr. L.'s daughter.*
M. G. et Mlle. L. sont mariés.	*Mr. G. and Miss L. are married.*
Mon frère va se marier.	*My brother is going to be married.*

3. Un de mes amis, is equivalent to the English, *a friend of mine*:—

Votre ami a épousé une de mes amies.	*Your friend has married a friend of mine.*

RESUME OF EXAMPLES.

Ils ont beau dire et beau faire, ils ne l'empêcheront par de se marier	*Whatever they may say or do, they will not prevent his marrying.*
Vous avez beau lui faire des remonstrances.	*It is in vain for you to remonstrate with him.*
L'évêque de B. a marié ma sœur.	*The Bishop of B. has married my sister.*
Le capitaine G. a épousé ma cousine.	*Captain G. has married my cousin.*

Quand il se mariera, il nous invitera à la noce.	*When he marries, he will invite us to the wedding.*
Votre cousine est mariée avec mon cousin.	*Your cousin is married to my cousin.*
Votre cousine a épousé un de mes cousins.	*Your cousin has married a cousin of mine.*
Le colonel a épousé fille de mes voisins.	*The colonel has married a sister of mine.*

Exercise 131.

Aîné, e, *elder, eldest.*	Devoir, 3. fr. *to owe, to be about.*	Parent, s, *relation.*
Archevêque, m. *archbishop.*	Époux, pl. *couple; man and wife.*	Princesse, f. *princess.*
Cadet, te, *younger.*	Infanterie, f. *infantry*	Prochain, e, *next.*
Demoiselle, f. *young lady.*	Evêque, m. *bishop.*	Savoir, 3. fr. *to know.*
		Régiment, m. *regiment.*
		Vieillard, *old man.*

1. Votre nièce ne va-t-elle pas se marier? 2. Elle se mariera l'année prochaine. 3. Qui épousera-t-elle? 4. Elle épousera le fils aîné du général M. 5. Savez-vous qui a marié ces deux époux? 6. L'archevêque de Paris les a mariés. 7. N'a-t-il pas aussi marié Mlle. L.? 8. Il l'a mariée avec M. G. 9. Qui votre demoiselle a-t-elle épousé? 10. Elle a épousé M. L., capitaine au 25ème régiment d'infanterie. 11. Ce vieillard n'a-t-il pas tort de se marier? 12. Il n'a pas tort de se marier, mais il a tort d'épouser cette demoiselle. 13. Quand ces princesses vont-elles se marier? 14. Elles se marieront le mois prochain. 15. Qui les mariera? 16. L'évêque d'Arras les mariera. 17. Qui doivent-elles épouser? 18. L'aînée doit epouser M. W. et la cadette M. G. 19. Le capitaine G. n'a-t-il pas épousé une de vos parentes? 20. Oui, Monsieur, il a épousé une de mes cousines? 21. Qui est cette demoiselle? 22. C'est une de mes sœurs. 23. N'avez-vous pas un de mes livres? 24. J'ai un de vos livres et une de vos plumes. 25. Je viens de parler à une de vos sœurs.

Exercise 132.

1. *Is your brother* going to marry Miss L.? 2. Yes, Sir, it is in vain for us to speak to him, he will marry her. 3. Will not your father marry your sister to Mr. G.? 4. No, Sir, he will marry her to Mr. L. 5. Is Captain H. married? 6. No, Sir, he is not yet married, but he will be married next year. 7. Whom does he intend to marry? 8. He intends to marry a cousin of mine, who is at my brother's. 9. Who will marry them? 10. My eldest brother intends to marry them. 11. Is your youngest sister married? 12. No, Sir, she is not married. 13. Is she going to be married? 14. She will marry when she is [Sect. 60, 6] old enough (*assez âgée*). 15. Whom did Colonel J. marry? 16. He married a sister of mine. 17. How long have they been married [Sect. 56. 2]? 18. They have been married two years. 19. Is not that young lady wrong to get married? 20. She is wrong to marry, she is too young. 21. Who married General S. and Miss N. 22. The Bishop of Arras married them. 23. Did not the Archbishop of York marry that couple? 24. The Archbishop of Paris married them. 25. Will not your aunt marry? 26. She will not marry. 27. Is not your sister at home? 28. No, Sir, she is with (*chez*) an aunt of mine. 29. Is your brother at your house? 30. No, Sir, he is with one of my relations. 31. Is he married? 32. He is not married. 33. Is Captain H. married? 34. He was married last week. 35. He married Miss H.

Section LXVII.

Dimension, Weight, etc.

1. The verb *avoir* is used in expressing the size of an object. The preposition *de* precedes the noun of dimension. When there is no verb in the sentence, the preposition must be placed before the number, and again before the noun of dimension :—

Cette muraille a dix pieds de hauteur.	*That wall is ten feet high.*
Ce puits a cent pieds de profondeur.	*That well is one hundred feet deep.*
Une table de quatre pieds de longueur.	*A table four feet long.*

2. In sentences where sizes are compared, and the verb *être* is used, the preposition *de* is placed before the number expressing the excess :—

Vous êtes plus grand que moi de deux pouces.	*You are taller than I by two inches.*

3. When the price of an article is mentioned, the article *de* is used before the noun expressing the measure, weight, &c. When the remuneration, or rent, &c., for a definite space of time is mentioned the preposition par (*per*) is used :—

Le beurre se vend un franc la livre.	*Butter is sold [at] a franc per pound.*
Il gagne dix francs par jour.	*He earns ten francs per day.*

4. The same preposition is used, when we speak of the number of times any occurrence takes place in a given space of time :—

Je vais à la poste deux fois par jour.	*I go to the post-office twice a day.*

Résumé of Examples.

La ficelle se vend deux francs la livre.	*Cheese is sold [at] two francs per pound.*
Cette soie vaut six francs le mètre.	*That silk is worth six francs per metre.*
Ce clocher a cinq cents pieds de hauteur.	*That steeple is five hundred feet high.*
Cet étang a huit pieds de profondeur.	*That pond is eight feet deep.*
Une chambre de quinze pieds de longueur, sur dix-huits de largeur, et huit de hauteur.	*A room fifteen feet long by eighteen feet broad and eight feet high.*
De quelle taille est votre frère?	*How tall is your brother?*
Sa taille est de cinq pieds huit pouces.	*His height is five feet eight inches.*
Notre ami est-il grand ou petit?	*Is our friend tall or short?*
Il est de taille moyenne.	*His height is middling.*
Votre maison est plus haute que la mienne, de cinq pieds.	*Your house is higher than mine by five feet.*
Je vais à l'école deux fois par jour.	*I go to school twice a day.*
Il nous paie huit francs par semaine.	*He pays us eight francs a week.*

Exercise 133.

Bon marché, *cheap.*	Grandeur, f. *size.*	Profondeur, f. *depth.*
Cassonade, f. *brown sugar.*	Hauteur, f. *height.*	Pouce, m. *inch.*
	Largeur, f. *breadth.*	Semaine, f. *week.*
Ecossais, e, *Scotch.*	Longueur, f. *length.*	Taille, f. *height, size.*
Epaisseur, f. *thickness.*	Loyer, m. *rent.*	Verge, f. *yard, gard, rod.*
Etoffe, f. *stuff.*		

1. Votre maison est-elle grande? 2. Elle a cinquante pieds de long et vingt-cinq de large. 3. Combien de longueur votre jardin a-t-il? 4. Il a vingt-cinq verges de longueur et douze de largeur. 5. De quelle grandeur est ce livre? 6. Il a dix-huit pouces de longueur, treize de largeur et trois d'épaisseur. 7. Votre maison est-elle plus longue que celle-ci? 8. Elle est plus longue de deux pieds. 9. Quelle profondeur a ce puits? 10. De quelle hauteur est ce clocher? 11. Il a trois cent cinquante-trois pieds de hauteur. 12. De quelle taille est cet officier? 13. Il est de haute taille. 14. De combien cet Ecossais est-il plus grand que son frère. 15. Il est plus grand de toute la tête. 16. N'êtes vous pas de beaucoup plus grand que moi? 17. Je suis plus grand que vous de trois pouces. 18. Combien cette étoffe se vend-elle la verge? 19. Elle se vend trois francs le mètre. 20. La cassonade ne se vend-elle pas cher? 21. Elle se vend à bon marché. 22. Combien de lettres écrivez-vous par semaine? 23. Je n'en écris que six par semaine. 24. Combien payez-vous par semaine pour votre loyer? 25. Je ne paie que dix francs par semaine.

Exercise 134.

1. How large is your father's garden? 2. It is twenty-five rods long and ten broad. 3. Is your cousin's house large? 4. It is fifty-six feet long and forty broad. 5. Is your house larger than mine? 6. It is larger than yours by ten feet. 7. Do you know how deep that well is? 8. It is twenty-five feet deep and six feet broad. 9. How is that cloth sold per metre? 10. It is sold [at] forty-five francs per metre. 11. How much do you receive a week for your work? 12. I receive fifty francs a week for my work. 13. How much does your friend pay a month for his board (*pension*, f.)? 14. He pays seventy francs a month. 15. Are you taller than your cousin? 16. I am taller than he by the whole head. 17. Is not your nephew taller than your son? 18. He is taller than my son by three inches. 19. How large is this room? 20. It is sixty feet long by forty. 21. What size is your brother? 22. He is tall, he is taller than I. 23. How many books do you read a week? 24. I read ten volumes a week. 25. How is butter sold per pound? 26. Butter is sold [at] two francs per pound? 27. Do you know how much your son earns a day? 28. He earns as much

as yours, he earns ten francs a day. 29. How much is that silk worth per metre? 30. It is worth six francs per metre. 31. Our friend's stature is middling. 32. Do you go to church twice a day? 33. I go to church once a day. 34. Does your son go to the post-office every day? 35. He goes thither six times a day.

Section LXVIII.

1. Mettre (4. ir.) forms, in French, many idiomatic expressions. Mettre à même de, *to enable*; mettre pied à terre, *to alight, to land*; mettre le pied, *to set one's foot*; mettre à la porte, *to turn out of doors*; mettre au fait de, *to acquaint with*; mettre à l'abri, *to shelter*; mettre à l'ombre, *to put in the shade*; mettre un habit à l'endroit, à l'envers, *to put on a coat right side out, wrong side out*, &c. :—

Nous l'avons mis à même de connaître la vérité.	*We enabled him to know the truth.*
Il a mis cet insolent à la porte.	*He turned that insolent person out of doors.*

2. Mettre conjugated reflectively, i. e. se mettre, means *to place one's self, to dress one's self*; se mettre à table, *to sit down to table*; se mettre en colère, *to become angry, to put one's self into a passion* :—

Il se met à l'ombre, au soleil.	*He places himself in the shade, in the sun.*

3. Se mettre, followed by an infinitive, means *to commence, to begin* :—

Ils se mirent à pleurer.	*They commenced weeping.*

A l'anglaise, à la française, are used elliptically for à la mode française, à la mode anglaise, *after the French fashion, after the English fashion.*

Résumé of Examples.

Ce cavalier a mis pied à terre.	*That horseman is come down from his horse.*
Vous n'osez mettre le pied chez lui.	*You dare not set your foot inside his house.*
Mettez ces enfants à l'abri de la pluie.	*Shelter those children from the rain.*
Vous avez mis votre manteau à l'envers.	*You have put your cloak inside out.*
Ce monsieur se met toujours à l'anglaise.	*That gentleman always dresses after the English fashion.*
Hier nous nous mîmes à table à dix heures.	*Yesterday we sat down to table at ten o'clock.*
Pourquoi vous mettez-vous à l'ombre?	*Why do you go into the shade?*
Ces enfants se mirent à rire.	*Those children commenced laughing.*
Pourquoi ne vous mettez-vous pas à l'ouvrage?	*Why do you not set yourself to work?*
Je vais me mettre en pension.	*I will commence boarding.*
Nous allons nous mettre en voyage.	*We are going to commence our journey.*

Exercise 135.

A l'italienne, *after the Italian fashion.*	Défend-re, 4. *to forbid.*	Etudi-er, 1. *to study.*
A merveille, *exceedingly well.*	Effets, m. p., *things.*	Mise, *f.* mettre, *dressed.*
Couvert, *See* Sect. 31, 1.	Entr-er, 1 *to come in.*	Pluie, *f. rain.*
	Etourdi, e, *giddy person.*	Rire, 4. ir. *to laugh.*
		Tablier, *apron.*

1. Avez-vous défendu à cet homme de mettre le pied chez vous? 2. Je le lui ai défendu. 3. Avez-vous mis ces effets à l'abri de la pluie. 4. Je les ai mis à l'abri de la pluie et du vent. 5. Avez-vous mis votre frère au fait de cette affaire? 6. Je ne l'en ai pas mis au fait. 7. Ne l'avez-vous pas mis à même d'étudier? 8. Je l'ai mis à même de s'instruire, s'il désire le faire. 9. Voulez-vous mettre cela de côté? 10. Je vais le mettre au soleil. 11. Votre ami n'a-t-il pas voulu entrer? 12. Il n'a point voulu mettre pied à terre. 13. Votre teinturier n'a-t-il pas mis son tablier à l'envers? 14. Non, Monsieur, il l'a mis à l'endroit. 15. N'avez-vous pas mis cet étourdi à la porte? 16. Nous lui avons fermé la porte au nez (*in his face*). 17. A quelle heure vous mettez-vous à table? 18. Aussitôt que le couvert sera mis [Sect. 60, 5]. 19. Cet homme se met-il bien? 20. Il se met toujours à l'anglaise ou à l'italienne. 21. Ces enfants ne se mirent-ils pas à pleurer? 22. Au lieu de se mettre à pleurer, ils se mirent à rire. 23. Pourquoi ne vous mettez-vous pas à écrire? 24. Il est temps de se mettre à table. 25. Ces Siciliennes sont-elles bien mises? 26. Elles sont mises à merveille.

Exercise 136.

1. Did the gentleman alight this morning? 2. No, Sir, he would not alight, he had no time. 3. Have you put that insolent person out of doors? 4. No, Sir, but I forbade him to set his foot in my house. 5. Did you shelter those little children from the rain? 6. I sheltered them from the rain and the wind. 7. Have you enabled your son to study medicine (*la médecine*)? 8. I enabled him to study medicine, if he wishes to do so. 9. Have you put on your coat inside out? 10. I have not put it on inside out, but right side out. 11. Did you put yourself in a passion? 12. No, Sir, I did not become angry. 13. Did you sit down to table at four o'clock yesterday? 14. We sat down to table at six o'clock. 15. Do you intend to commence boarding? 16. I intend to board with Mr. L. (*chez M. L.*) 17. When do you commence your journey? 18. We commence our journey to-morrow morning. 19. Did your son commence laughing? 20. No, Sir, he commenced weeping. 21. Why do you not commence working? 22. Because I am going to commence reading. 23. Does that lady dress after the English fashion? 24. She dresses after the Italian fashion. 25. Are those ladies well dressed? 26. They are extremely well dressed. 27. Will you not place yourself in the shade? 28. I will place myself in the sun, I am very cold. 29. Is your coat inside out? 30. No, Sir, it is right side out. 31. Is this the right side of this cloth (*l'endroit*)? 32. It is the wrong side (*l'envers*). 33. Are you not dressed after the English fashion? 34. I am dressed after the Italian fashion. 35. You are well dressed.

LESSONS IN GEOLOGY.—No. XVIII.

By Thomas W. Jenkyn, D.D., F.G.S., &c.

CHAPTER II.

ON THE ACTION OF WATER ON THE EARTH'S CRUST.

SECTION II.

ON THE ORIGIN OF SPRINGS OF WATER.

Whenever you look for the origin of great rivers, even such rivers as the Severn or the Thames in our own little island, you never find that their sources rise in the midst of plains, but always on the side, or at the base of mountains. This is pre-eminently the case with the immense rivers of the Continent and of America.

These facts start the question, How came these mountains by their stores of water? and where are the reservoirs which feed so many perpetual springs?

It used to be thought that all mountain springs are derived from the ocean, and that it is the sea that feeds all the wells. All this is pure fancy; and it is now nothing but a prejudice. Of this prejudice you must divest yourself at once. I only assume that you may have it, from the fact that thousands of people are brought up in this prejudice. I do not wish you to dismiss such an assumption, at my request; but as the result of your own intelligent examination of the phenomena of the case.

I will try to assist you to see that the theories which philosophers have invented to account for the derivation of springs from the ocean, are pure assumptions, and are therefore to be rejected by the geological student.

The *first* theory is that of the celebrated Descartes, [pronounced De Cart]. He thought that sea water diffused itself, in all directions, under ground; that when it reached the bottom of mountains, it found there large caverns. In these caverns, the waters become much rarified by the action of subterranean heat, ascended in vapour towards the cold roof, and in its ascent left its salts behind as being specifically heavier. These vapours, on reaching the cold roof, condensed into drops which trickled down the sides of the cavern, until they found interstices and crannies in the rocks through which the water forced for itself a passage to the sides of the hills in the open air.

To this theory, apply all the geological facts that may have come under your own observation. It is merely begging the question to assume such a passage between the sea and the foot of mountains, as that supposed by Descartes. No observation, no experiment has warranted the existence of such a

subterranean communication. On the contrary, wherever miners find running waters under ground, their current is invariably from the mountain towards the sea, and never in the other direction. If there be such passages, some of them must be many hundreds or thousands of miles in length. The explorations of mountains furnish no proof of the existence of internal caverns, 600 or 700 feet high, with cooling roofs to condense the vapours. Travellers have visited grottoes and caverns of all dimensions, but none of them support his theory. Some of these are perfectly dry, and consequently have no communication with the sea. Some of them have their walls and floors covered with incrustations of lime. The bottoms of some of them have small rivulets passing through them. Others distil drops of water from their roof and their sides. All the waters that distil from the roof, ooze out at the sides, or run in streamlets at the bottom, are derived from rain and atmospheric moisture. This is proved by the facts—that these cavern rivulets always increase or diminish in proportion as the season is dry or rainy—that no water oozes from the bottom of the cave—and that, in very long dry weather, the oozings at the sides, and the droppings from the roof cease altogether.

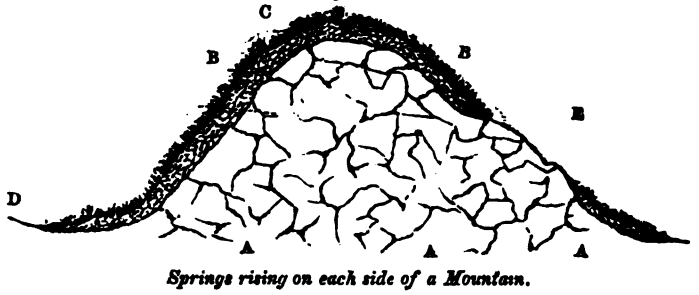
If springs originated in sea water in a cave, heated by subterranean fire, rising in vapour, condensed by a cooling roof, the droppings and oozings of water would have nothing to do with the changes of dry and wet seasons, for they would be independent of all outward causes on the surface.

The *second* theory, invented to account for the derivation of springs from the ocean, professes to be more philosophic than that of Descartes. It supposes that the sea water has left all its salt behind, on the sides of the subterranean channels and crannies through which it has passed, and that the water becomes purged and purified of all heterogeneous mixtures by being drained through sands and porous rocks. It is by this process, say its advocates, that salt water becomes fresh and drinkable.

Test, again, this theory by our geological knowledge. If you have ever descended the shaft of a mine, or walked along any of the adits and levels in our coalpits, and have seen the oozings, droppings, and streamings of water, ask yourself, what has become of the salt of all this water? Has any miner ever discovered this salt? When you are puzzled at this, then ask yourself, what has become of the salt of all the thousands of rivers that flow on our earth? If it has been deposited in the crevices of rocks, it is probable that some mining exploration would have discovered it. I shall, hereafter, show that salt springs give no support to this theory. Think what an enormous quantity of salt must, on this theory, have been left behind by all the river systems of the earth—rivers of immense volumes, which have been running for thousands and myriads of years. In the course of all these ages, either the ocean must have emptied itself of its salt, or the earth become overcharged with it. Besides, the salt left behind in the crevices would eventually block up such channels of communication with the sea, as we see now calcareous and ferruginous water incrusting the insides of pipes, until they are completely choked. In numerous instances, there are springs of fresh water close to the margin of the sea, and some of them in very small islands. Such springs can be proved to have no communication whatever with the sea, except by running into it.

I will now state to you the geological hypothesis established by induction to account for the origin of springs. The sea communicates with mountains, not by subterranean passages through the crevices of sands and rocks, but by atmospheric moisture in the form of dew and rain. Vapours are constantly exhaling from rivers, lakes, and seas. These are carried by winds through the atmosphere in the forms of mists and clouds. Mists and clouds are stopped in their course by high mountains: their watery particles become condensed and fall to the surface in dew, rain, hail, and snow. The water, thus produced, penetrates the soil, finds chinks and interstices in the rocks, through which it percolates, and insinuates itself into the bodies of mountain masses, until it reaches a bed of impervious stone or clay. There it stops and increases in quantity and power, and penetrates interstices and crevices, till it forces an outlet into the open air as a well of water. The spring becomes perennial or intermittent, according to the extent and capacity of the district, on which the moisture has fallen, to supply water for feeding the current.

Fig. 39.



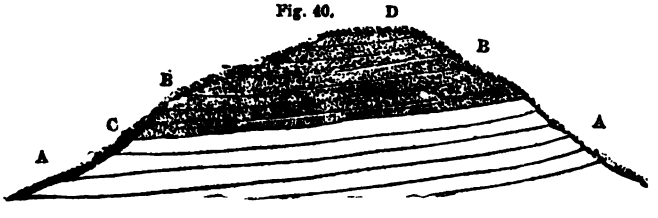
Springs rising on each side of a Mountain.

That springs owe their origin to atmospheric moisture is proved thus. It needs no proof that the atmosphere being replete with vapours, discharges, on their condensation, its waters into the soil and the crevices of hills and mountains. It is well known that springs are low, or quite dried up, when the season is dry, and that the return of rain never fails to renew and recruit them. It is, therefore, evident that rain water finds a passage to these wells whether they are on the sides, or at the base of a mountain. According as the mass or stratum of sand, which the water penetrates, is more or less thick or deep, or as the water-tight stratum below is curved or basin-shaped, and capacious or small, to contain a larger or less quantity of moisture, so will the well that bubbles up be intermittent or perennial.

I will now endeavour to explain to you some of the geological circumstances, which give rise to different descriptions of springs.

It is generally the case that the external surface of the earth, whether on mountain or in plain and valley, consists of some porous and loose strata, covered with gravelly beds and vegetable mould. Lower down is an impervious and water-tight rock, through which water cannot percolate. The surface soils allow the water to pass through them easily. When the percolating water reaches the upper surface of a water-tight stratum, it collects and accumulates, especially if that surface be dented or curved. As it increases in quantity and weight, it will endeavour to find for itself an outlet, and form a well. If the beds that have been percolated by the water be deep and extensive, the flowing at the spring head may continue the whole length of a dry season, and then it is called a perennial fountain.

Fig. 40.



Springs rising on one side only of a Mountain.

The rocks of the earth are susceptible of four forms of structure, which give rise to as many forms of springs. The first is where the underlying water-tight rock is a ridge that bends downwards on each side. The second is where it is an inclined plane in one direction. The third is where the sides of the rock curve up on both sides like the inside of a basin. The fourth is where rocks have been dislocated by what is called a *fault*. These peculiarities of structure will be illustrated to you by the different woodcuts of this Lesson.

The first instance of a spring formed by the concave curve of a water-tight rock is represented by fig. 39.

In this diagram A represents a water-tight rock which constitutes a mountain mass. B is a gravelly bed formed by the disintegration of A and resting upon it. C is the vegetable mould which covers A and B. From D to E is a well formed at the bottom of the mountain, and E is another spring bubbling at a high elevation one one of its sides.

Springs of this description are generally known from the fact of their having the same mean temperature as the region in which they appear. On this account they seem in summer to be colder, and in the winter to be warmer, than the atmosphere.

It is possible that rain water, which has entered these rocks in a comparatively pure state, may, in passing through crannies and pores of the beds, dissolve chemically some of the soluble elements it meets with, and bear them away with it in its course. In these instances, the percolating moisture, originally derived from the atmosphere, springs up in wells charged with carbonic acid, with some of the alkalis and salts, or with some calcareous or siliceous elements, in quantities, perhaps, too small to be detected by analysis, but sufficient to give a different taste to the water. These are all, to a certain degree, mineral springs.

The second instance of wells formed by geological structure, is where all the upper beds of a hill, or a mountain, consist of porous rocks through which water can easily percolate, and where they and the water-tight rock below them, form an inclined plane, as represented in fig. 40.

In fig. 40 A is a series of inclined beds of a water-tight rock forming the base of a hill. B is a series of porous strata, consisting of gravel or sand, resting conformably on the inclined beds of A. C is the point of junction of the porous beds with the water-tight strata, at which the permeating water will appear as a spring, at a considerable elevation on the side of the hill. It is evident that with such a geological structure of rocks, no spring of water can appear at D. The copiousness and the continued flow of such a spring must depend upon the depth and the extent of the beds B B.

The water of wells of this description penetrate deeper into the earth, than the water of the springs represented in fig. 39. On account of the depth of rock penetrated, the percolating water increases a little in temperature, according to the laws of increase of temperature in the inferior rocks. Hence most wells thus formed have remarkably a greater warmth, than the mean temperature of the district in which they rise. This is the case sometimes even in elevated mountains, where the water has attained the degree of 40 or 50 degrees of heat Fahr., and are accordingly called hot-wells, or thermal springs, which have been described to you in a former Lesson. In all probability the several hot-wells, which are found in the Alps, derive their warmth, only from the circumstance of rain water having to descend five or six thousand feet into the mountain before it bubbles up on the side, or at the bottom, of a rock, as a spring.

The third instance of springs being occasioned by geological structure, is where the surface of water-tight rocks curves upwards on both sides, and forms a kind of basin for the percolated waters. I shall reserve what I have to say on wells of this description to our next Lesson, which will be "On the Principles of Artesian Wells."

LESSONS IN LATIN.—No. XXX.

By JOHN R. BEARD, D. D.

DEVIATIONS IN THE FIRST CONJUGATION.

2. *Perfect, ŭi; Supine, ĭtum.*

i. Crepo, crepŭi, crepare, crepĭtum 1, *to creak.*
ii. Cubo, cubŭi, cubare, cubĭtum 1, *to lie down.*
iii. Domo, domŭi, domare, domĭtum 1, *to tame, subdue.*
iv. Mico, micŭi, micare (no supine), *to glitter;* so emico, emicui, emicare, emicatum, *to dart forth;* but dimico, *I fight,* has dimicavi, dimicare, dimicatum.
v. Plico, plicui, plicare, plicatum, and plicitum, *to fold;* implico has implicui, implicatus (Cicero), and implicitus; explico and applico, in Cicero, have always avi, atum; replico, also, is regular.
vi. Sono, sonŭi, sonare, sonĭtum, *to sound;* part. fut. sonaturus.
vii. Tono, tonŭi, tonare (no supine), *to thunder.*
viii. Veto, vetŭi, vetare, vetĭtum, *to forbid.*

Let me impress on the student the necessity of committing these forms to memory. Only by committing them to memory—only by retaining them in your memory—can you become thoroughly master of them, and so have them in your possession for all necessary purposes. Be not deluded by any representations which may aim to make you think that you can become familiar with the Latin or any other language unless at the expense of very considerable and very close labour. Again, and again, twice or thrice over, must you acquire and repeat to yourself or to a friend all the forms I give; nor be satisfied that they are yours until, by repeated examinations and trials, you learn that you have them in your mind. You will act wisely to call in to your aid the principle of mutual stimulus and mutual instruction. Go over these forms aloud, several persons reciting them at once. For this purpose, it would be well to have a leader or drill-sergeant, to give the word, and keep the recital correct. When you have repeated a form or a vocabulary sufficiently, then proceed to examine each other. You would do well to call into play the same impulse and aid in writing and correcting the examples and exercises. If you are unable to get several to join you in the task, undertake to teach Latin to some poor boy who cannot afford to purchase the POPULAR EDUCATOR, or who may be neglected by his proper guardians. If two persons, who, with equal time and equal talents, began together to study Latin, the one teaching another, the other confining all his attention to himself, the former would outstrip the latter very easily, and make such progress, as in a few months to defy competition.—Docendo discimus.

VOCABULARY.

Increpo 1, *to scold;* percrepo 1, *to resound;* accubo 1, *to lie up to, to lie (sit) at table;* excubo 1, *to keep watch;* perdŏmo 1, *to tame thoroughly;* applico 1, *to lean against;* se applicare, *to bring near, approach, apply to some one, to turn to some thing;* complico 1, *to fold together;* complicatus, *complicated, dark;* replico 1, *to unfold, explain;* cremo 1, *to burn;* aduro, adussi, adurere, adustum 3, *to set on fire, burn;* evolvo, evolvi, evolutum 3, *to roll out, unfold;* verecundia, æ, f. *modesty;* scaturigo, ĭnis, *a spring;* gemĭtus, ūs, m. *a groan;* nutus, ūs, m. *a nod, command;* ploratus, ūs, *a complaint, a weeping;* passim, *hither and thither, everywhere;* age, *come;* discedo 3, *to depart, go;* reperio 4, *to find;* et—et, *both.*

EXERCISES.—LATIN-ENGLISH.

Quis venit? fores crepuerunt; dux milites vehementer increpuit; tota urbs vocibus civium de victoriâ ex hostibus reportatâ exsultantium percrepuit; age, cubitum discedamus; Romani multas gentes ac nationes armis perdomuerunt; docemur auctoritate nutuque legum, domitas habere libidines, coercere omnes cupiditates; ex hoc fonte ingentes scaturigines aquæ emicuerunt; Indorum sapientes ad flammam se applicant; Indorum sapientes sine gemitu aduruntur; indorum sapientes, quum ad flammam se applicaverunt, sine gemitu aduruntur; Cicero ad Molonem philosŏphum se applicavit; sapiens studet animi sui complicatam notionem evolvere; quum memoriam temporum replicaveris, et virtutum et vitiorum multa exempla reperies; quum urbs expugnata esset, omnia passim mulierum puerorumque ploratibus sonuerunt; teremur quum serenâ tempestate (weather) sonuit; nitimur in vetĭtum; Augustus carmina Virgilii cremari vetuit; Augustus carmina Virgilii cremari contra testamenti ejus verecundiam vetuit.

ENGLISH-LATIN.

The hinges of the door creaked; the mother scolded her innocent son; the soldiers kept watch all night; the sailors will subdue the enemy's fleet; I shall apply myself to Cicero (study under him); I forbid you to study under Aristotle; we shall strive for what is forbidden (vetitum); the whole house sounded with the groaning of the sick men; the city sounds with arms; Jupiter subdues the other gods by his nod; everywhere groanings and weepings sound; I have thoroughly tamed the lion.

DEVIATIONS IN THE FIRST CONJUGATION.

3. *Perfect, ŭi; Supine, tum.*

i. Frico, fricui, fricare, fricatum, *to rub;* refrico, refricui, refricare, refrictum *to rub up, renew* (p. f. refricaturus).
ii. Neco, necui, necare, nectum, *to kill;* enĕco, enecui, enecare, enectum, *to torture in killing.*
iii. Seco, secui, secare, sectum, *to cut, flog* (p. f. secaturus).

4. *Perfect, i; Supine, tum.*

i. Juvo, juvi, juvare, jutum (juvaturus), *to help;* adjŭvo, adjūvi, adjuvare, adjutum, adjuturus.
ii. Lavo, lāvi, lavare, lautum, *to wash.*

Vocabulary.

Adjuvare (acc.), *to support, assist*; desecare, *to cut down*; resecare, *to cut off*; perfricare, *to rub greatly*; refricare, *to rub back, rub again*; alligare 1, *to bind to, or on*, coeno 1, *to sup, dine*· attingo, attingere, attigi, attactum 3, *to touch*; peto, petĕre, petīvi, petītum 3, *to ask, seek, fetch*; oleum, i, n. *oil*, principium, i, n. *a beginning*; principio, *at the first*; garrulitas, ātis, f. *talkativeness*; solutus, a, um, *free*; frustra, *in vain* (E. R. *frustrate*); desiderium, i, n. *sense of loss, regret for*; quantopĕre, *how much*; garrulus, a, um, *chattering*; garrio 4, *I chatter*; horreum, i, n. *a barn*; congero 3, *I carry*; reporto 1, *I bring back, gain*.

Exercises.—Latin-English.

Vereor ne litteris meis refricuerim desiderium ac dolorem tuum; tuis scelerĭbus reipublicae praeterīta fata refricaturus es; dubium non est quin tuis scelerĭbus reipublicae praeterita fata refricaturus sis; Tantălus summam aquam attingens, enectus siti fingitur, a poetis; nescisne quantopĕre garrulus iste homo me garriendo enecuerit? Caius Marius, quum secaretur, principio vetuit se alligari nec quisquam ante Marium solutus dicitur esse sectus; Agricolae frumenta desecta in horrea congĕrunt; nisi libidines reseccueris, frustra studebis beate vivere; quis nescit quantopere Cicero patriam juverit? non solum fortuna, sed etiam industria tua te in negotio tuo adjūvit; si quid fortuna mīlites nostros adjuverit, non dubitamus quin splendidam de hostibus reportaturi simus victoriam; exercitus maximis itineribus profectus est cives obsidione cinctus adjūtum; ne prius coena quam manus lavāris; corpus lauturus aquam puram e vive (running) flumine pete!

English-Latin.

Boys, rise, wash, and when you have washed (2nd fut.), apply to your business; these women have tortured me with their chatter; I do not doubt that these women have tortured thee with their chatter; these talkative girls will kill me with their tongues; I shall forbid my son to chatter; hast thou washed thy hands? come! wash thy hands well before you sit to table (accubo); they will not (nolo) wash their feet; the father's word assists the son; ships are coming to assist the besieged city; there is no doubt but the army of our general will speedily assist the city; hast thou cut thy thumb? I have cut my leg; thou hast revived my grief; not willingly (willing) have I revived thy grief; fortune aids the brave; the slave is bound; the father forbids his son to be bound.

You ought now to be able to translate, at least with the aid of a dictionary, an easy Latin sentence. Make the trial. Here is a fable by Æsop. I have marked the order in which the words should be taken. Can you translate it?

Accipiter et Columbae.

1	3	2	5	4	6	8	7	
Columbae	Milvii	metu	acipitrem	rogaverunt,	ut	eas	defenderet.	
1	2	1	3	4	2	8	6	7
Ille	annuit.	At	in	columbare	receptus	uno	die	majorem stragem
5	10	11	14	15	12	13	1	2
edidit,	quam	Milvius	longo	tempore	potuisset	edere	Fabula	docet,
4		3		6	7			
malorum	patrocinium	vitandum	esse.					

Have you read the whole carefully through? There are words you do not know the meaning of? Well, there are several with which you ought to be familiar. I will supply you with the signification of such as I suppose you do not know.

Vocabulary.

Milvius, i, m. *a kite*; accipiter, tris, m. *a hawk*; strages, is, f. *slaughter*; edo 3, *I put forth, cause*; patrocinium, i, n. *patronage*; possum, posse, potui, *I am able*.

With this aid you ought to be able to make out the whole. Here then you have a test of your progress. If you cannot, after sufficient study, make it out, you may feel assured that you have not attended to my instructions as you should have done. However, I will supply you with a nearly literal translation, as another means of assisting you.

The Hawk and the Wood Pigeons.

The wood pigeons, through fear of the kite, entreated the hawk to defend them. He assented. But, being received into the dove-cote, he committed more slaughter in one day than the kite could have done in a long time. The fable teaches you that the patronage of the wicked should be shunned.

I will also show you the grammatical connexion of some of the words, and the reason of the condition in which they severally are; that is, I will give you in it a specimen of what is called Parsing.

Columbae, from columba, columbae, a wood-pigeon or dove, a noun feminine of the first declension in the nominative case plural number, being the subject to the verb rogaverunt. Milvii, from milvius, milvii, a noun masculine of the second declension, governed in the genitive case by metu. Metu, from metus, metūs, a noun masculine of the fourth declension in the ablative case, the cause, manner, or instrument being put in the ablative. Accipitrem, from accipiter, accipetri, a noun masculine of the second declension in the accusative case, being the object of the verb rogaverunt, which requires its object to be in the accusative. Rogaverunt, from rogo, rogare, rogavi, rogatum, to ask, a transitive verb of the first conjugation in the perfect tense third person plural, to agree with its subject columbae. Ut, a conjunction, which, when, as here, it signifies a contemplated result, requires its verb to be in the subjunctive mood. Eas, a demonstrative pronoun referring to columbae, from is, ea, id, the accusative plural feminine gender to agree with its noun, and governed by defenderet. Defenderet, a transitive verb, from defendo, defendere, defendi, defensum, of the third conjugation subjunctive mood imperfect tense third person singular number, agreeing with its subject ille understood, and governed by the conjunction ut. Ille, from ille, illa, illud, a demonstrative pronoun referring to accipiter, the subject to the verb annuit. Annuit, from annuo, annuere, annui, annutum, an intransitive verb of the third conjugation in the perfect tense indicative mood third person singular, to agree with its subject ille. Annuit is made up of ad and nuo; nuo is connected with the noun nutus, a nod; so that the exact meaning of ille annuit is *he nodded assent*.

If we view the first sentence logically it will stand thus:—

Subject.	Predicate.	
	Verb.	*Object.*
Columbae	rogaverunt	accipitrem.

You thus see that milvii metu are accidental terms, terms not necessary to the sentence. Ut eas defenderet is equivalent to eas defendere, *to defend them*. Accordingly rogo has two objects; first object, accipitrem; second object, ut eas defenderet. In the grammars it is said that rogo, with other verbs of asking, governs two accusatives, the one of the person, the other of the thing.

Now in the parts thus parsed nothing occurs but what you ought to know and be able to explain. Nay, more than this, you ought to be able to give the stems of the nouns and verbs. At any rate, I must enjoin it on you, in the attempts which I now recommend you to make in parsing, to go through every noun, every tense, &c., according to the models already supplied—to go through all the parts carefully in every instance. Remember, "practice makes perfect."

Two verbs in the fable may give you some trouble, namely, edidit and potuisset. Edidit from edo, edere, edidi 3, in the perfect tense third person singular, is, like dedit from do, formed by reduplication from the present edo. Potuisset, from the irregular verb possum, potui, posse, *to be able*, is in the subjunctive mood pluperfect tense third person singular, English, *might have been able*, or *could have done*.

LESSONS IN GERMAN.—No. XXI.

Section XXXVII.

Impersonal Verbs

Impersonal verbs are confined to the third person singular, and have as their subject, or nominative only the pronoun es Ex.: Es regnet; it rains. Es donnert; it thunders. Es blitzt it lightens. (§ 81. I.)

I. Besides those verbs that are merely impersonal, others may be thus employed; as, Es ſcheint, daß er krank iſt; it appears that he is sick. Es ſchmerzt mich, das zu hören; it pains me to hear that, &c.

II. Many verbs, however, that, in German are used impersonally, have, in this respect, no verbs of the same kind in English to correspond. Ex.: Es gelingt mir; I succeed (it succeeds to me), &c.

III. Geben, "*to give*," is often, with its proper case (the *accusative*), employed to denote *existence* in a manner general

and indefinite, and is translated like sein, "*to be.*" Ex.: Es giebt (not es sind) Leute, die alle Tage auf den Markt gehen; there are (i. e. there *exist*) people who go to the market every day.

Es sind heute (not es giebt) viele Leute auf dem Markte; there are many people to-day at the market.

Es giebt keine Rosen ohne Dornen; there are (there *exist*) no roses without thorns.

Es sind (not es giebt) viele Kinder in dieser Schule; there are many children in this school.

Es giebt (there *exist*) noch Riesen in der Welt; there are still giants in the world.

Exercise 41.

Armee', *f.* army;	Einbre'chen, to break in;	Rückzug, *m.* return;
Aufgang, *m.* rising, ascent;	Eis, *n.* ice;	Schneien, to snow;
Bis, until, up to;	Erklä'ren, to explain;	Stürmen, to storm;
Blitzen, to lighten;	Feindlich, hostile;	Tagen, to dawn, become day;
Ding, *n.* thing, affair;	Fürchten, to fear;	Thauen, to thaw;
Donnern, to thunder;	Georg, *m.* George;	Verge'ben, to forgive;
Edel, noble, magnanimous;	Hageln, to hail;	Wahr, true;
	Leicht, easy, easily;	Wolf, *m.* wolf;
	Reißend, ravenous;	Zuflucht, *f.* refuge.

Es wird immer Leute geben, die sich gegen die hellsten Wahrheiten empö'ren, wie viele giebt es deren heut zu Tage nicht!	There will always be people, who exalt themselves against the clearest truths; how many of those are there [not] at the present day!
Es war einmal ein Weiser, welcher behaup'tete, daß es kein besseres Gut gebe, als eine gesun'de Vernunft' in einem gesun'den Körper.	There was once a sage, who maintained, that there was no better possession, than a sound understanding in a sound body.
Ei'nige behaup'ten, daß es Einwohner im Monde gebe. Sect. 43.	Some maintain, that there are inhabitants in the moon.
Es ist kein Mensch unglücklicher, als jener, der nie Widerwärtigkeiten erdul'dete.	There is no mortal more unfortunate than he (that one) who never endured reverses of fortune.
Es giebt wenig Helden, die ihren Charac'ter bis in ihr Alter behaup'ten.	There are few heroes who maintain their character till [in] their old age.
Es ist nichts lo'benswerther, als andere das'jenige zu lehren, was man weiß.	There is nothing more praiseworthy than to teach what one knows, to others.

1. Es giebt dieses Jahr sehr viel Obst. 2. Es ist heute sehr schönes Wetter. 3. Es giebt mehr arme, als reiche Leute. 4. Es ist ein wahres Vergnügen, diesen Morgen spazieren zu gehen. 5. Giebt es in Deutschland auch reißende Thiere? 6. Es giebt noch viele Wölfe in den Gebirgen. 7. Es ist die feindliche Armee auf ihrem Rückzuge. 8. Giebt es etwas Schöneres, als den Aufgang der Sonne? 9. Es hat den ganzen Tag geschneit. 10. Gehen Sie diesen Nachmittag mit mir auf's Eis. 11. Nein, es thauet schon, und das Eis kann leicht einbrechen. 12. Wenn es taget, werde ich Sie zu einem Spaziergang abholen. 13. Es schneit heute den ganzen Tag. 14. Regnet es schon? 15 Nein, aber es wird bald anfangen zu regnen. 16. Wie lange hat es geregnet? 17. Es hat bis vier Uhr geregnet. 18. Donnert es? 19. Ja, es donnert und blitzt, und ich fürchte, daß es auch hageln wird. 20. Wo waren Sie, während es schneite? 21. Ich suchte in der Capelle des St. Georg Zuflucht, denn es schneite nicht nur, sondern es stürmte und hagelte auch. 22. Ich sage Ihnen nur dasjenige, was (Sect. 22. L.) ich gehört habe.

1. It seemed this morning as if it[1] would rain, but now the weather begins to be fine. 2. It happened[2] that it rained, just as the battle commenced, and thundered and hailed throughout the whole day. 3. It has rained, hailed, snowed and frozen this winter. 4. As long as it rains I cannot depart. 5. It appears that there are many strangers in this hotel. 6. There are (exist) many things which we cannot explain. 7. As soon as it becomes day, I shall call upon you to go and see the rising of the sun. 8. Exists there anything more noble than to forgive an enemy? 9. Do you intend to go to-morrow with me upon the ice? 10. No, I fear, that it thaws already, and it would not be safe to venture it[3]. 11. As soon as the wind abates it will rain. 12. In every community there exist more blockheads than villains, and more ignorant men than learned.

[1] Als ob es. [2] Es ereignete sich. [3] sicher sein es zu wagen

Section XXXVIII.

Reflexive Verbs.

Reflexive verbs (§ 86. 1, 2, &c.) are those that represent the subject as acting upon itself; as, Er besinnt sich; *he* bethinks *himself &c* Verbs of this class are much more numerous than in English, and are variously translated. Ex.: Er macht sich über mich lustig; he makes himself merry over me (i. e. he ridicules me.) Er tröstet sich über seinen Verlust; he mourns over (or an account of) his loss. Er freut sich über sein Glück; he rejoices at his prosperity. Er widersetzt sich den Befehlen des Tyrannen; he opposes (himself to) the command of the tyrant. Das Buch hat sich gefunden; the book has been found; (active form, the book has made its appearance.) Der Himmel bedeckt sich mit Wolken; the sky is covered with clouds. Soll der Frevel sich vor unsern Augen vollenden? shall the outrage be accomplished before our eyes? Er hält sich in Berlin auf; he (holds himself up) stops in Berlin. Er hat sich bei der Arbeit zu lange aufgehalten; he has (kept himself) remained too long at the work. (See paradigm, page 386, and § 86).

Aufhalten, when followed by „sich über," signifies to find fault with, to sneer at, to criticise, to blame. Ex.: Er hält sich immer über Kleinigkeiten auf; he is always finding fault about trifles (stopping over trifles.) Er hält sich über ihren Brief auf; he criticises your letter. Er hält sich über die ganze Gesellschaft auf; he sneers at the whole company.

Exercise 42.

Alter, *n.* age;	Gewöl'be, *n.* arch, vault;	Sammeln, to gather, collect;
An'eignen, to appropriate;	Gläu'big, believing;	Schaden, to hurt, injure;
Atmosphä're, *f.* atmosphere;	Indem', in that, while;	Selbst, self:
Auf'halten, to sojourn, lodge;	Karl, *m.* Charles;	Slave, *m.* Slavonian;
Aus'dehnen, to extend, expand;	Kraft, *f.* force, power;	Strudel, *m.* whirlpool;
Aus'zeichnen, to mark, to distinguish (one's self);	Kühn, daring;	Stürzen, to plunge;
Bedürf'niß, *n.* want, necessity;	Lagern, to encamp;	Taucher, *m.* diver;
Belohn'en, to reward;	Lei'denschaftlich, passionately;	Toben, to rage, to roar;
Beständig, continually;	Meer'eswoge, *f.* ocean-billow;	Uebel, evil;
Bewe'gen to move;	München, *n.* Munich;	Ueben, to exercise;
Dampf, *m.* steam, vapour;	Muskel, *m.* muscle;	Unermeß'lich, immeasurable;
Darben, to suffer, want;	Natur', *f.* nature;	Un'gemach, *n.* affliction;
Dunst, *m.* exhalation;	Nebel, *m.* mist, fog;	Unzäh'lig, innumerable;
Empö'ren, to rebel, to make insurrection;	Nennen, to name, to call, to denominate;	Verbin'den, to unite, combine;
Entste'hen, to proceed;	Oft, often;	Vertrau'en, to confide in, to trust;
Gegen, against;	Oest'reichisch, Austrian;	Waffen, *f.* arms, weapons;
Gewöh'nen, to accustom;	Palast', *m.* palace;	Wagen, to venture, risk;
Gewohn'heit, *f.* habit, custom;	Prachtvoll, splendid, gorgeous;	Wind, *m.* wind;
	Raum, *m.* room, space;	Zeigen, to show, exhibit;
	Regen, *m.* rain;	Zusam'menziehen, to contract, to draw together.
	Regie'rung, *f.* government;	
	Reihe, *f.* row, range;	

Der Kaiser hielt sich letzten Winter in der Hauptstadt auf.	The emperor remained in the capital last winter.
Der Spötter hält sich über Andere auf.	The derider sneers (finds fault with) at others.
Das Volk empört' sich gegen den König.	The people rebel (rise) against the king.
Die Füchse graben Höhlen.	The foxes dig themselves holes
Der tap'fere Soldat' erwirbt' sich Ruhm und Ehre.	The valiant soldier acquires fame and honour.

Der Geiz'ige erfreut' ſich nicht, obgleich' er ſehr reich iſt.	The avaricious (man) does not enjoy himself, although he is very rich.
Er ſitzt und hört dem Rauſchen der Gewäſ'ſer zu.	He sits and listens to the roaring of the waters.

1. Alle Dünſte und Dämpfe, welche beſtändig von der Erde aufſteigen, ſammeln ſich in der Atmoſphäre, und indem ſie ſich verbinden, entſteht daraus Regen, Schnee, Nebel, Wind und jede andere Veränderung der Luft. 2. Derjenige, der ſich in der Jugend an Arbeit gewöhnt, braucht im Alter nicht zu darben. 3. Die Ludwigſtraße in München zeichnet ſich durch eine Reihe prachtvoller Paläſte aus. 4. Diejenigen Perſonen, welche ſich ſelbſt loben, machen ſich ſehr oft lächerlich. 5. Die Söhne Karls des Großen mußten ſich in den Waffen, im Reiten und im Schwimmen üben. 6. Der kühne Taucher wagt es, (Sect. 36. IV.) ſich in den tobenden Strudel zu ſtürzen. 7. Der Neidiſche ſchadet ſich ſelbſt mehr, als andern. 8. Friedrich der Große hielt ſich oft zu Potsdam, im Schloſſe Sanssouci, auf. 9. Das Gute belohnt ſich ſelbſt. 10. Der Gläubige zeigt ſich im Ungemach wie ein Fels in Meere, wenn die Meereswogen um ihn toben. 11. Das Große blaue Gewölbe, welches wir Himmel nennen, iſt ein unermeßlicher Raum, in welchem die Erde, die Sonne, der Mond und unzählige Sterne ſich bewegen. 12. Die Kraft, mit welcher die Muskeln ſich zuſammenziehen und ausdehnen, iſt ſehr groß. 13. Viele Menſchen eignen ſich üble Gewohnheiten ſo leidenſchaftlich an, daß ſie dieſelben für Bedürfniße der Natur halten. 14. Ein Kind an der Hand ſeiner guten Eltern fürchtet ſich nicht,—ſo der Menſch, der Vertrauen zu Gott hat. 15. Die Armee zog ſich zuſammen, und bewegte ſich dem Fluſſe zu. 16. Der Feind lagerte ſich um die Stadt. 17. Er zeichnete ſich von den andern durch ſein tapferes Betragen aus. 18. Er fürchtete ſich vor Niemanden. 19. Er hält ſich über die Worte meines Nachbarn auf.

1. The youth mourns at the loss of his parents. 2. Mother was pleased, when the letter from my sister was read to her. 3. She consoled herself with the thought, that she would arrive soon. 4. Will you sojourn long in Italy? No, it is not my intention. 5. An honest man fears nothing. 6. The Slavonians have rebelled against the Austrian government. 7. The English troops distinguished themselves at the battle of Waterloo by their bravery. 8. He who rejoices at the downfall of another deserves not the approbation of the virtuous. 9. He who mourns when another in his presence is praised, is a man who does not deserve to be loved and honoured. 10. He who rejoices when his neighbour is loved is a good natured man.

Section XXXIX.

Many verbs in German, as in other languages, especially when used as reflexives, acquire in certain phrases a figurative sense which deserves to be noted. Thus from ſchicken, to send, we have the reflexive ſich ſchicken, to send or throw one's self into, i. e. *to adapt* or *conform to*. Ex.: Der Menſch muß ſich in die Zeit, in ſeine Umſtände ſchicken; man must adapt himself to the times, to his circumstances. Es ſchickt ſich nicht, das zu thun; it is not proper to do that. So from fragen, to ask, we have, ſich fragen, to *be questionable*. Ex.: Es frägt ſich, ob er da war; it is questionable whether he was there. Sich zutragen, ſich handeln, &c., are of the same character; as, Es trägt ſich zuweilen zu, daß anhaltender Regen die ganze Ernte verdirbt; it happens sometimes, that continued rain destroys the entire harvest. Es handelt ſich nicht um Kleinigkeiten; it is not a question (an affair) of trifles. (See also § 86. 6.)

Exercise 43.

Ab'ſchlagen, to refuse;	Betrach'tung, *f.* consideration, view;	Fragen, to ask, (See above);
Achten, to respect;	Bewußt'ſein, *n.* consciousness;	Fremdling, *m.* stranger, foreigner;
An'nehmen, to adopt, accept;	Ein'ladung, *f.* invitation;	Froh, joyful, gladly;
Begeb'enheit, *f.* occurrence;	Ernſt'haft, earnest, serious;	Gehören, to belong, to be fit;
Begeg'nen, to meet, happen, befall;	Fordern, to demand, require;	Geſchehen, to happen, take place;
Bemü'hen, to fatigue, weary;		Hei'ligen, to hallow;

Pflicht, *f.* duty, obligation;	Seite, *f.* page;	Vermö'gen, *n.* wealth;
Rathen, to counsel;	Sonntag, *m.* Sunday;	Widmen, to devote;
Scheinen, to appear;	Un'gehorſam, disobedient;	Wirklich, really;
Scherzhaft, facetious, sportive;	Vermeh'ren, to increase;	Wiſ'ſenſchaft, *f.* science;
		Zu'ſehens, visibly.

Es trifft ſich zu'weilen, daß unter einem un'ſcheinbaren Kleide die ſchönſten Talen'te verborgen ſind.	It sometimes happens, that under an unsightly garb the most splendid talents are concealed.
Es trägt ſich häufig zu, daß die Männer, die ſich um das Va'terland am meiſten verdient' gemacht haben, hei'mathlos umher'irren.	It often happens, that the men who have rendered themselves the most serviceable to their (the) native country wander about homeless.
Meinem Neffen iſt ein großes Unglück geſche'hen.	A great misfortune has occurred to my nephew.
Er erzählt'e mir dieſes, als er mir heute von un'gefähr auf der Straße begeg'nete	He related this to me as he accidentally met me to-day in the street.

1. Es frägt ſich, ob wir morgen ſchönes Wetter haben werden. 2. Es gehört ſich, den Sonntag zu heiligen. 3. Es ſchickt ſich, ältere Leute zu achten. 4. Man arbeitet viel froher, wenn man das Bewußtſein hat, etwas Gutes zu thun. 5. Es ſchickt ſich nicht, die Einladung abzuſchlagen. 6. Der wirklich kluge Mann wird, ſo viel (Sect. 35. IV.) es ihm möglich iſt, ſich bemühen, ſich in die Zeit zu ſchicken. 7. Es macht große Freude, das Gute zu fördern. 8. Es ſchickt ſich, daß ein jeder Fremdling die guten, aber nicht die üblen Sitten eines Volkes annimmt. 9. Das Vermögen dieſes Mannes vermehrt ſich zuſehends (§ 101.). 10. Es ſchickt ſich nicht für Kinder ungehorſam zu ſein. 11. Es frägt ſich, ob dieſer Mann ſeine Pflicht gethan hat. 12. Es trägt ſich zuweilen zu, daß die Betrachtungen bei einer ſcherzhaften Begebenheit ſehr ernſthaft ſind. 13. Es trägt ſich häufig zu, daß kleine Veranlaſſungen große Ereigniſſe herbeiführen. 14. Wer iſt (§ 71 1.) Ihnen heute Morgen begegnet? 15. Mein Freund, der Capitän, iſt mir begegnet. 16. Iſt Ihm auf der letzten Reiſe nichts unangenehmes begegnet? 17. Ja, es iſt ihm ein großes Unglück begegnet. 18. Was iſt Ihnen geſchehen? 19. Es iſt mir nichts geſchehen 20. Es geſchieht ihm dieſe Strafe recht.

1. It is proper that the children should respect their parents. 2. It becomes not a wise man to follow the multitude. 3. Most young people wish to appear great in the world. 4 You should under all circumstances say the truth. 5. It is questionable, whether we shall accept your invitation. 6. It is questionable, whether you are right or wrong. 7. It happens sometimes that the best man fails. 8. The government asks obedience from its subjects. 9. The inhabitants of London increase enormously every year. 10. My brother devoted himself more to science than to pleasure. 11. Do you know to what extent your friend has counselled you? 12. He has counselled you to do that of which he spoke yesterday.

LESSONS IN ENGLISH.—No. XXII.

By John R. Beard, D.D.

SUFFIXES (*continued*).

Words have been curiously formed by abbreviation; the word omnibus affords an instance; derived from the Latin "omnibus," and so signifying *for all*; that is, every man's carriage, the word has been shortened into *bus*, and so it is now generally termed in common parlance. *Mob* appears to have been formed in the same way. What is now called the mob used to be called the rabble. But as the rabble are mobile vulgus, *a fickle crew*, so were they called mobile vulgus, and by contraction, *mob*. Still mob and rabble are not identical. *Rabble* is the general term, the class, and *mob* is a collection of persons belonging to that class. *Palsy* is a contracted form of the now more fashionable *paralysis*. Between *alms* and *eleemosynary* there would seem to be no connexion; both, however, come from the same Greek term, and the former is only a shortened form of the root from which the latter is derived. Well do we remember *kickshaws*, a term of our youthful days,

used to signify something contemptible. Little did we then suspect that it was only the English way of pronouncing the French *quelque chose*; i. e., *something*, contemptuously travestied to mimic and ridicule French prisoners in England.

Ment, from the Latin mentum (as in *ornamentum*, *an ornament*; adjumentum, *an assistance*), through the French *ment* (as in mandement, Latin mandatum, *a command*), is a suffix which denotes the result of the act indicated in the verb, from which the noun is derived; thus, velo means *I veil* or *cover*; and velamen or velamentum is *a veil* or *covering*; so aliment (from alo, Lat. *I nourish*) is a *means of nourishing*, *nourishment*. Hence, devotement properly indicates not the act, but the result, not the doing, but the state of feeling which ensues from the doing, the devotion. In practice, however, the usage seems reversed.

"Her (Iphigenia) *devotement* was the demand of Apollo."—*Hurd*.

"O how loud
It calls *devotion*, genuine growth of night!
Devotion! daughter of Astronomy!
An undevout astronomer is mad."
Young, "The Complaint."

Mony, as in ali*mony*, sanct*imony*, a Latin termination (as in parsimonia, *sparingness*; and matrimonium, *the condition of a mother*, matri*mony*, not in great use), which denotes a consequence, as in testi*mony*, the result of the act of testis, *a witness*.

Ness, as found in littleness, nothingness, is a Saxon suffix signifying the abstract quality. If we compare littleness with the French petitesse (Old English *nesse*), and take in other words, as tendresse, tenderness, we are led to conjecture that the *n* is only a connecting consonant, and that *ess* or *esse* in both French and English are the same. Consider also the Anglo-Saxon sarenes, *soreness*, that is, *sorrow*; gelicness, *likeness*; heardnes, *hardness*; micelness, *muchness*, that is, *greatness*; and you find the same form in the root of our language. If, however, the *n* is not an essential part of the word, then the *ness* or rather *ess* has no connexion with ness in such words as Dungeness, Sheerness, and other proper names, names of places. In these, the *ness* comes from the German nase, and the Anglo-Saxon nese, and signifies *nose*; that is, a *headland or promontory*.

"About six of the clock at night the wind vered to the south-west; and we weighed anker, and bare cleere of the *ness*, and then set our course north-east and by north until midnight, being then clear of the Yarmouth sands."—*Hackluyt*.

Ock, as in hillock, a diminutive; so that hillock is *a little hill*. So bullock originally meant *a young bull* or *calf*; compare Isaiah xi. 6 with Jer. xxxi. 18, where calf and bullock are the renderings of the same Hebrew term. In the suffix *ock* the *c* sound is the essential element, the *k* being merely an affair of spelling, and the *o* (probably) a connecting vowel. Thus regarded, we find the origin of our diminutive *c* in the Latin diminutive *c*, as seen in recula (res, *a thing*), specula (spes, *hope*), nubecula (nubes, *a cloud*), vulpecula (vulpes, *a fox*), &c. Another form of bullock is bulchin, obviously bull's-*kin*, that is, *bull's child*, as in the Hebrew, "steer, the son of a bull," for a bullock or calf (Exod. xxix. 1; Lev. iv. 3).

"And better yet than this, a *bulchin*, two years old,
A curl'd pate calf it is, and oft could have been sold."
Drayton, "Poly-Olbion."

Oon, or *on*, an augmentative; as in ball*oon*, or *great ball*. The termination *oon*, or *on*, comes to us from the Italian, but is originally from the Latin; as seen in naso, *a man with a large nose*; capito, *a man with a large head*. Like ballo*on* is salo*on* in the French sal*on*, a place of reception (*saluer*, Fr. to *salute*, greet; Latin salvus, *safe*).

Or, a termination borrowed from the Latin *or*; as seen in au*ctor*, in English, *author*. The correspondent Saxon ending is *er*, which has already been spoken of. *Or* denotes the agent. *Or*, in former times, was written *our*. Author, properly signifies originator; the first who does anything.

"The *author* of that which causeth anything to be, is *author* of that thing also which thereby is caused."—*Hooker*.

"From his loins
New *authors* of dissension spring." *Philips*.

Ory, a Latin suffix, seen in promon*torium*, a promon*tory* (pro, *forward*, and mons, a *mountain*); and auditory, from auditorium (audire, *to hear*).

Ose, from the Latin *osus*, as morosus (*ill-tempered*), morose. The *osus* in Latin, is sometimes *ous*; as, monstruosus, monstrous. We have the ending in imperi*ous*, imperi*osus*; religi*ous*, religi*osus*; invidi*ous*, invidi*osus*; suspici*ous*, suspici*osus*. The *osus* is Englished also by our termination *y*; as, ventosus, windy; lapidosus, stony.

Ote, of Latin origin, found in verbs formed from the Latin participle in *otus*; as, to promote, from promotus (*moved forward*); to devote (devotus, Lat. *consecrated* (votum, *a vow*), something sacred or set apart for the gods).

"Such on Isis' temple you may find,
On *votive* tablets to the life pourtray'd." *Dryden*.

Ric, as in bishop*ric*, in Anglo-Saxon denotes *power*, *dominion*, *territory*; as to-become thin *rice*, i. e. *thy kingdom come*. Bishop*ric* then, is the *jurisdiction of a bishop*.

Ship, as in hard*ship*, has no connexion with ship, a vessel, but comes from the Anglo-Saxon scipe, denoting *a state*, *an office*, *a dignity*; e. g., freond-scipe, *friendship*, *the state of being a friend*; in German, freund*shaft*; the *shaft* represents the older form of the word, which was *sceaft*. Here is seen the origin of wor*ship*; that is, weorth-*ship*, literally *worthiness*.

"My train are men of choice, and rarest parts,
That all particulars of duty know;
And in the most exact regard support
The *worships* of their names." *Shakspear*, "King Lear."

Hence "worship" is a title of honour.

"Dinner is on table; my father desires your *worship's* Company." *Shakspear*, "Merry Wives of Windsor."

Derivatively, "worship" signifies *adoration*.

"Under the name of church, I understand a body or collection of human persons, professing faith in Christ, gathered together in several places of the world for the *worship* of the same God, and united into the same corporation."—*Pearson*.

Sum, from the Anglo-Saxon *sum*, an adjective of the same meaning as our adjective *some*, is employed in both Anglo-Saxon and in English as a suffix; e. g., winsum, *winsome*; i. e., *winning*. We find the termination in our present lone*some*, hand*some*, tire*some*, &c. The spelling of *some* in the Anglo-Saxon, namely, sum shows the origin of our pronunciation of the word. Sound Etymology would throw great light on pronunciation.

Ster, *str*, a suffix of Anglo-Saxon origin, denoting the *feminine gender*, as spinster, a female spinner. We may exhibit the real meaning of nouns ending in *ster*, as found in the Anglo-Saxon, thus:

Masculine.		Feminine.	
Sangere,	*a singer*	Sangestre,	*a songstér*
Bacere,	*a baker*	Bacestre,	(Baxter), *female baker*
Fidelere,	*a fiddler*	Fidelstre,	*a female fiddler*
Vebber,	*a weaver*	Vebbestre	(Webster), *a female weaver*
Raedere,	*a reader*	Raedestre,	*a female reader*
Seamere,	*a seamer (sewer)*	Seamstre,	*a seamster*

In our present termination of these feminines, namely, *stress*, as seen in song*stress*, the *ess* or *ss* seems derived by attraction from the classical termination *ess* from *ix*. Originally, song*stress* was song*estre*, but by the prevalence of such forms as shepherd*ess*, songestre was gradually drawn into song*stress*; and thus came to have a double suffix, both feminine; that is, *str* of the Saxon, and *ess* of the Latin. Not inappropriately may the English language be called a medley.

"Through the soft silence of the listening night,
The sober-suited *songstress* trills her way." *Thomson*.

Th, of Anglo-Saxon origin, being a termination by which adjectives are transformed into nouns; as, treow*th*, tru*th*, from treowe, German treu, English true; whence tro*th* and be*trothed*. We find the ending in mir*th* (merry), dear*th* (dear), bread*th* (broad), dep*th* (deep), &c.

Tude, a Latin termination, found in lati*tudo* (latus, *broad*), *latitude*; longi*tudo* (longus, *long*), *longitude*. So forti*tude* (fortis, *brave*), magni*tude* (magnus, *great*), &c.

Ty, from the Latin substantive termination *tas*; e. g., commodi*tas*, *commodity*. Here we have an instance of the way in which derivatives often depart from the meaning of their primitives. Commoditas in Latin means *proportion*, *convenience*, while *commodity* now signifies *a thing*, and has a strictly commercial import. The steps by which the derivation took place may be supplied from our older

writers. Commodity is found signifying *advantage;* and as proportion, or due observance of measure, time, or opportunity leads to *convenience*, so does a regard to convenience conduce to *advantage;* but advantage is only *interest* or *profit*, and *profit* is by *commodities*, the sources of gain.

Commodity as *convenience*.

"Travellers turn out of the highway, draw either by the commodity of a footpath, of the delicacy or the freshness of the fields."—*B. Jonson.*

Commodity as *advantage*.

"They know that, howsoever men may seek their own *commodity*, yet if this were done with injury unto others it was not to be suffered."—*Hooker.*

Commodity as *wares*.

"Of money in the commerce of mankind the principal use is that of saving the continuation of more bulky *commodities*."—*Arbuthnot*, "On Coins."

Ule, as in globule, from the Latin globulus, *a small globe or ball*. The termination *ule* (in Latin both *ulus* and *ulе*) is found in particule (Lat. particula) shortened into particle. Animalcule, *a little animal*, is formed by analogy rather than authority, inasmuch as the only connected diminutive in Latin is animula from anima, there being no diminutive from *animal*.

Ure, from the Latin *ura*; e. g., tinctura (a colour), tincture. It is found also in verdure (Lat. viridis, *green*), immediately from the French; and in tenure from the word tenuri, belonging to feudal or mediæval Latin.

Ute, from the Latin participial ending *utus*, fs neuter (nou, Lat. *a heath*); *sharpened*, *brute*.

Ward appears in the German warts, as in vorwärts, *forwards*; and the Latin versus, *towards*. It forms many compounds, traces which of are found in the Anglo-Saxon, as thider-weard; *thither-ward*; ham-ward, *homeward*. In the use of *toward* the *to* and the *ward* were sometimes separated by the interposition of the noun under regimen, as in 1 Thes. i. 8.

"Your faith *to* God-*ward* is spread abroad."

Wise, from the Anglo-Saxon wise, *manner*, is used in both Anglo-Saxon and English as a suffix; e. g., rightwis; *righteous*, formerly *rightwise*; unrightwis, *unrighteous*. Wise, denoting manner, is found in the Bible.

"Now the birth of Jesus Christ was on this *wise*." (Matt. i. 18.)
"If thou smite them in *any* wise." (Exod. xxii. 2.)

Webster, in his dictionary, under *wise*, states that wise is corrupted into *ways*, as in *lengthways*. This position may be questioned. *Way*, signifying manner, is good English. Why then may we not say *lengthways*? The *s* is merely a terminating consonant for the voice to rest on, as in *always*. Good writers use *lengthways* as less than *longwise*. *Sideways* is more common than *sidewise*. For always, *alyates*; and for otherwise, *otheryates* (which are the same as our always and otherways; *yates* being from the German gehen, *to go*; and gasse, *a street* or *way*), are not uncommon in the north of England.

Y, a Saxon termination, in adjectives representing *by*, as myrig, merry; wässerig, watery; and in nouns representing for the Latin *ia*, as victoria, *victory*; for the Greek also *ia*, as geometria, *geometry*. See the terminations *ite* and *se*. In such words as yclept, that is, *called*; yclad, that is, *clothed*; the *y* is a softened sound of the German *ge*, which is prefixed to the past participles as *geboren*, *born*.

"But come, thou goddess, fair and free,
In heaven yclep'd Euphrosyne,
And by men, heart-easing mirth." *Milton.*

ENGLISH SUFFIXES.

From Greek.	From Latin.	From French.	From Saxon.	Meaning.
		1 ade	..	result
	1 age	..	..	being
	2 al	..	..	personality
	3 ance	..	..	condition
	4 ar	..	..	effect
1 archy	..	..	..	government
			1 ard	habit
	5 ary	..	..	quality
		2 aster	..	diminution
	6 ble	..	..	possible

ENGLISH SUFFIXES (*continued*).

From Greek.	From Latin.	From French.	From Saxon.	Meaning.
			2 th	result
			3 ell	diminution
			4 dom	*dom*inion
		3 ee	..	effect
			5 el	instrument
	7 ence	..	..	result
			6 end	agent
			7 er	agent
			8 ery	place
			9 es, s	possession
		4 esque	..	quality
	8 ess	..	..	female
		5 et	..	diminution
		6 ette	..	result
	9 eur	..	..	agent
			10 head	condition
			11 ite	family
			12 ive	being
			13 ing	sonship
	10 ion	..	..	action
9 ism	..	..	..	division
2 ist	..	..	..	adherence
4 istry	..	..	..	place
	11 ix	..	..	female
			14 kin	sonship
			15 let	diminution
			16 ling	descent
		7 ment	..	result
	12 mony	..	..	effect
			17 ness	quality
			18 ock	diminution
		8 oon, on	..	greatness
	13 or	..	..	agency
	14 ory	..	..	condition
			19 rik	authority
			20 ship	condition
			21 ster	female
			22 th	result
	15 ty	..	..	result
	16 ture	..	..	condition
	17 tude	..	..	diminution
			23 able	capacity
	18 al	..	..	belonging to
	19 an	..	..	pertaining to
	20 ant	..	..	state
	21 ar	..	..	according to
	22 ary	..	..	quality
	23 ate	..	..	condition
			24 en	result
			25 ent	condition
			26 ever	augmentive
			27 full	abundance
			28 ic	like
	24 ile	..	..	condition
	25 in	..	..	place, quality
	26 ique	..	..	quality
			29 ish	diminution
			30 less	privation
			31 ly	likeness
	27 ose	..	..	quality
			32 some	a part
			33 ward	direction
			34 wise	manner
			35 ly	quality
			36 en	to make
			37 en, s	be
			38 est	thou
			39 eth	he
	28 fy	..	..	to make, do
3 ize	..	..	..	to make, do
5 ize	..	..	..	to make, do
7 ote	..	..	..	to make, do

SUMMARY.

Suffixes of Greek origin	7
Suffixes of Latin origin	28
Suffixes of French origin	8
Suffixes of Saxon origin	39
Total	82

It is of little consequence in general whether the suffixes ascribed to the French be ascribed to it or to the Latin, whence they originally come. If the eight French suffixes are added to the 28 Latin ones, then the Latin suffixes are nearly equal to those of Saxon origin. Adding all the foreign suffixes together we find they amount to 43, and so out-number our native or Saxon suffixes.

OUR MAPS.

Besides the explanations which have been given along side of the Maps of Europe and Asia, and which will be given with each successive map, a fuller account of each quarter of the world, and of each separate country, will be given in our Lessons in Geography as we proceed, beginning with the Map of the World. We have hitherto been detained by a wish to let our students know how the earth stands externally related to the solar system of which it forms a part, before we proceeded to give a description of its surface and its inhabitants. Besides, the additions which have been recently made—and are now making—to our knowledge of this local astronomy of the heavens, are not only very interesting in themselves, but they make us acquainted with the history of planetary changes, and with what may some day happen to the earth itself; "but of that day and hour knoweth no man; no, not the angels of heaven, but my Father only," said he who knew all things, even the most difficult to know, the thoughts of men, and the intents of their hearts.

ANSWERS TO CORRESPONDENTS.

James Vencock (James-street): We have Thomson's Arithmetic, and we were well acquainted with Mr. Knowles. Our correspondent's letters reached us, but we have not had time to reply.—W. (University, London): If our present correspondent, or any other, will only prove that *Judicial Astrology* (as it is called), or the doctrine of foretelling events in a man's life *by the stars;* that is, by drawing his horoscope, and announcing the day of his death, or any other remarkable event in his history, without any previous knowledge of that history, we shall make the *amende honorable*, and confess that we were wrong to call in question the truth of the said science. We are fully open to correction, and we are strenuous advocates of free inquiry. At the same time, we beg to remark that the standard of the religion of the British Empire says, "Go to, now, ye that say, To day or to morrow, we will go into such a city and continue there a year, and buy and sell and get gain; whereas *ye know not what shall be on the morrow.*"

Henry and John (Regent-street): See Cassell's Emigrant's Handbook.—Alpha's questions received.—H. C. (Sheen, Staffordshire): Some books on Geography contain rules for the pronunciation of the proper names, as Thomson's and others. In reading Latin poetry the elision of *e* and *um* is not necessary unless you are scanning the lines. We could not learn Latin in three years ourselves to do what you state; so be content, you are no worse than your neighbours.—Hubbets (Hull): Thanks for his letter.—J. Jones (Glossop): In the Euclid, (*Hyp.*) means *by hypothesis* or *supposition*, and (*Const.*) means *by construction*.—C. Hill (Cirencester): His difficulty will be explained in another lesson soon.—Miles et Musicus (Newport): *Allantoides* means sausage or pudding shaped; it is a medical term. *Paulinæ* is the nominative plural feminine, agreeing with *Horæ*, and derived from the name of the Paul, the apostle, thus, *Paulinus*, a, um, of or belonging to Paul. *Music* is pronounced *mu-ic* on the continent, *music*, as if one word, in England. Doe-u-it is right. *Vocatis magis*, abl. abs., the Magi being called; the nominative singular is *Vocatus magus*.

P. Balchin (Somer's-town): Wrong.—James Adamson (St. Martins): We thank him for his ingenious method of working Compound Multiplication and Proportion, and shall avail ourselves of them in the P. E. as soon as possible.—J. Binney: There *are* some lessons in Drawing in the "Magazine of Art."—W. M. T. (Camden-town): Wrong.—A Constant Subscriber (Wharfdale): Send to Messrs. Bagster, Paternoster-row, for their printed list of books on the Oriental languages.—H. Martyn (Southampton): We are not aware of any recently published cheap editions of English Classical Literature; but there have been many. In the prefaces to the British Essayists, the signatures of the different authors are pointed out. For cheap French Classical Literature, apply to any of the foreign booksellers in London, as Bohn, Nutt, and others. We disapprove of Shakspere being read until the elements of useful learning and correct modern literature have been acquired. Moreover, that work is not adapted, in our humble opinion, to the purpose of improving the mind either for time or eternity. The celebrated, revd. and learned Dr. Pye Smith *never read it*.—Pupil Teacher (Notts.): Right; thanks for his letters and suggestions.—One who wishes to get on (Colchester): We have known many clever mathematicians and students of Euclid whose age was no more than fifteen years; we solved the following problem ourselves at fourteen:—"Prove that if two chords of a circle intersect each other at right angles, the squares of the four segments are together equal to the square of the diameter;" and we did prove it by the *second* book of Euclid, too, without going into the *third*.—Isaac (Leicester): Both right and ingenious.—H. V. D. L. (Belfast): Try Mr. Moore, bookseller, for the extra edition in numbers.—Discipulus (Thirsk): The best Hebrew Grammar is Gesenius's, translated by Dr. Benjamin Davies, and published by Messrs. Bagster, Paternoster-row.—H. F. (Stokesley) would be obliged to X. X. X. if he would inform him, as soon as convenient, what books it would be best to study before entering the Normal School, London, for a period of six months.—Ignoramus (Pushle) tells us that "his first lesson on receiving a monthly part [of the P. E.] is to read the notices to correspondents; then Geology, then Physiology, then Geography, then English, next Geometry, next Architecture, followed by Botany; he then goes over Natural History, and lastly, Biography;" he next asks if "his mode of procedure be judicious, or his field too varied." In answer to this, we say, *first*, that our correspondent is *too modest* in the adoption of a name, for whoever does as he does, cannot be an *ignoramus*, but the reverse; *second*, we wish all our readers would follow his first lesson and read the answers to correspondents, they would thus gain much useful information, and save both themselves much trouble in asking the same questions over and over again, and us the same in answering them. As to his mode of procedure in other matters, if he can take up only half of what he reads he will do uncommonly well; but we recommend him to read the papers entitled the Philosophy of Study.—J. Pratt (Willenhall): Logic is a very good study; we recommend Whateley's, of which we believe a cheap copy may be had at about 4s.—Ellivas (Stepney): Right on the snail query.

M. H. Penmaenmawr, ingeniously proposes for solution *by geometrical construction only*, without arithmetic or algebra, the problem "To find the length of a pole which is ⅓ of that length in mud, ½ of it in water, and 10 feet above the water."—J. C. G. (Aberdeen): We cannot really advise him on the matter he wishes to know.—Enobladus: *Mr. James Sheridan Knowles* is a teacher of elocution, at 33, Howland-street, Fitzroy-square. He was the author and actor of several plays, a mode of livelihood which he has wisely abandoned; he has our deepest sympathy and recommendation. *James Knowles*, the author of the modern "English Pronouncing Dictionary," was his father. We believe this gentleman was distantly related to *Dr. T. Sheridan*, who was the author of an old pronouncing dictionary before *Walker*. The different subjects you mention will sooner or later form part of our course.—J. M. O. A Subscriber (Nott): The Prince like other men will be of age at 21. By a wise arrangement of Providence the face is the index both of body and mind.—Aristides (Limehouse): Thanks for his suggestions.—C. A. S.; J. Redman (Haworth); G. Martin (Glasgow); C. Hill (Cirencester): Right.—Ignoro (Brompton): Q. E. D. are the initial letters of the Latin words *Quod Erat Demonstrandum*, signifying *Which was to be demonstrated*, and not, as a pupil of ours *once thought, Quite Elegantly Done!* Q. E. F. are the initial letters of the Latin words *Quod Erat Faciendum*, signifying *which was to be done*.—A. B. C.: The remarks of Mr. Nichol on the phosphorescence of the sun, and moon, and the planets are certainly very ingenious and worthy of consideration; but we doubt much whether they can be so substantiated by facts as to throw the light of the sun *into the shade*. Let us take a common lens or burning glass; it is surely not the glass that burns, but the rays of light from the sun concentrated to a focus; neither is it the Aurora Borealis or any other Aurora that does with the lens in the day time that which cannot be done at night.

Une Jeune Cuisinier (Borough): We would advise him to apply at H. M. Victualling Office, at Deptford, or H. M. Naval Stores, at Chatham.—James Smith (Camberwell): Many thanks for his testimony to our edition of Euclid.—Robert Smith (Manchester): Many thanks for his hint on the philosophy of mind: we have made a beginning in the Philosophy of Study. The more recent works on mental philosophy are so full of erroneous views in religion that we cannot recommend them; we would rather recommend some of the older writers, as Locke on the "Human Understanding," Reid on the "Intellectual Powers," Stewart on the "Philosophy of the Human Mind," Brown on the same subject, to which he may add "Whateley's Logic."—Je Vois La Raison: To answer her queries would require us to sit down and compose the most remarkable work on morals, mental philosophy, and religion, as well as the natural history of man that ever yet beheld the light; but as *she sees the reason* perhaps she would favour us with her views on the queries she has proposed, and enable us to enlighten the public.—George Graham (Belfast): Thanks for his suggestions.—W. B. (Bowling): As to his first query, we are not dentists, and can't say; as to his second, study our Lessons in Penmanship; as to his third, certainly there is remuneration for contributions to the press, if they are worth it.—J. C. (Edinburgh): The question he proposes can be solved *algebraically*.—P. S. (Lynn): Received.—W. Gane (Boston): Cassell's Arithmetic will contain a rule for the extraction of all roots.—J. Guthrie, sen. (Kelso) has mystified himself with subtle distinctions, and he wants us to do the same to our readers, but we wont.—B. S. (Garmouth): Received.—Anxious Learner should not mind all that people say to him. He can learn without a pronouncing dictionary; and Mr. Cassell's "Lessons in French," which he can have sent to his address by sending seven penny stamps to this office, will enable him to acquire the pronunciation very well.

LITERARY NOTICES.

JOHN CASSELL'S ALMANACKS FOR 1853 ARE NOW READY.

The Uncle Tom's Cabin Almanack; or, The Abolitionist Memento for 1853, splendidly Illustrated by George Cruikshank, Gilbert, Harvey, "Phiz," and other eminent Artists, price 1s.

The Illustrated Exhibitor Almanack for 1853, containing upwards of Thirty beautiful Engravings, price 6d.

The Popular Educator Almanack for 1853, containing Forty-eight Pages of most interesting and valuable Educational Statistics; including a Comparative View of Education at Home and Abroad; Essays on the Leading Sciences; Brief Notices of Eminent Scholars; Exposition of Technical Terms; &c. &c., price 2d.

The Temperance Almanack for 1853, much improved and enlarged, and in which will be inserted a Tale of thrilling interest, from the inimitable pen of Mrs. Harriet Beecher Stowe, authoress of "Uncle Tom's Cabin," entitled, "The Pledge Taken; or, The Husband Saved, and a Family made Happy;" with valuable details of the great Temperance Movement, Statistics, &c. With several Engravings, designed by Gilbert, price 2d.

The Protestant Dissenters' Almanack for 1853, with 12 beautiful Designs, by Gilbert, of striking Events in the History of Nonconformity, price 6d.—Published by John Snow, Paternoster-row.

Cassell's Elements of Arithmetic (uniform with Cassell's Euclid), is now ready, price 1s. in stiff covers, or 1s. 6d. neat cloth.

Printed and Published by John Cassell, La Belle Sauvage Yard, Ludgate-hill, London.—November 6, 1852.

EOGRAPHY.—No. XIV.

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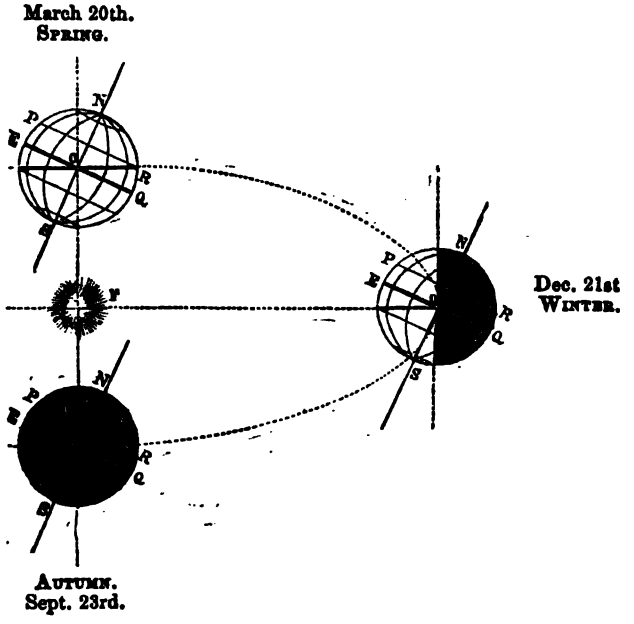
centre of the sun, or the focus of that orbit. Consequently, the earth is about double this distance, or 3,198,050 miles *nearer* to the sun *in winter* than in summer.

In our diagram, the earth is represented in four different positions (*momentary* positions) in its orbit; namely, at mid-summer, mid-spring, mid-winter, and mid-autumn. In all these positions, as well as all round in its various positions in the orbit, the parallelism of its axis N S is preserved. This axis is inclined to the plane of the orbit, as we have before observed, at an angle of 66° 32′; hence it makes an angle of 23° 28′ with the perpendicular to the plane of its orbit; for the perpendicular, represented by the dotted line passing through the centre O, makes an angle of 90° with the plane of the orbit; and subtracting 66° 32′ from 90° gives the remainder 23° 28′, which is the angle between the axis N S and the perpendicular or dotted line. By reason of this parallelism of the axis N S, it

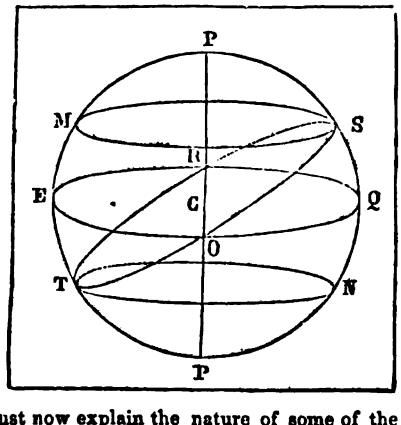


so happens that at *mid-spring*, or March 20th, the half of the globe is illuminated from pole to pole, that is, from the northern extremity of the axis N, to the southern extremity of the axis S, and the days and nights are then exactly equal all over the earth; that is, there are twelve hours of light and twelve hours of darkness to every spot on the earth's surface for this day. Hence this day is called the *equinox* (*equal night*) *of spring*, or the vernal equinox. Again, at *mid-summer*, or June 21st, the half of the globe is illuminated from the circumference of a small circle of the globe at the distance of 23° 28′ from the north pole N, to the circumference of a small circle at the distance of 23° 28′ from the south pole S; and the day is 24 hours long at all places of the earth contained in the space between the small circle and the north pole; that is, there are 24 hours of light and no darkness at all to every spot within this space on this day; but the night is 24 hours long at all

places of the earth contained in the space between the small circle and the south pole, that is, there are 24 hours of darkness and no light at all to every spot within this space on this day. As at this point the earth begins to *return* to a position similar to that at the vernal equinox, and the sun seems to be *stationary* as to its appearance and effects on the earth's surface for two or three days before and after this day, it is called the *summer solstice* (*sun-standing*), or the *tropic* (*turning*) *of summer*. Next, at *mid-autumn*, or Sept. 23rd, the half of the globe is again illuminated from pole to pole, and the same appearances take place as at the equinox of the spring, that is, the days and nights are then exactly equal all over the earth, or there are 12 hours of light and 12 hours of darkness to every spot on the earth's surface for this day. Hence, this day is called the *equinox of autumn*, or the autumnal equinox. Lastly, at *mid-winter*, or Dec. 21st, the half of the globe is illuminated from the circumference of a small circle of the globe at the distance of 23° 28′ from the south pole s, to the circumference of a small circle at the distance of 23° 28′ from the north pole N, and the day is 24 hours long at all places of the earth contained in the space between the small circle and the south pole; that is, there are 24 hours of light and no darkness at all to every spot within this space on this day; but the night is 24 hours long at all places of the earth contained in the space between the small circle and the north pole; that is, there are 24 hours of darkness and no light at all to every spot within this space on this day.

In looking at the diagram, *you see* at the equinox of spring, or March 20th, the whole of the illuminated half of the globe, because from the representation of its position it is turned in front both to the sun at F, and to you the spectator; at the summer solstice, or June 21st, you see only *half* of the illuminated half of the globe, because it is turned in front to the sun at F, but only sideways to you the spectator, you being outside of the orbit; at the autumnal equinox, or Sept. 23rd., you see *none* of the illuminated half of the globe, because it is turned in front to the sun at F, but at the back to you the spectator, you being outside the orbit and as it were behind the globe; and at the winter solstice, or Dec. 21st, you again see *half* of the illuminated half of the globe, because it is turned in front to the sun at F, but only sideways to you the spectator for the same reason as before. But were you placed in the middle of the orbit at the point F, you would, by turning round and round to the different points of it we have been describing, see the *whole* of the illuminated half of the globe at each point; and were you placed outside of the orbit in the directions of the major and minor axes, and made to look at the globe in these directions only, you would see *none* of the illuminated half of the globe, but only the dark side in each position.

Fig. 3.



We must now explain the nature of some of the more important circles on the sphere or globe of the earth. If, in fig. 3, which we suppose to be a representation of the globe of the earth, P P denotes the axis; that is, the diameter of the sphere, passing through the centre (the heart or middle point) C, on which the sphere or globe revolves like a wheel on an axle, then it is evident that every point on its surface will, in the course of its revolution or whirling on its axis, describe a circle; thus the points, M, E, and T on the surface, will describe the circles M S, E Q, and T N respectively; and it is evident that the point E, equally distant from the two points P P, the extremities or poles of the axis, will describe the largest circle of all in the course of the revolution; and that if the sphere were cut by a plane or flat surface, like an orange by a knife, through the circle E Q, it would pass through C, the centre of the sphere. Every circle, whose plane thus passes through the centre of the sphere, is called *a great circle* of the sphere. It is further evident that every point, such as M, on the surface of the sphere, will describe a circle smaller than the circle E Q in proportion to its distance from the point E on either side, or to its vicinity to either of the points P P; and that if the sphere were cut by a plane or flat surface, like an orange by a knife, through such a circle as M S, it would *not* pass through C, the centre of the sphere. Every circle whose plane does not pass through the centre of the sphere, is called *a small circle* of the sphere. Accordingly, the circles M S and T N, are called small circles of the sphere; and if the points M and T be equally distant from the point E, these circles will be equal in size, and their planes will cut the axis in two points equally distant from the centre C. The plane of a great circle such as E Q, cuts the globe or sphere into *two equal hemispheres*; but the plane of a small circle cuts it into *two unequal parts*, or *segments* (cuttings) *of a sphere*. For some purposes, the circumference of a circle, large or small, is divided into 360 equal parts, in order to enable us to measure distances along the circumference; each of these equal parts being called *a degree*; for other purposes, the circle is divided into two equal parts called *semicircles*, and these are also divided into degrees, each containing 180 degrees, and both 360 degrees as before; and for other purposes still, the circle is divided into four equal parts called *quadrants*, each containing 90 degrees, and the whole containing 360 degrees as before. Each degree is divided into 60 equal parts called *minutes*, and these minutes (minute parts) are employed to express any part or fraction of a degree which may be found over and above a certain number of degrees in any distance. Again, each minute is divided into 60 equal parts called *seconds*, and these *seconds* (second minute parts) are employed to express any part or fraction of a minute which may be found over and above a certain number of degrees and minutes in any distance; and so on, to *thirds*, *fourths*, &c. This division of *the degree* is called the *sexagesimal* (*by sixtieths*) division of the *degree*; the division of the *quadrant* of a circle into 90 degrees, is called the *nonagesimal* (*by ninetieths*) division of the *quadrant*. The French, in some of their scientific works, adopt a different division of the circle and its parts. They divide the *circle* into 400 equal parts, calling them degrees; and of course, the *quadrant* into 100 degrees; also the *degree* into 100 parts called *minutes*; and so on; this is called the *centesimal* (*by hundredths*) division of the *quadrant*. Any number of *degrees* is marked by a *circlet* (or *small circle*) placed on the right of the number in a small character, and above the line; thus 27° denotes 27 degrees. Any number of minutes is marked by *one acute accent* or dash from right to left; of seconds, by two dashes, and so on.

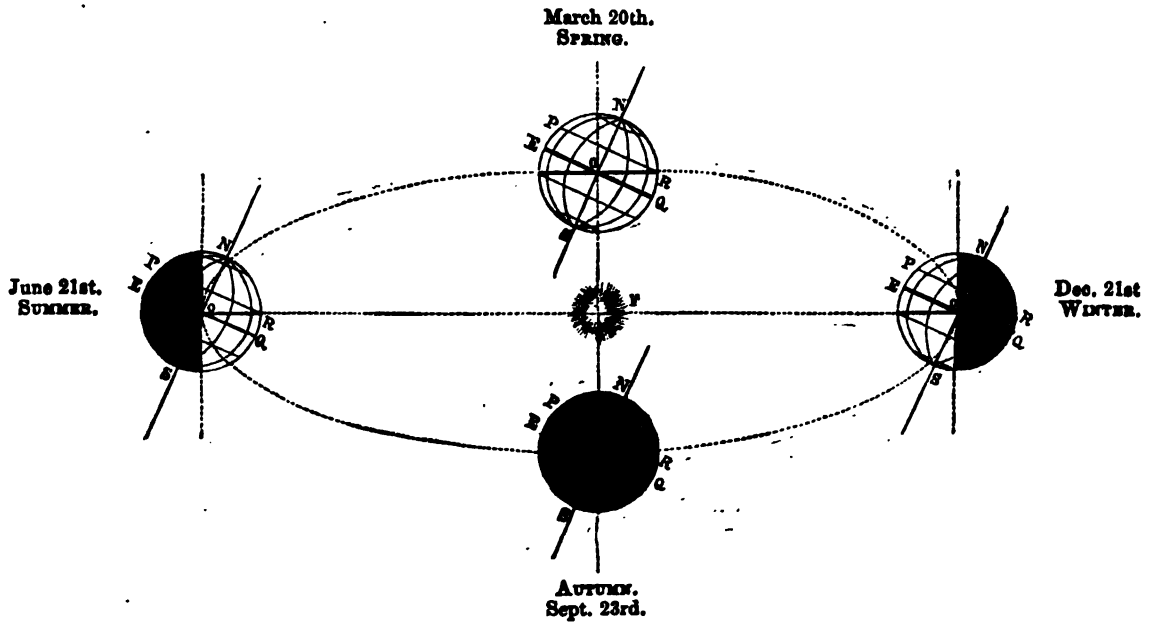
On the globe of the earth, or *terrestrial globe* as it is called, the *first* great circle of importance is the *meridian*; this is a great circle which passes through the two poles P P of the axis of the earth, and through any point, as M, on the earth's surface; it is called *meridian*, because when the sun in our climate shines on a gnomon or style (the pin of a sun-dial) and casts its shadow in the direction of this line on the surface of the earth, it is then (*meridies*) *mid-day* or *noon*; and whenever any heavenly body appears in the plane of this circle, as determined by the position of the style and its shadow at noon it is said to be *on the meridian*. The meridian of the point M is, according to this definition, the circle P M T P N S. But as every spot on the surface of the globe has *its own meridian*, if we wish to have a proper notion of the distance of the meridian of any place from that of the place where we dwell, we must fix upon the meridian of *some one place* as *a standard* to which we shall refer the distance of every other meridian. Accordingly the *meridian of Greenwich* has been fixed upon by common consent in this country, as the *standard* or FIRST MERIDIAN, to which we are to refer all others in point of distance. The *second* great circle of importance is the *equator*; this is a great circle which

LESSONS IN GEOGRAPHY.—No. XIV.

(*Continued from p.* 63.)

HAVING explained, in our Lesson No. XI., of No. 27, the nature of the seasons arising from the annual motion of the earth in its orbit or path round the sun, and the parallelism of its axis, or the invariable inclination of that axis to the plane of its orbit, we shall render this subject more strikingly evident by means of the accompanying diagram of the seasons. Here the sun is considered to be fixed at the point P in the diagram, which is considered to be the *focus* of the elliptical or oval orbit in which the earth moves, and which is so near to the centre of the curve that it may be, on this small scale of figure, reckoned the same with that centre; and you know that the centre is the point where the *major* axis, between summer and winter, intersects or crosses the *minor* axis, between spring and autumn. If you are curious enough to know how far the *focus* P is from the real centre of the orbit, we shall tell you; it is about *one-sixtieth part* of the half of the *major axis* or of the *mean distance* between the earth and the sun, from the real centre. Let us see if we can express this distance in some known measure. According to Laplace, the mean distance of the earth from the sun, or the length of the mean semidiameter of the earth's orbit, is 23,984 times the length of the mean terrestrial radius, or of the mean distance from the centre of the globe of the earth to its surface. According to the same authority, the earth's mean radius is about 3956 British miles, and of course its mean diameter 7912 miles. Therefore, multiplying 3956 miles by 23,984, we have the mean distance of the earth from the sun, that is, half the major axis of its orbit, about 94,880,704 miles; this makes the mean diameter of the earth's orbit about 189,761,408 miles, and its circumference about 596,153,045 miles. The true eccentricity of the earth's orbit being ·016792 instead of *one-sixtieth*, we have 1,599,025 miles for the distance between the centre of the orbit and the centre of the sun, or the focus of that orbit. Consequently, the earth is about double this distance, or 3,198,050 miles *nearer* to the sun *in winter* than in summer.

In our diagram, the earth is represented in four different positions (*momentary* positions) in its orbit; namely, at mid-summer, mid-spring, mid-winter, and mid-autumn. In all these positions, as well as all round in its various positions in the orbit, the parallelism of its axis N S is preserved. This axis is inclined to the plane of the orbit, as we have before observed, at an angle of 66° 32′; hence it makes an angle of 23° 28′ with the perpendicular to the plane of its orbit; for the perpendicular, represented by the dotted line passing through the centre O, makes an angle of 90° with the plane of the orbit; and subtracting 66° 32′ from 90° gives the remainder 23° 28′, which is the angle between the axis N S and the perpendicular or dotted line. By reason of this parallelism of the axis N S, it

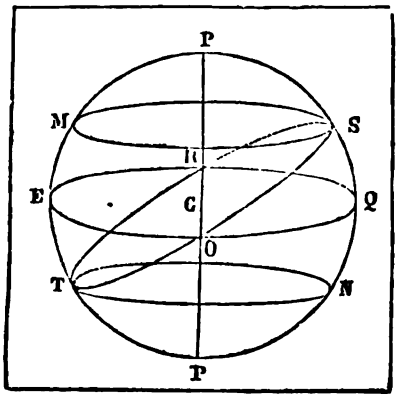


so happens that at *mid-spring*, or March 20th, the half of the globe is illuminated from pole to pole, that is, from the northern extremity of the axis N, to the southern extremity of the axis S, and the days and nights are then exactly equal all over the earth; that is, there are twelve hours of light and twelve hours of darkness to every spot on the earth's surface for this day. Hence this day is called the *equinox* (*equal night*) *of spring*, or the vernal equinox. Again, at *mid-summer*, or June 21st, the half of the globe is illuminated from the circumference of a small circle of the globe at the distance of 23° 28′ from the north pole N, to the circumference of a small circle at the distance of 23° 28′ from the south pole S; and the day is 24 hours long at all places of the earth contained in the space between the small circle and the north pole; that is, there are 24 hours of light and no darkness at all to every spot within this space on this day; but the night is 24 hours long at all

places of the earth contained in the space between the small circle and the south pole, that is, there are 24 hours of darkness and no light at all to every spot within this space on this day. As at this point the earth begins to *return* to a position similar to that at the vernal equinox, and the sun seems to be *stationary* as to its appearance and effects on the earth's surface for two or three days before and after this day, it is called the *summer solstice* (*sun-standing*), or the *tropic* (*turning*) *of summer*. Next, at *mid-autumn*, or Sept. 23rd, the half of the globe is again illuminated from pole to pole, and the same appearances take place as at the equinox of the spring, that is, the days and nights are then exactly equal all over the earth, or there are 12 hours of light and 12 hours of darkness to every spot on the earth's surface for this day. Hence, this day is called the *equinox of autumn*, or the autumnal equinox. Lastly, at *mid-winter*, or Dec. 21st, the half of the globe is illuminated from the circumference of a small circle of the globe at the distance of 23° 28′ from the south pole s, to the circumference of a small circle at the distance of 23° 28′ from the north pole N, and the day is 24 hours long at all places of the earth contained in the space between the small circle and the south pole; that is, there are 24 hours of light and no darkness at all to every spot within this space on this day; but the night is 24 hours long at all places of the earth contained in the space between the small circle and the north pole; that is, there are 24 hours of darkness and no light at all to every spot within this space on this day.

In looking at the diagram, *you see* at the equinox of spring, or March 20th, the whole of the illuminated half of the globe, because from the representation of its position it is turned in front both to the sun at Y, and to you the spectator; at the summer solstice, or June 21st, you see only *half* of the illuminated half of the globe, because it is turned in front to the sun at Y, but only sideways to you the spectator, you being outside of the orbit; at the autumnal equinox, or Sept. 23rd., you see *none* of the illuminated half of the globe, because it is turned in front to the sun at Y, but at the back to you the spectator, you being outside the orbit and as it were behind the globe; and at the winter solstice, or Dec. 21st, you again see *half* of the illuminated half of the globe, because it is turned in front to the sun at Y, but only sideways to you the spectator for the same reason as before. But were you placed in the middle of the orbit at the point Y, you would, by turning round and round to the different points of it we have been describing, see the *whole* of the illuminated half of the globe at each point; and were you placed outside of the orbit in the directions of the major and minor axes, and made to look at the globe in these directions only, you would see *none* of the illuminated half of the globe, but only the dark side in each position.

Fig. 3.



We must now explain the nature of some of the more important circles on the sphere or globe of the earth. If, in fig. 3, which we suppose to be a representation of the globe of the earth, P P denotes the axis; that is, the diameter of the sphere, passing through the centre (the heart or middle point) C, on which the sphere or globe revolves like a wheel on an axle, then it is evident that every point on its surface will, in the course of its revolution or whirling on its axis, describe a circle; thus the points, M, E, and T on the surface, will describe the circles M S, E Q, and T N respectively; and it is evident that the point E, equally distant from the two points P P, the extremities or poles of the axis, will describe the largest circle of all in the course of the revolution; and that if the sphere were cut by a plane or flat surface, like an orange by a knife, through the circle E Q, it would pass through C, the centre of the sphere. Every circle, whose plane thus passes through the centre of the sphere, is called *a great circle* of the sphere. It is further evident that every point, such as M, on the surface of the sphere, will describe a circle smaller than the circle E Q in proportion to its distance from the point E on either side, or to its vicinity to either of the points P P; and that if the sphere were cut by a plane or flat surface, like an orange by a knife, through such a circle as M S, it would *not* pass through C, the centre of the sphere. Every circle whose plane does not pass through the centre of the sphere, is called *a small circle* of the sphere. Accordingly, the circles M S and T N, are called small circles of the sphere; and if the points M and T be equally distant from the point E, these circles will be equal in size, and their planes will cut the axis in two points equally distant from the centre C. The plane of a great circle such as E Q, cuts the globe or sphere into *two equal hemispheres*; but the plane of a small circle cuts it into *two unequal parts*, or *segments* (cuttings) *of a sphere*. For some purposes, the circumference of a circle, large or small, is divided into 360 equal parts, in order to enable us to measure distances along the circumference; each of these equal parts being called *a degree*; for other purposes, the circle is divided into two equal parts called *semicircles*, and these are also divided into degrees, each containing 180 degrees, and both 360 degrees as before; and for other purposes still, the circle is divided into four equal parts called *quadrants*, each containing 90 degrees, and the whole containing 360 degrees as before. Each degree is divided into 60 equal parts called *minutes*, and these minutes (minute parts) are employed to express any part or fraction of a degree which may be found over and above a certain number of degrees in any distance. Again, each minute is divided into 60 equal parts called *seconds*, and these *seconds* (second minute parts) are employed to express any part or fraction of a minute which may be found over and above a certain number of degrees and minutes in any distance; and so on, to *thirds*, *fourths*, &c. This division of *the degree* is called the *sexagesimal* (*by sixtieths*) division of the *degree*; the division of the *quadrant* of a circle into 90 degrees, is called the *nonagesimal* (*by ninetieths*) division of the *quadrant*. The French, in some of their scientific works, adopt a different division of the circle and its parts. They divide the *circle* into 400 equal parts, calling them degrees; and of course, the *quadrant* into 100 degrees; also the *degree* into 100 parts called *minutes*; and so on; this is called the *centesimal* (*by hundredths*) division of the *quadrant*. Any number of *degrees* is marked by a *circlet* (or *small circle*) placed on the right of the number in a small character, and above the line; thus 27° denotes 27 degrees. Any number of minutes is marked by *one acute accent* or dash from right to left; of seconds, by two dashes, and so on.

On the globe of the earth, or *terrestrial globe* as it is called, the *first* great circle of importance is the *meridian*; this is a great circle which passes through the two poles P P of the axis of the earth, and through any point, as M, on the earth's surface; it is called *meridian*, because when the sun in our climate shines on a gnomon or style (the pin of a sun-dial) and casts its shadow in the direction of this line on the surface of the earth, it is then (*meridies*) *mid-day* or *noon*; and whenever any heavenly body appears in the plane of this circle, as determined by the position of the style and its shadow at noon it is said to be *on the meridian*. The meridian of the point M is, according to this definition, the circle P M T P N S. But as every spot on the surface of the globe has *its own meridian*, if we wish to have a proper notion of the distance of the meridian of any place from that of the place where we dwell, we must fix upon the meridian of *some one place* as *a standard* to which we shall refer the distance of every other meridian. Accordingly the *meridian of Greenwich* has been fixed upon by common consent in this country, as the *standard* or FIRST MERIDIAN, to which we are to refer all others in point of distance. The *second* great circle of importance is the *equator*; this is a great circle which

passes through all the points on the earth's surface situated at an equal distance from the two poles P P of the earth's axis; it is called *equator* because when the sun's rays are vertical to this line, there is no shadow to the gnomon or style at noon, and there is an *equalisation* of light all over the globe (on the days when this takes place), this position of the sun being the *equator* (equator). The equator is also made the starting place he distances of places on the surface osition in the northern or southern ator divides the globe into two equal nd southern *hemispheres* or *half-globes*; h we live, is called the *northern* hemi- n ancestors called the point opposite to ; and that hemisphere in which the sun in the contrary direction, is called s, because they called the point at noon the *south*. The *distance* rthern or southern hemisphere from measured in degrees of the quad- that place. Thus, the meridian of e surface of the globe, fig. 3, being stance of M from the equator, E Q, is of degrees of the quadrant, E P, con- rtion of the circumference of a circle) E P is divided into 90° from E to P, e the north pole at P, and the degrees hich is marked 0° (*no degrees*), to P, ty *degrees*). Hence, if M be any point which the rays of the sun are vertical represented in the diagram of the mer), then the distance of the point M 8′ N; that is, 23 degrees 28 minutes s is plain; for, if from the right angle e plane of the earth's orbit and the ne (see the diagram above mentioned), ngle or 90° formed between the plane and the perpendicular to that plane we take away the common angle N O E, rth's axis to the plane of the earth's we shall have 23° 28′ in either case; between the polar circle and the pole, lane of the earth's equator to the plane consequently the distance M E, fig. 3.

The distance of any point on the earth's surface, measured in degrees, from the equator is called its *latitude* (from latitudo, Lat. *breadth*), because the extreme distance of the earth from north to south was by early geographers reckoned less than its extreme distance from east to west; the term *longitude* (from longitudo, Lat. *length*) being applied to distances reckoned east or west from the first meridian. The *latitude* of the point M on the earth's surface is thus reckoned 23° 28′ N. In like manner the *latitude* of the point T, on the earth's surface, or any point to which the rays of the sun are vertical on the 21st of December is reckoned 23° 28′ S; that is, 23 degrees 28 minutes *south*.

LESSONS IN LATIN.—No. XXXI.

By JOHN R. BEARD, D.D.

II. DEVIATIONS IN THE SECOND CONJUGATION.

MANY verbs of the second conjugation are without supines; such are, horreo, *I am stiff*; paveo, *I fear*; floreo, *I flourish*.

1. *Perfect, ui; Supine, tum.*

i. Arceo, arcere, arcui (no supine), *to keep off, restrain*; artus or arctus, the passive participle of arceo, is used as an adjective in the sense of *restrained, close, tight*; connected with artus, ūs, *a joint*. The compounds of arceo, in which the a passes into e, are formed like moneo, as coerceo, coercere, coercui, coercitum, *to hold together, hold in, keep back*.

ii. Doceo, docere, docui, doctum (with 2 acc.), *to teach*.

iii. Misceo, miscēri, miscui, mixtum or mistum (with dat.), *to mix*.

iv. Teneo, tenere, tenui (tentum in compounds) *to hold*.

v. Torreo, torrere, torrui, tostum, *to dry, parch, toast*.

The student may here advantageously stop a moment, in order to compare his Latin with his English. Obviously in horreo (horridus) we have our *horrid*; in floreo, our *flower*; in coerceo, our *coerce* and *coercion*; in moneo, our *monition, monitor*, and *admonition*; in doceo, our *doctor*; in misceo, our *mix*; in teneo, our *tenet*; and in torreo, our *torrid* and our *toast*; to such an extent do the Latin and the English agree. These facts lie on the surface. An acquaintance with philology would disclose other facts. For instance, our *teach* (which Richardson derives from *to take*, because teaching is taking into the mind; which, rather, is what learning does) is the same word as the Latin docere; and the two are found in the Greek didaskein; thus, *teach*, doce, dase, have a common origin, and a common import.

2. *Perfect in ui; Supine in um.*

Only one verb. Censeo, censere, censui, censum, *to give an opinion, estimate, take the census, to judge*.

Thus are the compounds formed: recenseo, *I go over, investigate, revise*, has recensītum as well as recensum; percensere, *to go through, recount*, has no supine.

3. *Perfect in evi; Supine in etum.*

i. Deleo, delere, delevi, deletum, *to destroy*.

ii. Plere, *to weep*.

iii. Nere, *to spin*.

iv. Complere (and other compounds of the obsolete plere), *to fill*.

v. Aboleo (from the obsolete oleo, *I grow*), *to abolish*, forms in the supine abolītum; this verb does not occur until after the Augustan age.

vi. Cieo, ciere, civi, cītum, *to arouse*, slightly differs from the model. Cio, cire, civi, cītum (never cītum), follows the fourth conjugation. The compounds are divided between the two forms; e. g., concieo, īre (rare), īvi, ītum or concio, īre, ītum; and escieo, īre, īvi, ītum, or excio, īre, īvi, ītum, and percieo, īre (rare), ivi, ītum, or percio, īre, ivi, ītum; but accio, accēre, accīvi, accītum, follows exclusively the fourth conjugation. Cieo means *to stir up*; concieo, *to arouse*; excieo, *to call forth*; percieo, *to arouse thoroughly*; and accio, *to call to, send for*.

Aboleo is in signification somewhat curious. Its root oleo (olo) means *to grow*; hence, adoleo, *to flourish in growth*; and adolescens, *a young man, age during the period of growth*. By the force of the prefix ab, *from*, the verb aboleo denotes *to be checked in growth*, then *to grow down*, and so *to perish or to destroy*.

I have said above that the word does not belong to the Augustan age. This is as much as to say that the word is not of the purest Latin source. Three ages may be distinguished in Roman Literature, the prae-Augustan, the Augustan, the post-Augustan, the first comprising the writers who lived before the age of the first Roman emperor, namely, Augustus (A. C. 63—A. D. 14), the second, those who lived during that age, and the third, those who lived after that age. In the second class stand Cæsar, Cicero, Virgil, Sallust, Livy, and Horace. Undoubtedly these are very great names. But why should Lucretius be made light of, because he lived before, or Tacitus, because he lived after the days of Augustus? And is Cornelius Nepos, on the ground that he flourished in the middle of the period, preferable to Suetonius, because he wrote when the period had run out? In truth, the distinction is to some extent arbitrary, as well as indefinite, and it has been made to pass for more than it is worth. These remarks, however, are made to explain what is meant by the Augustan age rather than to question its propriety, or disparage its worth. Beyond a question, during that age, lived and wrote Roman authors whose style is the model. But, because they are excellent, it by no means ensues that other good writers are not of authority. However, this classification is far better than that which it has superseded, and which divided the Roman writers into those of the iron, those of the brazen, those of the silver, and those of the golden age. Having taken a little refreshment in a topic of general interest, we must now resume our verbal studies.

4. *Perfect in i; Supine in tum.*

The short vowel of the stem is lengthened in the perfect.

i. Căveo, căvēre, cāvi, cautum, *to guard against* (ab. aliquo).

ii. Făveo, făvere, fāvi, (fautum, rare), *to be favourable, to favour* (takes the dative).

iii. Fŏveo, fŏvere, fōvi, fotum, *to warm, cherish, nurse*.

iv. Mŏveo, mŏverc, mōvi, mōtum, *to move.*
v. Vŏveo, vŏvere, vōvi, vōtum, *to vow.*

The ensuing have no supine.

vi. Ferveo, fervĕre, fervi (in composition ferbui, rarely fervi), *to be hot, boil.*
vii. Paveo, pavere, pāvi, *to dread* (expavescere is more common).
viii. Conniveo, connivĕre, *to close the eyes, wink.*

VOCABULARY.

Admiscēre, *to mix with, mingle;* distinēre, *to keep apart, occupy:* sustinēre, *to uphold, support* (E. R. *sustain*); removēre, *to remove;* dedico 1, *I dedicate, consecrate;* implico 1, *I enfold, implicate;* respiro 1, *I breathe;* agere gratias, *to give thanks;* sedo 1, *I still;* amplexor 1, *I embrace;* deprehendo, di, sum 3, *I take hold of;* excludo, si, sum 3, *I shut out;* gallina, ae, *f. a hen;* vigiliae, arum, *a watch;* pullus, i, m. *a young animal;* clades, is, *f. slaughter;* gravitas, atis, *f. weight, earnestness;* testis, is c. (common, that is, either masculine or feminine) *a witness;* ascensus, ūs, m. *a going up, ascent;* publice, *publicly, at the public expense;* Allobroges, um, *the Allobroges, a people of Gaul;* quo minus—eo facilior, *the less—the more easy;* pons, tis, m. *a bridge;* horno, adv. *this season.*

EXERCISES.—LATIN-ENGLISH

Ciceronem Minerva omnes artes edocuit; gravitas modestiae mista maxime admirābilis est; tot, tantisque negotiis distentus sum, ut mihi non liceat libĕre respirare; nescisne quot labores, quot pericula, quot miserias milites in itinĕre sustinuĕrint? si virtus te a malis cupiditatibus arcŭerit, vita tua beāta erit; Cicero per legatus cunctae doctus, praetoribus imperavit, ut in ponte Allobrŏges deprehenderent; ne animi se admisceant hominum vitiis; bonis facilis ascensus est in coelum; quo minus animi se admiscuerint atque implicaverint hominum vitiis atque erroribus, eo facilior illis ascensus in coelum erit; simplex animi natura est, nec habet in se quicquam admixtum; vescimur uvis sole tostis; horno multas uvas torrulmus; Cato, Carthaginem delendam esse, censuit; quinto quoque anno tota Sicilia censa est; duae urbes potentissimae, Carthāgo et Numantia, a Scipióne sunt deletae; Graecorum Romanorumque gloriam nulla unquam oblivio delēvit, nec unquam delēbit; Deus bonis omnibus mundum implevit, mali nihil admiscuit; dum abest dux, milites, seditionem civerunt; nuntiata clades majorem quam res erat, terrorem in urbe excivit; Catilina neque vigiliis neque quietibus sedabatur; ita conscientia mentem excitam vastabat; cautum est legibus ut mortui post diem tertium sepelirentur; non dubito quin semper ab hominum impurorum consuetudine caveris; non ignóro te mihi meisque semper favisse; pulli a matribus exclusi fotique anxie custodiuntur; dubitabisne quin summum semper in te fovĕrim amorem? me sic amplexati estis, sic in manibus habuistis, sic fovistis, ut nunquam illius diei oblivisceer; Brutus et Cassius, interfectores Caesaris, ingens bellum moverunt; ingratus est qui, remotis testibus, agit gratias; multi Romanorum imperatores pro salute patriae sua capita voverunt; Eodem anno tria templa sunt publice vota et dedicata.

ENGLISH-LATIN.

Cicero was instructed in all arts by Minerva; the citizens have vowed six temples (to be built) at the public expense; they have consecrated a temple to Venus; the mother cherishes her infant; the mother always will cherish her children; the wives cherished their husbands; keep from (caveo ab) impure women; the slaughter of the troops raised great weeping in the city; I know not what labours you have sustained; you know not what labours I have sustained; thy father has kept thee away from vice; give thanks to thy father because he kept thee away from evil; let not your mind mix itself with (dat.) the cares of this life; I have cherished great love in thy breast; great love towards thee has been cherished in my breast; who moved (caused) this war? the generals of the enemy moved this war; thy excited mind will never be stilled; blot out those words; he has blotted out the history of his reign; evil deeds are not easily blotted out; thy father gave it as his opinion that wickedness should be blotted out.

CONSTRUCTION OF DOCEO, *I teach.*

Doceo has in the active voice two accusatives, or a double object, one of the person, the other of the thing. In the passive [illegible] latter may be retained, and thus we have the ano[illegible]bject in the passive voice. In English, to teach [illegible]e same construction; as,

I teach the young Latin.
The young are taught Latin by me.

Examples in Latin.

[illegible]agister te ista docuit, non ego.—*Plautus.*
Trans.:—*Worse master thee those things taught, not I.*
Trans.:—*A worse master taught thee those things, not I.*
Is reliqua frustra docetur.—*Quintilian.*
Lit. Trans.:—*He the rest in vain is taught.*
Id. Trans.:—*He is taught (attempted to be taught) the rest in vain.*

Docere may have an ablative with de; e. g.

Praemittit ad Boios, qui de suo adventu doceant.—*Caesar.*
Lit. Trans.:—*He sends before him to the Boii, who of his coming should teach.*
Id. Trans.:—*He sends before him to the Boii, persons to inform them of his approach.*

The instrument or object on which a person receives instruction is put in the ablative case.

VOCABULARY.

Grammatica, ae, f. *grammar;* musica, ae, f. *music;* Graeca lingua, ae, *f. the Greek,* Latina lingua, ae, *the Latin.*

EXERCISES.—LATIN-ENGLISH.

Doce me quo modo ea effugere possim; non litteras accepi quae me docerent quid ageres; fratris causam te docui; causam reo docendus est judex; de injuriis Augusti docet judices pater ejus; docebit avunculus de itinere tuo; studiosos discendi docere est aequum et jucundum; invideo magistro tuo qui te tanta mercede nihil sapere docuit; multos discipulos linguam Latinam doceo; Graece loqui docendus sum; filiam meam docuit fidibus; docebat eum equo, armisque; mene docebis Graecam linguam? musicam doce hos meos filios; litteras te libens docebo.

ENGLISH-LATIN.

Teach me how I may do you good; they will teach thy daughter grammar; I have taught my wife to speak Latin; they teach me (to play) on the lyre; he has been taught Latin; teach them to speak Greek; I have been taught many things by my father; they are taught music by my sister; I know not what I shall teach you concerning the event of the war; the boys must be taught Latin; I have been taught to speak Greek (Graece loqui); many pupils have been taught Latin by me.

MUS ET MILVIUS.

Fabula Aesopii.

1 3 2 5 4 6 8 10
Milvius laqueis irretitus musculum exoravit, ut ipsum, corrosis
9 7 1 2 4 3 8 5 6
plagis, liberaret. Quo facto, milvius liberatus murem arripuit et
7 1 2 3 4 5 6 9 10
devoravit. Haec fabula ostendit, quam gratiam mali pro beneficiis
8 7
reddere soleant.

VOCABULARY.

Laqueus, i, m. *a snare, trap;* irretitus, a, um, *caught,* passive participle from irretio 4, *I catch in a net* (root, rete, *a net*); musculus, i, m. diminutive of mus, muris, m. *a mouse;* exoro (ex, and oro) 1, *I entreat earnestly* (ex gives the force of *earnestly*); corrosus, passive participle from corrodo (cum, and rodo) 3, *I gnaw;* plaga, ae, in the plural, *the meshes of a net;* quo facto, *which being done,* instance of the ablative absolute; arripio (ad, and rapio) 3, *I seize;* devoro (de, and voro) 1, *I devour;* soleo 2, *I am accustomed.*

LESSONS IN NATURAL HISTORY.—No. XI.

THE BAT. (*Continued.*)

ONE of the most remarkable creatures of this class is the horse-shoe bat, distinguished by a nasal cutaneous appendage, bearing a fancied resemblance to a horse-shoe. Its use is uncertain; some naturalists believe it serves merely for closing the nostrils.

The long-eared bat—an elegant species—when in captivity, is confident and familiar, very careful in cleaning its fur, enjoying its gambols with others of its kind, and pretending to bite as we see dogs do, when in good-humoured sport.

The barbastelle is timid and restless, and very impatient of confinement. One of these creatures, with others, was taken during a very hard frost in December, from a large chalk cavern, to which several species were found to retreat. When all were brought into a warm room, they soon began to exhibit signs of vivacity; and the barbastelle, with the rest, fed readily on small bits of meat, and drank water. But he did not show the slightest disposition to become acquainted with his host. He rested, with his companions, at the top of the box in which they were placed.

Persons accustomed only to our British bats, cannot fail to be greatly surprised at the size of some of the foreign species. Such,

for example, as the kalong, *Pteropus Javanicus*. In adult specimens, the breadth of the expanded wings is full five feet, and the length of the body one foot. Some of these may be seen by our readers who are residents in, or visitors to the metropolis, in one of its *free* exhibitions—the Museum of the East India Company, in Leadenhall-street. The length of the arm and the fore-arm together, from the union of the body to the origin of the finger-joints, is fourteen inches. The naked thumb, projecting beyond the membrane, measures two inches; and the claw, which is strong and sharp, has an extent of nearly one inch beyond its curvature. On the fore-finger the claw is minute, and, by the particular inflection of the joints, it obtains a direction opposed to the plane of the membrane. The length of the hind-legs is eight inches and a-half.

The general colour of the body and the head is black, and of the neck and adjoining parts smoky-brown; but there are many variations in the extent and intensity of these colours. In many individuals, the brown or yellowish-red hairs form a complete collar round the neck, though the colour is always more intense above. The breadth of this collar varies considerably; in some instances it extends from the middle of the neck to beyond the shoulders; in others it is confined to the neck, and the back part of the head. The tint, likewise, varies from yellowish-red to blackish-brown, but in all cases it has a smoky hue. When the animal is young, the hairs are long, glossy, and soft to the touch, but when it is old, the hairs become crisp and tough. The colour of the flying membrane is dark-brown, inclining to black, with a slight yellowish-red tint.

THE HORSE-SHOE BAT.

The kalong is very abundant in the lower parts of Java, but it does not visit the more elevated districts. These animals always live in society. Selecting a large tree for their support, companies of several hundreds suspend themselves with the claws of their posterior extremities to the naked branches, and thus present to the stranger a very extraordinary spectacle. A very favourite retreat is a species of fig tree, which is often found near the villages of the natives, and sometimes the extended branches of one of these is covered by kalongs. These societies generally preserve the utmost silence during the day; but should strife arouse them, or should they be disturbed, they emit sharp piercing shrieks; and their awkward attempts to extricate themselves when oppressed by the light of the sun is described as ludicrous. So strong is their attachment, from the sharpness of their claws, that they cannot readily leave their hold without the aid of the expanded membrane; and should any be suddenly killed in this natural attitude during the day, they continue suspended after death.

If it be desired to obtain them during the day, it is necessary, therefore, to oblige them, by alarming them, to take wing. Soon after sunset they gradually quit their hold, and pursue their nocturnal flights in chase of food. By an unerring instinct they direct their course to the forests, villages, and plantations, where they occasion incalculable mischief. Far from confining themselves to one kind of vegetable product, they attack and devour indiscriminately all kinds from the cocoa-nut, so highly useful, and which surrounds every dwelling of the meanest peasants, to the most rare and delicate fruits which are cultivated with care by Javanese chiefs and princes.

It is a curious sight which the kalongs present to the eye of the traveller in Java, as soon as the light of the sun is withdrawn. One animal is observed after another, following on at a short but irregular distance, in uninterrupted succession, until darkness conceals them from the view. Unlike the flight of our bats, so characterised by abrupt and sudden turns, that of the kalong is slow and steady, pursued in a straight line, and capable of long continuance. As the moonlight nights in the latitude of Java are peculiarly serene, the chace of this creature occasionally forms an amusement to the colonists and inhabitants of that island. The kalong is watched in his descent to the fruit trees, and is readily brought to the ground by a discharge of small shot. By this means the eminent naturalist Dr. Horsfield, to whom our acquaintance with this animal is principally owing, obtained four or five specimens in the course of an hour.

The spectre vampyre, one of the largest of the bat tribe, is a native of South America, and some of the islands of the Pacific Ocean. It has an insatiable thirst for blood. According to M. Condamine, "the bats which suck the blood of horses, mules, and even men, when not guarded against, by sleeping under the shelter of a tent, are a scourge to most of the hot countries of America." He asserts that, in his time, at Boria, and several other places, they had even destroyed, in certain situations, the breed of great cattle introduced there by the missionaries.

The spectre vampyre generally bites cattle in the ear, but always in places where the blood flows spontaneously. It attacks human beings, however, in a different way. Knowing, by instinct, that the person it designs to attack is in a sound slumber, it generally alights near the feet, where, while it continues fanning its victim with its enormous wings, to keep him cool, it bites a piece out of the top of his great toe. So very small is this, that the head of a pin could scarcely be received into the wound, which is consequently not painful; yet, through this minute orifice it sucks the blood, until it is obliged to disgorge. It then begins again, and proceeds sucking and disgorging, until it is scarcely able to fly.

The intelligent and indefatigable naturalist, Mr. Waterton, gives us the following illustrative instance:—"Several years ago, I went to the river Paumaron, in South America, with a Scotch gentleman, by name Tarbet. We hung our hammocks in the thatched loft of a planter's house. Next morning, I heard this gentleman muttering in his hammock. 'What is the matter, sir?' said I, softly: 'is anything amiss?' 'What's the matter?' answered he, surlily:' why the vampyres have been sucking me to death!' As soon as there was light enough, I went to his hammock, and found it much stained with blood. 'There,' said he, thrusting his foot out of his hammock,' see how these imps have been drawing my life's blood.' On examining his foot, I found the vampyre had tapped his great toe. There was a wound somewhat less than that made by a leech. The blood was still oozing from it. I conjectured he might have lost from ten to twelve ounces of blood. Whilst examining it, I remarked that a surgeon would not have been so generous as to bleed him without making a charge.

LESSONS IN GERMAN.—No. XXII.

Section XL.

Lassen is often employed in the sense of *causing* or *ordering*, like the English verbs, "*have*" and "*get*." Ex.: Er läßt seine Kleider in Paris machen; (Sect. 34. I.) he *gets* his clothes made in Paris. Sie lassen ein Haus bauen; they *are having* a house built.

I. *Holen*, (Sect. 26.) signifies *to go for*. The phrase holen lassen, signifies "to *cause* to go for;" that is, "*to send for*." Ex.: Ich lasse Aepfel holen; I send for apples. Ich habe sie schon holen lassen; (Sect. 25. VII.) I have already sent for them.

Exercise 44.

Bahnhof, *m.* rail-road depot;	Fehlen, to fail;	Ruhe, *f.* rest, repose;
Diener, *m.* servant;	Koffer, *m.* trunk;	Ruhen, to rest;
Ein'laden, to invite;	Lassen, to let, to cause;	Todt, dead;
Ereig'niß, *n.* event;	Major', *m.* major;	Weg, *m.* way.
	Post, *f.* post-office;	

Der Taucher holte den gol'denen Becher des Königs aus dem Strudel. — The diver brought the king's golden goblet from the whirlpool.

Die Köchin holt Gemüse und Fleisch von dem Markte. — The cook is getting vegetables and meat at market.

Das Gericht' läßt den Verbre'cher enthaup'ten. — The court causes the criminal to be beheaded.

Dieser Mann läßt den Freund im Stiche. — This man leaves his friend in the lurch.

1. Was holt jenes Dienstmädchen? 2. Es holt Wasser an dem Brunnen, Holz aus dem Walde und Fleisch vom Markte. 3. Hat es schon meinen Koffer von dem Bahnhofe geholt? 4. Ja, gleich nach dem Aufstehen (Sect. 43. III.) hat es ihn geholt. 5. Wir ließen dem kranken Manne einen Arzt holen. 6. Er ließ mich den Brief abschreiben, um ihn auf die Post zu tragen. 7. Ich lasse es an nichts fehlen, (§ 146. 1. *d.*) um Ihren Sohn auf einen bessern Weg zu bringen. 8. Lassen wir uns durch dieses Ereigniß nicht täuschen. 9. Man *sollte* den Todten ihre Ruhe lassen. 10. Er ließ mich warten, und ich lasse ihn nun ruhen. 11. Warum ließet Ihr Euren kleinen Bruder nicht kommen? 12. Weil er den ganzen Nachmittag in der Schule war. 13. Lassen Sie ihre Kinder Französisch lernen? 14. Nein, weil ich die englische Sprache für nützlicher halte. (Sect. 169. II.) 15. Der Major ließ seinen Diener mir den Weg nach dem Dorfe zeigen. 16. Der Herr, nach welchem Sie fragen, ließ den Hauptmann auf das Land fahren. 17. Für wen lassen Sie die Bücher holen? 18. Ich lasse sie für meine jüngste Schwester holen, um sie italienisch zu lehren. 19. Er ließ mich einladen, in der nächsten Woche mit ihm zu reisen.

1. Which of those physicians will you send for? 2. I shall send for neither. 3. Let me be quiet, for I am not well. 4. Only cowardly soldiers leave the commander-in-chief in the lurch. 5. Why did you not let your little sister come? 6. She could not, for she was at school the whole morning. 7. He has sent for a dentist to have a tooth extracted. 8. For what have you sent your servant? 9. I have sent her for paper and ink. 10. Let us act humanely. 11. Pray let us go to school. 12. Let us not follow the examples of the wicked.

Section XLI.

Was für ein (§ 66. 5.) literally, *what for a*, answers to the English "*what kind of*," or simply, "*what*;" as, Was für ein Buch haben Sie? *What kind of* a book have you? Was für ein Messer ist das? What kind of a knife is that? Für, in this connection, loses its prepositional character and may precede any case. Ex.: Was für Bücher sind diese? What kind of books are these? Was für Bücher haben Sie? What kind of books have you? Mit was für einem Buche sind Sie beschäftigt? With what kind of (a) book are you employed?

I. Was für is likewise used in the way of exclamation; corresponding to what. Ex.: Was für Thorheit! What folly! Was für ein Mann! What a man! Welch abbreviated from welcher, is used in the same manner; as, Welch ein Mann! What a man!

II. Jeder and jeglicher are often preceded by the indefinite article, and are then, accordingly, inflected after the mixed declension. (Sect. XI.) They are never used in the plural. Ex.: Der Tod jedes Menschen, or eines jeden Menschen ist gewiß; the death of every man is certain. Ein Jeder muß sterben; every one must die.

III. Aller, unlike the English "*all*," is joined directly to its noun without any article intervening. Ex.: Aller Wein; all the wine. Alles Wasser; all the water, &c.

Our word "*all*," when connected with the names of countries, towns, &c., as, also, in such phrases as, "all day, all the time, all my life," &c., is not expressed in German, by „all," but by „ganz." Ex.: Ganz Europa; all Europe. Ganz Böhmen; all Bohemia. Die ganze Schweiz; all Switzerland. Den ganzen Tag; all the day, or the whole day. Die ganze Zeit, mein ganzes Leben, &c.

Alle or all, in some elliptical phrases, is equivalent to our "*all gone*," "no more," and the like. Ex.: Sein Geld ist alle; his money is *all gone*.

IV. Mancher, answers to "many a." Ex.: Mancher Reiche ist unglücklich; many a rich man is unhappy.

V. Solcher, is often preceded by the indefinite article, as also by kein, and is then like jener and jeglicher, inflected after the mixed declension. Ex.: Er ist eines solchen Lebens nicht würdig; he is not worthy of such a (a such) life. Ich habe kein solches Buch; I have no such book.

VI. Aller, mancher, solcher, (and welcher, See I.) often drop the last syllable, and are then undeclined. Thus, aller, when it precedes a *pronoun*, is often abbreviated to „all;" mancher, when it precedes an *adjective*, often becomes „manch;" solcher (as also welcher) is always thus abbreviated when it precedes the *indefinite article*, as also, sometimes, when it precedes an *adjective*. Ex.: Ich habe all mein Geld verloren; I have lost all my money. Ich habe all diese Bücher gekauft; I have bought all these books. Manch ehrlicher Mann ist arm; many an honest man is poor. Solch ein Tag ist angenehm; such a day is agreeable. Solch schönes Papier ist theuer; such beautiful paper is dear, &c. It should however be noted, that, as in the above examples, when the abbreviated form is followed by an adjective, this latter instead of being inflected after the new declension (Sect. X. II.) follows that of the old (§ 29).

VII. Einiger and etlicher are regularly declined. They are nearly synonymous, and answer to our words "*some*, *a few*, &c. Ex.: Er sprach nur einige Worte; he spoke only a few words. Er hat noch etliche Freunde in Deutschland; he has still *some* friends in Germany. Er wohnt in einiger Entfernung von der Stadt, he resides at *some*, or *a little* distance from the city. Nach einiger Zeit kam er, after *some* time he came. Etlicher is not used in the singular, except in Biblical style; as, Etliches fiel an den Weg, *some* fell by the way-side.

VIII. Etwas, besides the signification, noticed Sect. XV. II, has also an adverbial use, and answers to "somewhat." Ex.: Er ist etwas älter als ich; he is somewhat (or something) older than I. Es ist etwas kälter als vorgestern; it is somewhat colder than the day before yesterday.

Exercise 45.

Ab'legen, to lay aside;	Ein'wohner, *m.* inhabitant;	Gewäh'ren, to grant, allow;
Anblick, *m.* aspect;	Erfah'ren, to experience;	Gewiß', certain, certainty;
An'näherung, *f.* approach;	Erle'ben, to live, to see;	Größe, *f.* size, magnitude;
Bege'hen, to commit;	Erstaun'enswürdig, astonishing;	Handlung, *f.* action, procedure;
Beschäf'tigen, to employ;	Et'licher, several, some, a few;	Hegen, to cherish;
Beschwer'de, *f.* hardship,	Feinheit, *f.* delicacy;	Herrlich, glorious;
Besitz'en, to possess;	Firmament', *n.* firmament;	Hervor'rufen, to call forth;
Bewun'derung, *f.* admiration;	Flüchten, to flee;	Knochen, *m.* bone;
Bilden, to form, constitute;	Geber, *m.* giver, donor;	Macht, *f.* power;
Blind, blind;	Gefühl', *n.* touch, feeling;	Mancher, many a;
Darü'ber, thereon;	Gemüth', *n.* mind;	Meinung, *f.* opinion;
Daven', of it, thereof;	Genuß', *m.* enjoyment;	Merk'würdig, remarkable;
Dennoch, notwithstanding;	Geschenk', *n.* present, gift;	Musik', *f.* music;
Eigen, own, particular;	Gesell'schaft, *f.* society;	Nachwelt, *f.* posterity.
Einan'der, one another;		Nichtsthun, *n.* inaction;
Einmal, once;		Noth'wendigkeit, necessary

Punkt, *m.* point;
Seefisch, *m.* fish of the sea;
Seltsam, strange;
Solcher, such;
Stählen, to steel, temper;
Sturm, *m.* storm;
Theils, partly;
Thorheit, *f.* folly;
Uebereinkommen, to agree, accord;
Versammlung, *f.* meeting;
Verständigen, to agree, to come to an explanation;
Verwenden, to employ, apply;
Vortrefflich, excellent;
Vorzug, *m.* advantage;
Was für, what kind of;
Werk, *m.* work;
Wohlhabend, opulent;
Zubringen, to spend, pass;
Zurückziehen, to retire, withdraw.

Was für einen Camera'den hast Du?	What kind of a companion have you?
Was für ein Landsmann bist Du?	What countryman are you?
Welch ein Riese!	What a giant!
Ein Jeder ist des Seinen werth.	Every one is worthy of his own!
Ein solchen Auftrag schreckt mich nicht.	Such a commission alarms me not.
Einen solchen Sturm habe ich noch nicht erlebt'.	Such a storm I have not yet experienced.
Solch' ein Kaiser konnte sich so de'müthigen!	Such an emperor could thus humble himself.
Solch' schönes Wetter kommt selten.	Such beautiful weather comes seldom.
Er sprach so leise, daß ich ihn nicht verste'hen konnte.	He spoke so softly, that I could not understand him.
Mancher Traum der Jugend schwindet mit den Jahren.	Many a dream of youth disappears with years.
Manch schönes Buch habe ich schon gele'sen.	Many a beautiful book have I already read.
Nach einigen Minu'ten kehrte er zurück'.	After some minutes he returned.
Der Elephant' ist etwas stärker, als das Nashorn.	The elephant is somewhat stronger than the rhinoceros.
Der un'erfahrene Kaufmann kann leicht all sein Vermö'gen verlieren.	The inexperienced merchant may easily lose all his fortune.
Er war das ganze Jahr krank.	He was sick all the year.
In großen Städten sieht man alle Tage etwas Neues.	In large cities one sees something new every day.

1. Was für Wetter ist heute? 2. Es ist heute schönes Wetter, aber etwas kälter als gestern. 3. Was für eine Meinung hegt er von dieser Sache? 4. Seine Meinung ist nicht die beste davon (Sect. 36. III.). 5. Meine Gesellschaft ist die angenehmste von der Welt. 6. Was für Fische sind dies? (Sect. 36. III.) 7. Es sind Seefische. 8 Mit was für Arbeiten beschäftigt er sich? 9. Er beschäftigt sich theils mit Schreiben, theils mit Lesen. 10. Welch ein Macht hat die Musik auf das Gemüth des Menschen! 11. Welch ein hoher Genuß ist es, die Welt zu sehen! 12. Welch einen herlichen Anblick gewährt das Firmament mit seinen unzählichen Sternen! 13. Jeder Stern am Himmel bildet eine eigene Welt. 14. Der wahre Tugendhafte verwendet jeden Tag seines Lebens darauf, seine Fehler immer mehr abzulegen. 15. Hat nicht jeder Ihrer Freunde einen solchen Hut? 16. Nein, ein Jeder hat einen andern. 17. Solche Männer sind nothwendig, um das Vaterland zu retten. 18. Haben Sie jenen Blinden gesehen, der eine solche Feinheit des Gefühles besitzt, die erstaunenswürdig ist? 19. Ja, ich habe ihn gesehen. 20. Der Geber eines solchen Geschenkes ist zu loben. 21. Die Beschwerden einer solchen Reise stählen den Körper. 22. Solche Handlungen werden die Bewunderung der Nachwelt hervorrufen. 23. So angenehme Stunden habe ich lange nicht gehabt. 24. Unter den Einwohnern sind manche sehr wohlhabend. 25. Haben Sie nicht auch schon manches Seltsame erlebt? 26. O ja, ich habe schon manches Merkwürdige erfahren. 27. Manch tapferer Soldat mußte in der Schlacht sein Leben lassen. 28. Hat dieser Schriftsteller nicht manch gutes Werk geschrieben? 29. Gewiß, manche derselben sind vortrefflich. 30. Haben sich die beiden Freunde über diese Sache verständigt? 31. Ja, in einigen Punkten sind sie miteinander übereingekommen. 32. Einige englische Schiffe gingen bei diesem Sturme unter. 33 Etliche kluge Männer zogen sich aus der Versammlung zurück. 34. Alle Einwohner der Stadt flüchteten sich bei der Annäherung der Feinde. 35. Manche Menschen bringen ihr ganzes Leben mit Nichtsthun zu. 36. War das Ihr Bruder, der gestern den ganzen Tag in Ihrer Gesellschaft war? 37. Nein, es war mein Neffe, der mich alle Jahre einmal besucht. 38. Welch eine Größe hat die Erde, und wie viel kleiner ist sie dennoch als die Sonne. 39. Welche Vorzüge hat der Mensch vor den Thieren? 40. Was für eines Vogels Feder ist diese? 41. Ist der Schüler fleißig, so lernt er etwas.

1. Many a learned man has been misunderstood. 2. Oh, what folly does man commit in his life. 3. With what kind of society have you associated. 4. Many an industrious merchant has been ruined by an imprudent speculation. 5. Full many a flower is born to blush unseen[1]. 6. Every leaf, every twig, and every drop of water, testifies infinite wisdom and power. 7. Every one must give an account of himself. 8. The whole environs of Coblentz are romantic. 9. All are well[2] at home. 10. The conversation with such persons is instructive. 11. I have never heard of such an accident. 12. It is beautiful weather to-day, but somewhat colder than yesterday. 13. I have had already many a pleasure. 14. I wish to have some lemons. 15. He came somewhat too late.

[1] Blühet im Verborgenen. [2] wohl.

ANCIENT HYMNS.

[The following are translations, as literal as the rhyme would admit, of two ancient hymns from the Greek, which were accustomed to be sung in the early Christian Churches, at *Matins* and *Vespers*, in the first century; or, as Dr. J. Pye Smith says, at a period "little short of Apostolic."]

THE MORNING HYMN.

1. Glory be to God above,
Unto men both peace and love;
Thee we praise, and thee we bless,
Thee we worship, and address,
Thee we glorify below,
All our thanks on thee bestow.

2. All thy glory great, we sing,
Oh Jehovah, heavenly King;
Triune God, Almighty Sire;
Jesus Christ (our sole desire),
Son of God's eternal love,
Holy Spirit from above.

3. Oh Jehovah, God of might,
Lamb of God (our chief delight),
Son of God the Father, hear,
Unto us be ever near;
Thou who takest sins away,
Mercy shew us, when we pray.

4. Thou who hast the world restor'd,
Thou who art its sov'reign Lord,
May our pray'rs acceptance find,
With thee, Saviour, ever kind,
Thou who sittest on the right
Of thy Father's throne of might.

5. Mercy show us, priest above,
By thy interceding love;
Thou alone art sanctified,
Thou alone, the Lord, who died;
Christ our Saviour we confess,
Own, and sanctify, and bless;
Unto God the Father's name,
Glory and eternal fame.

THE EVENING HYMN.

1. Cheering light of sacred glory,
Son of our eternal King,
Holy, heav'nly, blest in story,
Jesus Christ, thy praise we sing.

2. We behold, by grace, not merit,
Setting sun, and ev'ning light,
Father, Son, and Holy Spirit,
Thee we praise, O God of might.

3. Thou art worthy, still for ever,
To be prais'd with sacred tongues:
Wherefore, Son of God, Life-giver,
Thee we celebrate in songs.

LESSONS IN PENMANSHIP.—No. IV.

The Lessons for this week consist of the following words and sentences:—Text: *Ingolstadt, Juggernaut, Kenilworth, Leamington.* Half-text: *Innocence renders repentance unnecessary; Judgment commonly surpasses memory; Kings most commonly command respect; Labour most commonly improves wealth.* Court-hand: *Innumerable annoyances accompany all mankind; Judgments are commonly formed from precedents; Kings may command, but subjects must obey them; Learning without labour is granted to none below.*

LESSONS IN GERMAN.—No. XXII.

Section XL.

Lassen is often employed in the sense of *causing* or *ordering*, like the English verbs, "*have*" and "*get*." Ex.: Er läßt seine Kleider in Paris machen; (Sect. 34. I.) he *gets* his clothes made in Paris. Sie lassen ein Haus bauen; they *are having* a house built.

I. Holen, (Sect. 20.) signifies *to go for*. The phrase holen lassen, signifies "to *cause* to go for;" that is, "*to send for*." Ex.: Ich lasse Aepfel holen; I send for apples. Ich habe sie schon holen lassen; (Sect. 25. VII.) I have already sent for them.

Exercise 44.

Bahnhof, *m.* rail-road depot;	Fehlen, to fail;	Ruhe, *f.* rest, repose;
	Koffer, *m.* trunk;	Ruhen, to rest;
Diener, *m.* servant;	Lassen, to let, to cause;	Todt, dead;
Ein'laden, to invite;	Major', *m.* major;	Weg, *m.* way.
Ereig'niß, *n.* event;	Post, *f.* post-office;	

Der Taucher holte den gol'denen Becher des Königs aus dem Strudel.	The diver brought the king's golden goblet from the whirlpool.
Die Köchin holt Gemü'se und Fleisch von dem Markte.	The cook is getting vegetables and meat at market.
Das Gericht' läßt den Verbre'cher enthaup'ten.	The court causes the criminal to be beheaded.
Dieser Mann läßt den Freund im Stiche.	This man leaves his friend in the lurch.

1. Was holt jenes Dienstmädchen? 2. Es holt Wasser an dem Brunnen, Holz aus dem Walde und Fleisch vom Markte. 3. Hat es schon meinen Koffer von dem Bahnhofe geholt? 4. Ja, gleich nach dem Aufstehen (Sect. 43. III.) hat es ihn geholt. 5. Wir ließen dem kranken Manne einen Arzt holen. 6. Er ließ mich den Brief abschreiben, um ihn auf die Post zu tragen. 7. Ich lasse es an nichts fehlen, (§ 146. 1. *d.*) um Ihren Sohn auf einen bessern Weg zu bringen. 8. Lassen wir uns durch dieses Ereigniß nicht täuschen. 9. Man sollte den Todten ihre Ruhe lassen. 10. Er ließ mich warten, und ich lasse ihn nun ruhen. 11. Warum ließet Ihr Euren kleinen Bruder nicht kommen? 12. Weil er den ganzen Nachmittag in der Schule war. 13. Lassen sie ihre Kinder Französisch lernen? 14. Nein, weil ich die englische Sprache für nützlicher halte. (Sect. 169, II.) 15. Der Major ließ seinen Diener mir den Weg nach dem Dorfe zeigen. 16. Der Herr, nach welchem Sie fragen, ließ den Hauptmann auf das Land fahren. 17. Für wen lassen Sie die Bücher holen? 18. Ich lasse sie für meine jüngste Schwester holen, um sie italienisch zu lehren. 19. Er ließ mich einladen, in der nächsten Woche mit ihm zu reisen.

1. Which of those physicians will you send for? 2. I shall send for neither. 3. Let me be quiet, for I am not well. 4. Only cowardly soldiers leave the commander-in-chief in the lurch. 5. Why did you not let your little sister come? 6. She could not, for she was at school the whole morning. 7. He has sent for a dentist to have a tooth extracted. 8. For what have you sent your servant? 9. I have sent her for paper and ink. 10. Let us act humanely. 11. Pray let us go to school. 12. Let us not follow the examples of the wicked.

Section XLI.

Was für ein (§ 60. 5.) literally, *what for a*, answers to the English "*what kind of*," or simply, "*what*;" as, Was für ein Buch haben Sie? *What kind of* a book have you? Was für ein Messer ist das? What kind of a knife is that? Für, in this connection, loses its prepositional character and may precede any case. Ex.: Was für Bücher sind diese? What kind of books are these? Was für Bücher haben Sie? What kind of books have you? Mit was für einem Buche sind Sie beschäftigt? With what kind of (a) book are you employed?

I. Was für is likewise used in the way of exclamation; corresponding to what. Ex.: Was für Thorheit! What folly! Was für ein Mann! What a man! Welch abbreviated from welcher, is used in the same manner; as, Welch ein Mann! What a man!

II. Jeder and jeglicher are often preceded by the indefinite article, and are then, accordingly, inflected after the mixed declension. (Sect. XI.) They are never used in the plural. Ex.: Der Tod jedes Menschen, or eines jeden Menschen ist gewiß; the death of every man is certain. Ein Jeder muß sterben; every one must die.

III. Aller, unlike the English "*all*," is joined directly to its noun without any article intervening. Ex.: Aller Wein; all the wine. Alles Wasser; all the water, &c.

Our word "*all*," when connected with the names of countries, towns, &c., as, also, in such phrases as, "all day, all the time, all my life," &c., is not expressed in German, by „all," but by „ganz." Ex.: Ganz Europa; all Europe. Ganz Böhmen; all Bohemia. Die ganze Schweiz; all Switzerland. Den ganzen Tag; all the day, or the whole day. Die ganze Zeit, mein ganzes Leben, &c.

Alle or all, in some elliptical phrases, is equivalent to our "*all gone*," "no more," and the like. Ex.: Sein Geld ist alle; his money is *all gone*.

IV. Mancher, answers to "many a." Ex.: Mancher Reiche ist unglücklich; many a rich man is unhappy.

V. Solcher, is often preceded by the indefinite article, as also by kein, and is then like jener and jeglicher, inflected after the mixed declension. Ex.: Er ist eines solchen Lebens nicht würdig; he is not worthy of such a (a such) life. Ich habe kein solches Buch; I have no such book.

VI. Aller, mancher, solcher, (and welcher, Sec I.) often drop the last syllable, and are then undeclined. Thus, all, when it precedes a *pronoun*, is often abbreviated to „all;" mancher, when it precedes an *adjective*, often becomes „manch;" solcher (as also welcher) is always thus abbreviated when it precedes the *indefinite article*, as also, sometimes, when it precedes an *adjective*. Ex.: Ich habe all mein Geld verloren; I have lost all my money. Ich habe all diese Bücher gekauft; I have bought all these books. Manch ehrlicher Mann ist arm; many an honest man is poor. Solch ein Tag ist angenehm; such a day is agreeable. Solch schönes Papier ist theuer; such beautiful paper is dear, &c. It should however be noted, that, as in the above examples, when the abbreviated form is followed by an adjective, this latter instead of being inflected after the new declension (Sect. X. II.) follows that of the old (§ 29).

VII. Einiger and etlicher are regularly declined. They are nearly synonymous, and answer to our words "*some*, *a few*, &c. Ex.: Er sprach nur einige Worte; he spoke only a few words. Er hat noch etliche Freunde in Deutschland; he has still *some* friends in Germany. Er wohnt in einiger Entfernung von der Stadt, he resides at *some*, or *a little* distance from the city. Nach einiger Zeit kam er, after *some* time he came. Etlicher is not used in the singular, except in Biblical style; as, Etliches fiel an den Weg, *some* fell by the way-side.

VIII. Etwas, besides the signification, noticed Sect. XV. II, has also an adverbial use, and answers to "somewhat." Ex. Er ist etwas älter als ich; he is somewhat (or something) older than I. Es ist etwas kälter als vorgestern; it is somewhat colder than the day before yesterday.

Exercise 45.

Ab'legen, to lay aside;	Ein'wohner, *m.* inhabitant;	Gewäh'ren, to grant, allow;
Anblick, *m.* aspect;	Erfah'ren, to experience;	Gewiß', certain, certainly;
An'näherung, *f.* approach;	Erle'ben, to live, to see;	Größe, *f.* size, magnitude;
Bege'hen, to commit;	Erstaun'enswürdig, astonishing;	Handlung, *f.* action, procedure;
Beschäf'tigen, to employ;	Ei'licher, several, some, a few;	Hegen, to cherish;
Beschwer'de, *f.* hardship,	Besitz'en, to possess;	Herrlich, glorious;
Bewun'derung, *f.* admiration;	Feinheit, *f.* delicacy;	Hervor'rufen, to call forth;
Bilden, to form, constitute;	Firmament', *n* firmament;	Knochen, *m.* bone;
Blind, blind;	Flüchten, to flee;	Macht, *f.* power;
Darü'ber, thereon;	Geber, *m.* giver, donor;	Mancher, many a;
Davon', of it, thereof;	Gefühl', *n.* touch, feeling;	Meinung, *f.* opinion;
Dennoch, notwithstanding;	Gemüth', *n.* mind;	Merk'würdig, remarkable;
Eigen, own, particular;	Genuß', *m.* enjoyment;	Musik', *f.* music;
Einan'der, one another;	Geschenk', *n.* present, gift;	Nachwelt, *f.* posterity,
Einmal, once;	Gesell'schaft, *f.* society;	Nichtsthun, *n.* inaction;
		Noth'wendigkeit, necessary

Punkt, *m.* point; Seefisch, *m.* fish of the sea; Seltsam, strange; Solcher, such; Stählen, to steel, temper; Sturm, *m.* storm; Theils, partly; Thorheit, *f.* folly; Uebereinkommen, to agree, accord; Versammlung, *f.* meeting; Verständigen, to agree, to come to an explanation; Verwenden, to employ, apply; Vortrefflich, excellent; Vorzug, *m.* advantage; Was für, what kind of; Werk, *m.* work; Wohlhabend, opulent; Zubringen, to spend, pass; Zurückziehen, to retire, withdraw.

Was für einen Camera'den hast Du?	What kind of a companion have you?
Was für ein Landsmann bist Du?	What countryman are you?
Welch ein Riese!	What a giant!
Ein Jeder ist des Seinen werth.	Every one is worthy of his own!
Ein solchen Auftrag schreckt mich nicht.	Such a commission alarms me not.
Einen solchen Sturm habe ich noch nicht erlebt'.	Such a storm I have not yet experienced.
Solch' ein Kaiser konnte sich so de'müthigen!	Such an emperor could thus humble himself.
Solch' schönes Wetter kommt selten.	Such beautiful weather comes seldom.
Er sprach so leise, daß ich ihn nicht verste'hen konnte.	He spoke so softly, that I could not understand him.
Mancher Traum der Jugend schwindet mit den Jahren.	Many a dream of youth disappears with years.
Manch schönes Buch habe ich schon gele'sen.	Many a beautiful book have I already read.
Nach einigen Minu'ten kehrte er zurück'.	After some minutes he returned.
Der Elephant' ist etwas stärker, als das Nashorn.	The elephant is somewhat stronger than the rhinoceros.
Der un'erfahrene Kaufmann kann leicht all sein Vermö'gen verlieren.	The inexperienced merchant may easily lose all his fortune.
Er war das ganze Jahr krank.	He was sick all the year.
In großen Städten sieht man alle Tage etwas Neues.	In large cities one sees something new every day.

1. Was für Wetter ist heute? 2. Es ist heute schönes Wetter, aber etwas kälter als gestern. 3. Was für eine Meinung hegt er von dieser Sache? 4. Seine Meinung ist nicht die beste davon (Sect. 36. III.). 5. Meine Gesellschaft ist die angenehmste von der Welt. 6. Was für Fische sind dies? (Sect. 36. III.) 7. Es sind Seefische. 8. Mit was für Arbeiten beschäftigt er sich? 9. Er beschäftigt sich theils mit Schreiben, theils mit Lesen. 10. Welch ein Macht hat die Musik auf das Gemüth des Menschen! 11. Welch ein hoher Genuß ist es, die Welt zu sehen! 12. Welch einen herlichen Anblick gewähret das Firmament mit seinen unzählichen Sternen! 13. Jeder Stern am Himmel bildet eine eigene Welt. 14. Der wahre Tugendhafte verwendet jeden Tag seines Lebens darauf, seine Fehler immer mehr abzulegen. 15. Hat nicht jeder Ihrer Freunde einen solchen Hut? 16. Nein, ein Jeder hat einen andern. 17. Solche Männer sind nothwendig, um das Vaterland zu retten. 18. Haben Sie jenen Blinden gesehen, der eine solche Feinheit des Gefühles besitzt, die erstaunenswürdig ist? 19. Ja, ich habe ihn gesehen. 20. Der Geber eines solchen Geschenkes ist zu loben. 21. Die Beschwerden einer solchen Reise stählen den Körper. 22. Solche Handlungen werden die Bewunderung der Nachwelt hervorrufen. 23. So angenehme Stunden habe ich lange nicht gehabt. 24. Unter den Einwohnern sind manche sehr wohlhabend. 25. Haben Sie nicht auch schon manches Seltsame erlebt? 26. O ja, ich habe schon manches Merkwürdige erfahren. 27. Manch tapferer Soldat mußte in der Schlacht sein Leben lassen. 28. Hat dieser Schriftsteller nicht manch gutes Werk geschrieben? 29. Gewiß, manche derselben sind vortrefflich. 30. Haben sich die beiden Freunde über diese Sache verständigt? 31. Ja, in einigen Punkten sind sie miteinander übereingekommen. 32. Einige englische Schiffe gingen bei diesem Sturme unter. 33 Etliche kluge Männer zogen sich aus der Versammlung zurück. 34. Alle Einwohner der Stadt flüchteten sich bei der Annäherung der Feinde. 35. Manche Menschen bringen ihr ganzes Leben mit Nichtsthun zu. 36. War das Ihr Bruder, der gestern den ganzen Tag in Ihrer Gesellschaft war? 37. Nein, es war mein Neffe, der mich alle Jahre einmal besucht. 38. Welch eine Größe hat die Erde, und wie viel kleiner ist sie dennoch als die Sonne. 39. Welche Vorzüge hat der Mensch vor den Thieren? 40. Was für eines Vogels Feder ist diese? 41. Ist der Schüler fleißig, so lernt er etwas.

1. Many a learned man has been misunderstood. 2. Oh, what folly does man commit in his life. 3. With what kind of society have you associated. 4. Many an industrious merchant has been ruined by an imprudent speculation. 5. Full many a flower is born to blush unseen[1]. 6. Every leaf, every twig, and every drop of water, testifies infinite wisdom and power. 7. Every one must give an account of himself. 8. The whole environs of Coblentz are romantic. 9. All are well[2] at home. 10. The conversation with such persons is instructive. 11. I have never heard of such an accident. 12. It is beautiful weather to-day, but somewhat colder than yesterday. 13. I have had already many a pleasure. 14. I wish to have some lemons. 15. He came somewhat too late.

[1] blühet im Verborgenen. [2] wohl.

ANCIENT HYMNS.

[The following are translations, as literal as the rhyme would admit, of two ancient hymns from the Greek, which were accustomed to be sung in the early Christian Churches, at *Matins* and *Vespers*, in the first century; or, as Dr. J. Pye Smith says, at a period "little short of Apostolic."]

THE MORNING HYMN.

1. Glory be to God above,
Unto men both peace and love;
Thee we praise, and thee we bless,
Thee we worship, and address,
Thee we glorify below,
All our thanks on thee bestow.

2. All thy glory great, we sing,
Oh Jehovah, heavenly King;
Triune God, Almighty Sire;
Jesus Christ (our sole desire),
Son of God's eternal love,
Holy Spirit from above.

3. Oh Jehovah, God of might,
Lamb of God (our chief delight),
Son of God the Father, hear,
Unto us be ever near;
Thou who takest sins away,
Mercy shew us, when we pray.

4. Thou who hast the world restor'd,
Thou who art its sov'reign Lord,
May our pray'rs acceptance find,
With thee, Saviour, ever kind,
Thou who sittest on the right
Of thy Father's throne of might.

5. Mercy show us, priest above,
By thy interceding love;
Thou alone art sanctified,
Thou alone, the Lord, who died;
Christ our Saviour we confess,
Own, and sanctify, and bless;
Unto God the Father's name,
Glory and eternal fame.

THE EVENING HYMN.

1. Cheering light of sacred g'ory,
Son of our eternal King,
Holy, heav'nly, blest in story,
Jesus Christ, thy praise we sing.

2. We behold, by grace, not merit,
Setting sun, and ev'ning light,
Father, Son, and Holy Spirit,
Thee we praise, O God of might.

3. Thou art worthy, still for ever,
To be prais'd with sacred tongues:
Wherefore, Son of God, Life-giver,
Thee we celebrate in songs.

LESSONS IN PENMANSHIP.—No. IV.

The Lessons for this week consist of the following words and sentences:—Text: *Ingolstadt, Juggernaut, Kenilworth, Leamington.* Half-text: *Innocence renders repentance unnecessary; Judgment commonly surpasses memory; Kings most commonly command respect; Labour most commonly improves wealth.* Court-hand: *Innumerable annoyances accompany all mankind; Judgments are commonly formed from precedents; Kings may command, but subjects must obey them; Learning without labour is granted to none below.*

Ingolstadt

Innocence renders repentance unnecessary.

Innumerable annoyances accompany all mankind.

Juggernaut

Judgment commonly surpasses memory.

Judgments are commonly formed from precedents.

Kenilworth

Kings most commonly command respect.

Kings may command, but subjects must obey them.

Leamington

Labour most commonly improves wealth

Learning without labour is granted to none below.

LESSONS IN FRENCH.—No. XXXII.

By Professor Louis Fasquelle, LL.D.

Section LXIX.

The Imperative.

1. Conjugation of the Imperative of the Regular Verbs:—

	Chant	-e	fin	-is	reç	-ois	rend -s
	sing		*finish*		*receive*		*render*
Qu'il	parl	-e	chér	-isse	aperç	-oive	vend -e
	let him speak		*let him cherish*		*let him perceive*		*let him sell*
	Donn	-ons	fourn	-issons	perc	-evons	tend -ons
	let us give		*let us furnish*		*let us gather*		*let us tend*
	Cherch	-ez	pun	-issez	conc	-evez	entend-ez
	seek		*punish*		*conceive*		*hear*
Qu'ils	port	-ent	sais	-issent	d	-oivent	perd -ent
	let them carry		*let them seize*		*let them owe*		*let them lose.*

2. The second person singular, and the first and second persons plural of the imperative, are the same as the first person singular, and the first and second persons plural of the present of the indicative. The pronouns are dropped:—

Je parle, *parle*; je finis, *finis*. — *I speak, speak; I finish, finish.*

3. Exceptions—Avoir, *to have*, make in those persons of the imperative, *aie, ayons, ayez*; être, *to be, sois, soyons, soyez*; savoir, *to know, sache, sachons, sachez*; and aller, *va*, and *vas* before y not followed by an infinitive.

4. Vouloir has only the second person plural, veuillez, *have the goodness to.....*

5. A third person singular and plural is given in the imperative by most of the French grammarians. These parts, however, belong properly to the subjunctive, as they express rather a strong wish than a command. The English expressions, *let him speak, that he may speak*, are rendered in French by qu'il parle.

6. A droite, à gauche, correspond in signification to the English *to the right, to the left.*

Allez à droite, à gauche. — *Go to the right, to the left.*

7. For the place of the pronouns in connection with the imperative, see Sect. 26, R. 1, 4; Sect. 27, R. 1, 2, 3, 4.

Résumé of Examples.

Prenons la première rue à droite.	*Let us take the first street to the right.*
Ne cherchez plus à le tromper.	*Seek no longer to deceive him.*
Sachons nous contenter du nécessaire.	*Let us know how to content ourselves with necessaries.*
Faites bien attention à ce que vous dites.	*Pay great attention to what you say.*
Dites toujours la vérité.	*Always tell the truth.*
Allons! Messieurs, dépêchez-vous.	*Come! gentlemen, make haste.*
Tenez, Monsieur, voilà votre argent.	*Here, Sir, here is your money.*
Veuillez accepter ce présent.	*Be so kind as to accept this present.*

Exercise 137.

Clef, f. *key.*
Crayon, m. *pencil.*
Institutrice, f. *teacher.*
Obé-ir, 2. *to obey.*
Partie, f. *part.*
Précepteur, m. *instructor.*
Promett-re, 4 ir. *to promise.*
Rapport-er, 1. *to bring back.*
Remett-re, 4. ir. *to deliver.*
Renvoy-er, 1. *to send back.*
Sans faute, *without fail.*
Se serv-ir, 2. ref. *to use.*
Tiers, m. *third.*
Verrez, 3. ir. *from* voir, *to see.*

1. Envoyez chercher le médecin, votre petit garçon est malade. 2. Nous l'avons déjà envoyé chercher. 3. Vous n'avez pas besoin de votre crayon, prêtez-le-moi [Sect. 26, R. 4; Sect. 27, R. 4]. 4. Je ne saurais vous le prêter, je m'en sers. 5. Donnez-le-moi ou me le prêtez [§ 100 (6)]. 6. Je l'ai promis à votre institutrice. 7. Si vous ne le lui avez pas dit, dites-le-lui aussitôt que possible. 8. Ne le lui dites pas encore. 9. Parlez-lui-en [§ 39, 17] la prochaine fois que vous le verrez. 10. Ayez patience, mon ami, votre père ne tardera pas à venir. 11. Obéissez à votre précepteur. 12. Je lui obéis toujours, donnez-lui-en une bonne partie. 13. Je lui en ai déjà donné plus des deux tiers. 14. Avez vous porté cette clef au serrurier? 15. J'ai oublié de la lui remettre. 16. Portez-la-lui sans faute cette aprés-midi. 17. Veuillez me dire où demeure M. G. 18. Prenez la première rue à gauche, il demeure dans la deuxième maison à droite. 19. Allons, Mesdemoiselles, dépêchons-nous. 20. Menez-les-y le plus tôt possible. 21. Ne me les rapportez pas. 22. Renvoyez-les-moi demain. 23. Portons-les-y. 24. Ne les y portons pas. 25. Prêtez-les-lui, mais ne les lui donnez pas.

Exercise 138.

1. Give a book to the young man. 2. I have already given him one, and he does not read it. 3. Lend it to him, if you will not give it to him. 4. I will not lend it to him. 5. Make haste, young ladies, it is ten o'clock. 6. Have the goodness to give me a pen. 7. I have given one to your brother. 8. Obey your father, and speak to your sister. 9. Will you not send for the letter? 10. I will send for it. 11. Send for it as soon as you can. 12. Do not do so (*le*), but write to my cousin. 13. Come, children (*mes enfants*), learn your lesson. 14. Give him some [§ 39, 17], or lend him some [§ 100 (6)]. 15. Do not make haste, we have (*le*) time. 16. Have patience, my child, the merchant will soon come. 17. Send it to him, if you cannot give it to him. 18. Write to him this afternoon without fail. 19. I would write to him if I had time. 20. Let us take the first street to the left. 21. Take the second street to the right. 22. Pay attention to what your brother says. 23. Let us tell the truth. 24. Let us read that book to-day. 25. Pay your debts as soon as possible. 26. Let us obey our instructor. 27. Carry the key to him. 28. Bring me back the books which I have lent you. 29. Do not bring them back to me, read them. 30. Let us have patience, we shall soon have money. 31. Let us speak to them, they are at my father's. 32. Tell them that I intend to write to them tomorrow morning. 33. Go to church this afternoon. 34. Bring me back my letters. 35. Do not carry them there, but bring them to me as soon as possible.

Section LXX.

1. A verb following another verb in the imperative, is put in the infinitive (according to general rule, Sect. 20, 2). The conjunction which often comes between the two verbs in English, is not used in French:—

Allez parler au musicien. — *Go and speak to the musician.*
Allez faire votre ouvrage. — *Go and do your work.*
Courez voir ces messieurs. — *Run and see those gentlemen.*

2. Prendre garde, *to take care, to take heed*, when followed by another verb in the infinitive, means *to take care not to*:—

Prenez garde de tomber. — *Take care not to fall.*

3. Prendre le deuil, means *to go into mourning*; prendre la peine, *to take the trouble*; prendre les devants, *to go on before*; prendre un parti, *to take a determination*; prendre du café, du thé, &c., *to take coffee, tea*, &c.

Résumé of Examples.

Envoyez chercher le tapissier.	*Send for the upholsterer.*
Allez chercher votre parapluie.	*Go and fetch your umbrella.*
Courez voir votre père.	*Run and see your father.*
Prenons garde de nous blesser.	*Let us take care not to hurt ourselves.*
Prenez garde de déchirer vos habits.	*Take care not to tear your clothes.*
N'avez-vous pas pris le deuil?	*Have you not put on mourning?*
Prenez la peine de vous asseoir.	*Take the trouble to sit down.*
Prenez du thé ou du café.	*Take tea or coffee.*
Quel parti avez-vous pris?	*What resolution have you taken?*

Exercise 139.

Attend-re, 4. *to expect, to wait for.*
Chocolat, m. *chocolate.*
Courrier, m. *courier.*
Croi-re, 4. ir. *to believe.*
Déchir-er, 1. *to tear.*
Gât-er, 1. *to spoil.*
Gouverneur, m. *governor.*
Lorsque, *when.*
Port-er, 1. *to wear.*
Quelquefois, *sometimes.*
Robe, f. *dress.*
Soin, m. *care.*
Tomb-er, 1. *to fall.*
Tacher, 1. *to stain, to spot.*
Se tai-re, 4. ir. *to be silent*

Allez voir mon frère, il a quelque chose à vous communiquer. 2. Courez leur dire que je les attends. 3. Mon frère a bien pris garde de déchirer ses habits. 4. Votre cousine a-t-elle pris garde de tacher sa robe? 5. Elle a pris garde de tomber, car en tombant elle l'aurait gâtée. 6. Ces petites filles ont-elles pris le deuil? 7. Elles viennent de la prendre. 8. Pour qui prenez-vous le deuil? 9. Je porte le deuil de ma mère. 10. Prenez-vous du thé ou du café le matin? 11. Nous prenons du thé et du café. 12. Ne prenez-vous pas quelquefois du chocolat? 13. Nous n'en prenons que lorsque nous sommes malades. 14. Quel parti le gouverneur a-t-il pris? 15. Il a pris le parti de se taire. 16. Prendrez-vous mon parti (*my part*) ou celui de votre fils? 17. Je prendrai le vôtre, si je crois que vous avez raison. 18. Pourquoi ne prenez-vous

pas la peine de lire sa lettre? 19. Parce qu'elle n'en vaut pas la peine. 20. Votre courrier a-t-il pris les devants? 21. Il n'a pu prendre les devants. 22. N'avez-vous pas tort de prendre son parti? 23. Je n'ai pas tort de le prendre. 24. Avez-vous pris le thé* (*your tea*)? 25. Nous n'avons pas pris (*our*) le thé, nous avons pris le café?

Exercise 140.

1. Has your brother taken care not to spoil his hat? 2. He has taken care not to spoil it, he has only one. 3. Go and speak to your sister, she calls you (*appelle*). 4. Will you not take a cup (*tasse*) of tea? 5. I have just taken my tea. 6. What have you said to your little girl? 7. I have told her to take care not to tear her dress. 8. Let us take care not to tear that book. 9. My son has just brought it. 10. Has he taken his tea? 11. He has not yet taken tea, it is too early. 12. At what hour do you take tea* at your house? 13. We take tea at six o'clock. 14. Do you take tea* or coffee for breakfast (*à votre déjeûner*)? 15. We take coffee. 16. Is your courier gone on before? 17. He has not been able to go on before. 18. What resolution have you taken? 19. I have taken the resolution to study my lesson. 20. Have you taken care not to tear your books? 21. I have taken care not to stain them. 22. What has your brother determined? 23. He has determined to remain silent. 24. Have you taken my part? 25. I have taken my brother's part. 26. Are you right to take his part? 27. I am right to take his part, because he is right. 28. Are you not afraid to take his part? 29. I am not afraid to take his part. 30. Will you take your sister's part or mine? 31. I will take my sister's part. 32. Go and read your book, you do not know your lesson. 33. I know my lesson, and I know also that you are my friend. 34. Let us go to our father, he wants us.

Section LXXI.

The Subjunctive.

1. All the French verbs, regular and irregular, end in this tense with *e, es, e, ions, iez, ent*:—

2. Conjugation of the Present of the Subjunctive of the Regular Verbs:—

Que je chant	-e	fin -isse	reç -oive	rend -e
That I may sing		*may finish*	*may receive*	*may render*
Que tu parl	-es	chér -isses	aperç -oives	vend -es
That thou mayest speak		*mayest cherish*	*mayest perceive*	*mayest sell*
Qu'il donn	-e	fourn -isse	perç -oive	tend -e
That he may give		*may furnish*	*may gather*	*may tend*
Que nous cherch	-ions	pun -issions	conç -evions	entend -ions
That we may seek		*may punish*	*may conceive*	*may hear*
Que vous port	-iez	sais -issiez	d -eviez	perd -iez
That you may carry		*may seize*	*may owe*	*may lose*
Qu'ils aim	-ent	un -issent	déç -oivent	mord -ent
That they may love		*may unite*	*may deceive*	*may bite*

3. In the first conjugation, the subjunctive is in the singular, similar to the present of the indicative. Exception: aller—je vais, *que j'aille*.

4. The first and second persons plural of the subjunctive, in the four conjugations, are the same as the corresponding persons of the imperfect of the indicative. The third person plural is like the corresponding person in the indicative present. Exceptions: avoir, subjunctive, *nous ayons, vous ayez, ils aient*; savoir, *nous sachions, vous sachiez, ils sachent*; être, *nous soyons, vous soyez, ils soient*; faire, *nous fassions, vous fassiez, ils fassent*; aller, *ils aillent*; vouloir, *ils veuillent*; valoir, *ils vaillent*.

5. The subjunctive may also be formed from the participle present, by changing *ant* into *e, es, e, ions, iez, ent*: as, chantant, *je chante*; finissant, *je finisse*; recevant, *je reçoive*; sachant, *je sache*; craignant, *je craigne*.

6. The verbs presenting exceptions to this last rule are the following, which the student will find conjugated in the Second Part of this Grammar, § 62:—

Acquérir	Concevoir	Mourir	Prendre	Savoir	Venir
Aller	Décevoir	Mouvoir	(and	Tenir (and	(and
Apercevoir	Devoir	Percevoir	its com-	its com-	its com-
Avoir	Etre	Pouvoir	pounds)	pounds)	pounds)
Boire	Faire	Pourvoir	Recevoir	Valoir	Vouloir

* Le thé, *the meal called tea*; du thé, *the beverage called tea*.

7. The past of the subjunctive is formed from the subjunctive present of one of the auxiliaries, *avoir*, *être*, and the past participle of a verb [§ 45]:—

Que j'aie parlé, que je sois venu.	*That I may have spoken, that I may have come.*

8. A verb is put in the subjunctive, when it is preceded by the conjunction *que*, and another verb expressing consent, command, doubt, desire, surprise, want, duty, necessity, regret, fear, apprehension, &c. [§ 127 (2)]:—

Je veux que vous lui parliez.	*I wish you to speak to him.*
Je désire que vous arriviez à temps.	*I wish you to arrive in time.*

9. When the first verb expresses fear or apprehension, the verb preceded by *que* must also be preceded by *ne*, which, however, has no negative sense [§ 127 (3), § 138 (4) (5) (6)]:—

Je crains qu'il ne tombe.	*I am afraid lest he fall.*

10. After craindre, *to fear*; appréhender, *to apprehend*; avoir peur, *to be afraid*; trembler, *to tremble*, *pas* is used in connection with the *ne*, when we wish for the accomplishment of the action or occurrence expressed by the second verb [§ 138 (7)]:—

Je tremble qu'il n'arrive pas à temps.	*I tremble that he may not arrive in time.*

Résumé of Examples.

Le médecin veut-il que je boive de l'eau.	*Does the physician wish me to drink water?*
Je consens que vous alliez le voir.	*I consent that you go to see him.*
Nous doutons que vous arriviez à temps.	*We doubt your arriving in time.*
Je crains que votre maître ne vous punisse.	*I fear lest your master may punish you.*
Je crains que votre maître ne vous punisse pas.	*I fear that your master may not punish you.*
Je m'étonne qu'il ne sache pas cela.	*I am astonished that he does not know that.*
J'exige que vous lui donniez cela.	*I require you to give him that.*
Voulez-vous qu'il aille à la chasse?	*Do you wish him to go hunting.*
Que voulez-vous que je dise?	*What do you wish me to (that I should) say?*
J'aime mieux que vous me payiez.	*I would rather have you to pay me.*

Exercise 141.

Artisan, m. *mechanic.*	Empêch-er, 1. *to prevent.*	Moulin-à-scie, *saw-mill.*
Atelier, m *workshop.*	Fortement, *very much.*	Obé-ir, 2. *to obey.*
Au dessus, *above.*	Force, *f. strength.*	Rempl-ir, 2. *to fulfil.*
Bracelet, m. *bracelet.*	Magasin, m. *warehouse.*	Rue, *f. street.*
Déjà, *already.*	Malsain, e, *unhealthy.*	Tomb-er, 1. *to fall.*

1. Que voulez-vous que nous fassions? 2. Je désire que vous fassiez attention à vos études. 3. Ne craignez-vous pas que la pluie ne vous empêche de sortir? 4. Nous craignons fortement que la pluie ne nous empêche de remplir nos engagements? 5. Doutez-vous qu'il soit chez lui maintenant? 6. Je doute qu'il y soit, il est déjà dix heures. 7. Exigez-vous qu'il parte de bonne heure? 8. Je m'étonne qu'il ne soit pas déjà parti. 9. Aimez-vous mieux que je vous rende ces bracelets? 10. J'aime mieux que vous me les payiez. 11. Votre voisin craint-il que son enfant ne sorte? 12. Il craint qu'il ne tombe dans la rue. 13. Ne désirez-vous pas que vos élèves vous obéissent? 14. Je souhaite qu'ils m'obéissent et qu'ils obéissent à leurs professeurs. 15. Ne craignez-vous pas que cet artisan ne tombe malade? 16. Je crains qu'il ne tombe malade, car son atelier est très malsain. 17. Ne regrettez-vous pas qu'il soit obligé de travailler? 18. Je regrette qu'il soit obligé de travailler au dessus de ses forces. 19. Ne désirez-vous pas qu'on lui apprenne cette nouvelle? 20. Je désire qu'on la lui apprenne le plus tôt possible. 21. Votre père ne veut-il pas que vous achetiez un magasin? 22. Il veut que j'achète un moulin-à-scie. 23. Désirez-vous que je vous quitte? 24. Je désire que vous restiez avec moi. 25. Je veux que vous partiez ce matin.

Exercise 142.

1. Do you wish me to speak to the mechanic? 2. I wish you to tell him to (*de*) come here to-morrow morning. 3. What do you wish me to do? 4. I wish you to bring me a book. 5. Do you not wish me to read your letter? 6. I wish you to read it and (*que*) give it to my sisters. 7. Does not your sister fear lest the rain may prevent her going out?

8. She fears that the rain may prevent our going out. 9. Do you doubt that your father be at home now? 10. I doubt his being there. 11. Do you require me to do my work now? 12. I wish you to do your work before going out (*avant de sortir*). 13. Do you not regret your being obliged to work? 14. I do not regret my being obliged to work. 15. Are you not astonished that he knows that? 16. I am astonished that he knows all. 17. Do you require me to pay him to-day? 18. I wish you to pay him to-morrow. 19. What would you have me do (*see No. 1 of the above exercise*)? 20. I will have you pay him immediately. 21. Do you fear lest the master punish your son? 22. I fear that he may not punish him. 23. What would you have me say? 24. I would have you say the truth. 25. Does not your father wish you to buy a house? 26. He wishes me to buy a storehouse. 27. Do you wish us to leave you? 28. I wish you to go away to-morrow. 29. Do you wish me to stay with you? 30. I wish you to stay here. 31. Do you wish me to tell him that news? 32. I wish you to tell it to him. 33. Do you wish your children to obey their teacher? 34. I wish them to obey him.

LESSONS IN GEOLOGY.—No. XIX.

By THOMAS W. JENKYN, D.D., F.G.S., &c.

CHAPTER II.

ON THE ACTION OF WATER ON THE EARTH'S CRUST.

SECTION III.

ON THE PHENOMENA OF ARTESIAN WELLS.

IN our last Lesson, "On the Origin of Springs," I explained to you how wells and fountains are caused by peculiar conditions in the geological structure of the earth. Of these conditions I gave you two illustrations, and reserved two others for this Lesson.

You have seen that water derived from rain, dew, and snow, enters into porous soils of gravel and loose sands. You know from observation that such grounds become soon dry after heavy showers and long wet weather. Such soils and rocks are called arenaceous, or sandy, and easily "drink in" the water that falls upon them. The other soils and rocks, which retain the water, or through which water percolates with great difficulty, are called argillaceous, or clayey.

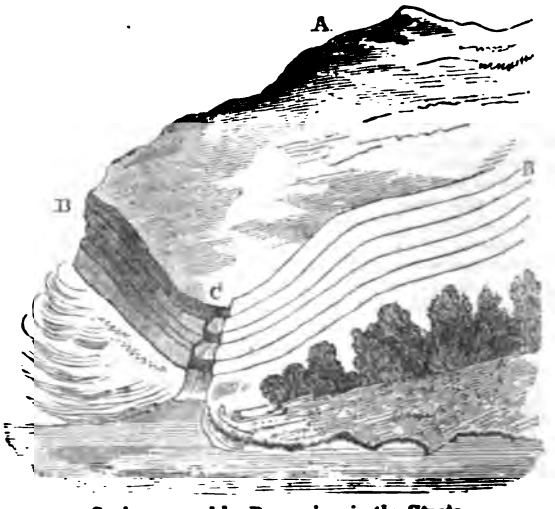
The water which percolates through these porous beds descends, by its own gravity, lower and lower, until it finds a stratum of stiff clay, or impervious rock, through which it cannot penetrate. This fact has been already explained to you in two instances. If the surface of the impervious rock forms a curve upward like a bow, the percolating waters will flow and produce wells on each side of the hill, as was represented in fig. 39. If the surface of the retentive rock be an inclined plane, as in fig. 40, the water will flow along the slope in one direction, and appear as a well on one side only of the mountain, or at its base.

It is hence obvious that when water reaches an impervious stratum and fails to percolate to a greater depth, it must accumulate as in a reservoir, and will then try to ooze out at any outlet, which it can effect by the laws of hydrostatic pressure. The principal difficulty in this phenomenon is to explain why the water does not ooze out at every point, along the line of junction of the porous beds with the impervious or water-tight stratum, instead of at a few points where we find springs.

The reason of springs being found at few points only, and not along the whole line, is that the percolating waters concentrate at those points. This concentration of the water is occasioned by two conditions in the structure of the soil. First, it is well known that even in gravelly and loose beds there are fissures and crevices, which act as natural and easy drains to the percolating waters. Secondly, there may be curves, swellings, and inequalities, in the surface of the stiff and impervious rock which the waters have reached. In the dents and hollows of these beds, the water accumulates till it overflows their edges; or it may be that by means of these depressions, the water is conducted to lower levels, and thus forms channels for a current to force for itself an outlet at a powerful spring.

These facts lead me to mention a third case, in which a peculiarity of geological structure gives rise to a different description of springs, a case which the next diagram will help you to understand.

Fig. 41.



Springs caused by Depressions in the Strata.

Fig. 41 represents a spring in a mountain side near Zurich, in Switzerland. You see that the upper part of the hill, A, consists of a deep and extensive mass of gravelly soil. Through this mass water, from rain and snow, penetrates until it reaches the impervious and retentive beds B B. These beds curve upward on both sides, and, therefore, form a kind of trough or basin at C, where the water, from the porous soil running on each side of the inclined planes B B, meet and gush out as a large and copious spring. Were the porous surface of this mountain thin and of small extent, the well would be an intermittent one, and would soon be exhausted in a dry season. For, if the supply of water in the porous soil be not equal to the discharge at the spring, the flow at the well will stop, until the reservoir be afresh replenished, either from rain or from melted snow. But, because this gravelly soil is deep and of considerable extent, and because the basin-shaped rocks below help the water to accumulate at the bottom, the fountain is copious, powerful, and perennial.

The knowledge of these conditions of geological structure will aid your comprehension of the phenomena of Artesian wells.

An Artesian well is a boring made perpendicularly into the ground by means of a large auger, which is worked till it penetrates through different soils and rocks into a bed which contains water. Such wells are called Artesian from the French province called Artois, which is the ancient Artesium. It was in this district that wells of this description were first formed in Europe. It has been lately ascertained that such wells have been established in China from a considerable antiquity.

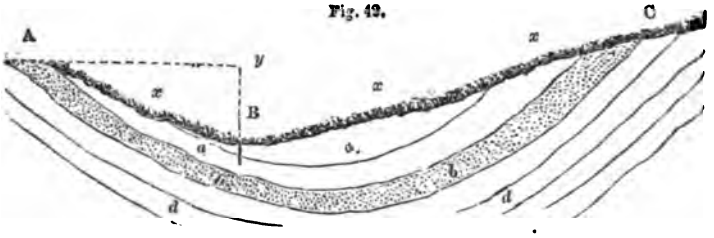
As the borer is worked and made to penetrate into the underlying rocks, a jointed tube of iron, and of larger bore or circumference, but surrounding it, is beaten down into the boring. This tube answers two purposes. First, it hinders the sides of the boring or well from failing in; and secondly, it prevents the water, in its ascent, from escaping and spreading into any interstice or fissure which it might find in the sides of the rock.

In these wells the water rises from various depths, either to the surface of the soil or many feet above it, according to certain conditions of the strata in which water is found. In many instances after the borer has passed through many hundreds of feet of impervious and retentive beds, and it comes to a porous stratum containing water, the fluid rises immediately with considerable impetuosity, rushes up the tube, and flows over. The first rush is often very violent, so that for a time

the water plays like the jets of a fountain, and then, where the origin of the percolating water is at a low level, it gradually sinks, and eventually continues to flow in a tranquil stream from the surface of the well; or, as the case of level may be, it is constantly full up to within a few feet of the surface.

You are aware that this action of Artesian wells is due to the laws of hydrostatic pressure, or to that constant tendency and effort of water to find its level. These phenomena will be easily comprehended by means of the following diagram, fig.

Fig. 42.



A Section explaining the Rise of a Natural Spring and the Perforation for an Artesian Well.

42, representing a geological section in which Artesian wells may be made.

Let A B C, in fig. 42, be the surface of a country, in which water is scarce, except where it has a natural spring at the height A. Under the vegetable soil *x x x* are the two beds *a a*, which are stiff and impervious to water, or through which water percolates with great difficulty. The rock *b b* is gravelly or sandy, and allows the water to percolate easily, and to accumulate between *b* and *b*. But this reservoir of water is concealed by the superficial soil and by the beds *a a*. A geologist, indeed, might, from the natural spring at A, and from the fact that these beds are what he calls synclinal (inclining together), infer that water would be found below at some points between B and C. The rock *b b* rises to the surface, or crops out, as it is geologically termed from beneath the rocks *a a* at the height A, where there is a natural spring. To the left of A, and to the right of C, it is found that beneath *b b* is another rock *d d*, which is impervious to water.

It is now obvious that water, entering the soil at A and C, will be absorbed by the elevated parts of the rock *b b*. The percolating water will now pass downward to, and along, the surface of the water-tight rock *d d*, and take a direction under the impervious bed *a a*, and render the whole rock *b b* a kind of subterranean drain.

The laws of hydrostatic pressure inform us that water, in such conditions, being constantly in effort to find its level, will strive to force its way upward through the overlying beds *a a*: but being unable to accomplish this, it will, in the natural order of things, remain beneath unexposed to evaporation, unless it can find an outlet at some lower level as at A.

If, under these geological conditions, a boring be made at B, through the beds *a a*, into the rock *b b*, the water in that stratum will rise in the well, and play above the surface as high as the dotted line B *y*; that is, it will play as high above the surface as C is higher than B. The great quantity of water contained in a reservoir so extensive as the bed *b b* between C and A, and the hydrostatic pressure from C to *b* and from A to *b*, are sufficient to account for the impetuosity and the copiousness of the rush of water at B.

The phenomena would be perfectly as represented here, if the heights A and C were of equal elevation. But the height A is lower than the height C, and accordingly the water that enters *b b* at C produces, according to hydrostatic laws, an outlet at A, where there is a natural spring, at the point where *b b* crops out above *d d*. You will see, however, even in this case, that when the Artesian boring has reached the bed *b b*, the water between A and *b*, as well as that between C and *b*, will have a tendency to rush towards the outlet effected at B. In consequence of this tendency, the natural spring at A will either be lowered, or have its supply of water diminished, in proportion to the discharge at B, or until the pressures previously exerted be balanced.

As a case in point, I may mention, that in the year 1784, an Artesian well was formed at Sheerness, in the Isle of Sheppey, near the junction of the Thames with the German Ocean. The sea is many miles wide between Sheerness and the opposite coast of Essex. This well was bored on a point of land close to the sea side. The perforation was more than three hundred feet deep. When the boring instrument reached the bed of gravel and plastic clay which is known to be under the stratum called the London clay, the water immediately rushed up with violence and filled the well. As the water continued to supply this Artesian well at Sheerness, it was found that the supply of water in the wells on the coast of Essex was proportionably diminished.

These representations will be sufficient to assist you in forming correct notions of the principles of the many Artesian wells which are about London and its neighbourhood; as well as of many others, according to their geological condition.

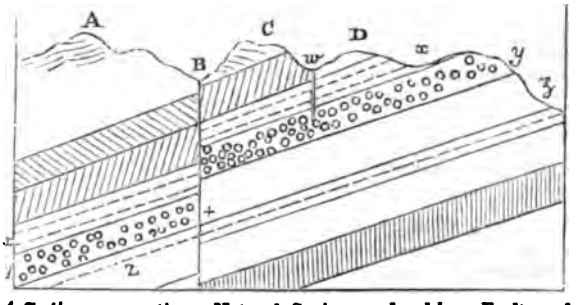
The instance of the natural spring found on the lower height A in fig. 42, introduces you to another condition of geological structure which gives rise to wells, as represented in fig. 43.

In fig. 43, let A B C D *z y z* represent a section of a country many miles in length, with three different rocks *x y z* resting conformably on each other, and among which the rock *y* is argillaceous and porous. The rain enters this rock in the space between *x* and *y*. The other rocks *x* and *z* are impervious to water.

It is found that the series of these beds have been fractured and dislocated by a disturbing force from below. Such a fracture is called, both by miners and geologists, a fault. This fault or fissure produces an outlet on the surface at B. The water which has entered the porous bed *y* at *x y*, is prevented from descending lower by the watertight character of the underlying rock *z*. Let B + be a fault or fissure, from the effect of which the continuity of the bed *y y* is broken, and a portion of it is thrown down to a lower level on the left of the diagram.

If the rock *y* be tapped by an Artesian perforation at *w*, the

Fig. 43.



A Section representing a Natural Spring produced by a Fault, and an Artesian Well by boring.

water will immediately rise to the surface. But irrespective of the artificial boring at *w*, you have a natural artesian well at B; for the fissure or fault B + serves the same office as the artificial boring. There is this difference between them: The artificial boring is a mere puncture, as to extent; but the effects of the fault are felt along a more extensive line downwards, frequently of some miles in length. On this account, springs produced by faults are more permanent than others. This arises from the mechanical arrangements of the reservoir, by which a vast quantity of water is accumulated, and can only escape by slow degrees. Without these natural fissures, which permit the escape of waters from a great depth, many districts would be comparatively destitute of this great necessary of life, particularly during long dry seasons. The severe droughts, which dry up the more superficial springs, are comparatively little felt by those which are produced by faults.

LESSONS IN ENGLISH.—No. XXIII.

By John R. Beard, D.D.

UNCOMBINED SUFFIXES.

The suffixes of which we have spoken enter into the structure of the words with which they are severally connected. Thus the *ment* in amend*ment* forms an essential part of the term. If *ment* is sundered from amend, the word amendment ceases to exist; and instead of a noun, there arises a verb, the verb to amend.

Other words are appended to roots without entering into union with them. For instance, we say *cast down* and *cast up*. Here *down* and *up* form no part of *cast*. Cut off *down* and *up*, and *cast* remains the same. Yet *down* and *up* modify the meaning of *cast*, and they modify it in a very important way. And *down* and *up* come after *cast*. In some sort, then, they are suffixes. They perform the part of suffixes in regard to meaning, and they differ from suffixes chiefly in not combining with the root as do the suffixes already considered. Hence they appear to be uncombined suffixes. Putting the two together, I may designate suffixes, properly so called, *combined suffixes*, and those that do not enter into the composition of words, *uncombined suffixes*.

The uncombined suffixes *down* and *up* are adverbs. Adverbs form one class of uncombined suffixes. Another class consists of prepositions; for instance, we say, *I speak to*, and *I speak of*. Here *to* and *of* are prepositions. These uncombined suffixes, you see, very materially modify the meaning of the verb to *speak*. Consequently, the right employment of prepositions as suffixes is a matter of great consequence.

If you carefully follow me in what immediately ensues, you will see reason to believe that the English is a very flexible and a very rich language, and that it owes these qualities largely to the existence in a free and uncompounded state of many of its words. Let me explain what I mean by "a free and uncompounded state." Suppose that *fall* and *down* had coalesced into one word: thus, to *falldown*; then *falldown* would be a compound, and neither *fall* nor *down* would be free, being absorbed in the new term. Indeed we have in the shape of a noun this very compound, only the terms are inverted as in *downfall*. Now down and fall, thus combining, you cannot modify *fall* by using other prefixes; you cannot, for instance, say outfall. But with *down*, as an uncombined prefix, you can say *fall out* equally well with *fall down*; and as you can say *fall out*, so can you also say *fall in*. Indeed the power of expression thus acquired is almost endless. The greater is the pity that some writers, ignorant of the treasures of the Saxon element of our language, and misled by false views of elegance, should have given preference to Latinisms, and frowned on the idiomatic diction which ensues from the employment of our uncombined suffixes.

Uncombined Suffixes.

1. *Adverbs.*

Aback.

"Away there! lower the mizen yard on deck,"
He calls, and, "brace the foremost yards *aback*."
Falconer, "Shipwreck."

Abaft, on the aft or hind part.

"Let all hands go *abaft*.—*Anon.*

Aboard, on board ship.

"Resolv'd, he said; and rigg'd with speedy care,
A vessel strong, and well equipp'd for war;
The secret ship with chosen men he stor'd,
And bent to die or conquer went *aboard*."

The facility of combination afforded by those uncombined suffixes may be exemplified in this verb *went*."

He went	*abaft*	the pinnacle	He went	*amongst*	the scholars
	aboard	the ship		*before*	the picture
	aloft	in a balloon		*behind*	the door
	aback	suddenly		*into*	the house
	afar	from his country		*out of*	the church
	back	in a carriage		*upwards*	to the ceiling
	forward	in good works		*round*	the monument
	backward	in morality		*in*	to see his friends
	sideward	to avoid a nuisance		*out*	to take a walk
	sideways	between the posts		*high*	in the air
	amidst	the crowd		*low*	in pocket
	below	the floor		*along*	the highway
	above	the roof		*over*	the seas
	apart	from the mass		*across*	the meadow
	ashore	from the boat		*under*	the archway

He went	*through*	the folding doors	He went	*far*	to prove it
	on	successfully		*wrong*	in his mind
	off	altogether		*right*	into the theatre
	aright	in all he undertook		*up*	the stairs
	near	the place intended		*within*	the enclosure
	by	the church			

Here are forty-one different acceptations of the word *went*. In no other language known to me is this multiplying power exceeded, if, indeed, it is equalled, even in the German; while in most languages, as in Latin, in French, and in Spanish, the facility of combination is very much less.

So familiar, however, are Englishmen with the import and the application of the *uncombined adverbs*, that I have no need to go through them in detail. It may be more useful to give two or three instances of the way in which they modify the verb to which they are subjoined.

Verbs.	Suffixes.
Run, throw, strike, bring	back
	down
	forwards
	in, into
	along
	near
	over, on
	across
	up
	under
	out
	backwards

Here are fifty-six words made out of four with the aid of suffixes, which being common property may enter into union with many other verbs. In Todd's edition of Dr. Johnson's Dictionary, sixty-two different applications of the verb to *cast* are given and exemplified; and this variety is owing mainly to the efficacy of the uncombined suffixes. The diversity of meaning given by these suffixes is no less remarkable. To *run up* an account is a very different matter from *running down* an enemy's vessel. By *blowing up* a citadel, a revolt may be *put down*. You may *enter into* a cave, and you may *enter into* Milton's Conception of Samson Agonistes. If you have money, you may *set up* a shop; if you are rich, you may *set up* your carriage; if you are liberal, you may, at the same time, *set up* a friend; and if you have also a proper spirit, you will not fail to *set down* the impertinent. Edgar having *run through* his fortune, enlisted as a common soldier, and *was run through* in battle. To *laugh with* one's friends is agreeable; to be *laughed at* by them is very unpleasant.

"So long as nature
Will *bear up* with this exercise, so long
I daily vow to use it." *Shakspear.*

"It shows a greatness of soul for persons in distress to *bear up* against the storms of fortune."—*Broome.*

"They are content to *bear with* my folly." *Sidney.*

"With such alacrity they *bore away*." *Dryden.*

"Whose navy like a stiff-stretch'd cord did shew,
Till he *bore in*, and bent them into flight." *Dryden.*

"As a lion bounding in his way
With force augmented *bears against* his prey." *Dryden.*

"The weight of the body doth *bear* most *upon* the knee joints."—*Wilkins.*

"I doubted whether that occasion could *bear* me *out* in my confidence."—*Temple.*

"An eagle fluttereth over her young, and *beareth* them *on* her wings." (*Deut.* xxxii. 11.)

"Do you suppose the state of this realm to be so feeble, that it cannot *bear off* a greater blow than this?"—*Hayward.*

"And *bears down* all before it with impetuous force." *Dryden.*

"And ebbing tides *bear back* upon th' uncertain sand." *Dryden.*

"Cæsar doth *bear* me *hard*; but he loves Brutus." *Shakspear.*

"Give but the word, we'll snatch his damsel up,
And *bear* her *off*." *Cato.*

To this list nautical phrases would add to *bear down* on an enemy, and to *bear up* against the wind; to *bear round* a headland, and *bear over* a sea; to *bear by* an island, and *bear through* a strait. What variety of meaning arises from these uncombined

suffixes may be seen by taking a single thing as their object. Let the first be a river and the second a bridge.

To go near	a river	To go near	a bridge
To go along	a river	To go along	a bridge
To go into	a river	To go over	a bridge
To go through	a river	To go across	a bridge
To go over	a river	To go under	a bridge
To go under	a river	To go upon	a bridge
To go upon	a river	To go above	a bridge

On a tempestuous night a horseman fatigued with a long day's journey, in attempting to *go across* a dilapidated bridge, was *blown over* it into the river. If you *go through* the Thames you will probably be drowned; if, by means of the Tunnel, you *go under it*, you will not wet the sole of your foot. A balloon will *carry* you *over* the Thames, and you may *cross* the river in a wherry. I sauntered *along* the river, and at length went *upon* its tranquil bosom. My cousin walked *under* the bridge, while I was *above* it in the balloon, and we both saw the sheep *go into* the river.

These adverbial suffixes must not be confounded with ordinary adverbs. They are only a small portion of ordinary adverbs. Their connexion with their verbs is more intimate than is the connexion of ordinary adverbs, for though uncombined they form a part of the verb in each case, and are essential to its signification. The office of the ordinary adverb is not to change the import of a verb, but to denote the manner of its action. In *to bear patiently*, the adverb patiently does nothing more than mark the way in which the evil is borne; it is borne patiently, not impatiently, not peevishly, not complainingly. But to *bear through*, as, "the admiral *bore through* the enemy's line," is in the primitive sense of the term not *to bear* at all, nor in the derivative sense to *endure*, but *to sail* or *direct a ship*. Besides, ordinary adverbs may be connected with these adverbial suffixes; e. g. "the admiral *boldly bore through* the enemy's line."

Uncombined Suffixes.

2. *Prepositions.*

I have termed the uncombined suffixes of which I have spoken *adverbs* and *adverbial suffixes*. In doing so I have, in regard to such as *into*, *through*, &c., considered them in their connexion with their several verbs. Thus viewed, they in construction are taken as parts of their verbs. In consequence the verbs become compound, and in their compound state govern their objects. But *through*, *into*, and others may be viewed as prepositions. When so considered they are connected not so much with the verb as with the noun; which in that case is governed not by the verb but by the preposition; in other words, the noun is directly dependent on the preposition rather than on the verb. I may illustrate my meaning by an example of

1. *A Verb Compounded with a Suffix.*	2. *A Preposition Connected with a Noun.*
He went-under the bridge.	He went under the bridge.
The boat sailed-down the river.	The boat sailed down the river.

In the use of prepositions in connexion with verbs, special regard must be paid to usage. The power of the verb is materially effected by the preposition. This fact is broadly seen in the appending of *to* or *of* to the verb *to speak*; e. g., *to speak to*, *to speak of*. Besides the phrase *to speak to*, we use the phrase *to speak with*. The two meanings are nearly the same, but *to speak to* is *to address*, and *to speak with* is to *interchange remarks*, *to converse*. The usage you are to follow is present usage. In its very nature usage is a varying thing. Of old, *to lay hold on* was employed in the way of our *to lay hold of*. At present we say *dependent on*, but *independent of*, yet the two adjectives, as they differ only in the negative *in*, would naturally require the same construction; and in former days *on* was used with *independent* as well as *dependent*.

"A being of dependent nature remains independent *upon* him."—*South*.

It is a rule that verbs, compounds of the Greek, Latin, and French languages, take after them the same prepositions as those which enter into their structure; thus, we say sympathise *with*, for the *sym* of *sym*pathise denotes *with*. In the same way we say *ad*here *to*; *inter*vene *between*. Yet we say *prefer to* instead of prefer *before* (prae, Lat. *before*). We have also conformable *with*, and conformable *to*.

"The fragments of Sappho give us a taste of her way of writing conformable *with* that character we find of her."—*Addison*.

"He gives a reason conformable *to* the principles."—*Arbuthnot*.

With, however, seems to denote a greater degree of resemblance or correspondence than *to*. According to the rule just enunciated *averse* (a, *from*; and verto, *I turn*) would take *from* after it; yet we say not averse *from*, but averse *to*. Exception (ex, *out of*; and capio, *I take*) would require *out of* or *from*; yet we say exception *to*.

"Pleads, in exception *to* all general rules,
Your taste of follies with our scorn of fools." *Pope*.

The elegance as well as the propriety of language much depends on a correct use of the prepositions, and, consequently, I shall make them the subject of a series of exercises in English composition.

Parsing.

God made the little worm that crawleth on the ground. I saw a fly crawl up the window pane. Let us go forth into the green fields. John has gone down into the cellar. The buds come out on the trees. The cowslips hold up their heads; will the cowslips never hang their heads down? The goslings are running on the green. They are now going down into the pond. The hen sits upon her nest. When the hen has broken the shell, the chicken will come out. The sheep can scarcely stand under their wool. The butterflies flutter from bush to bush. The young animals of every kind sport about. The shepherd careth for his sheep, and bringeth them back to the fold. My son, take care of your aged mother, and sustain her in her weakness. Your mother brought you up on her knees. You lay in her bosom. She fed you with her own vital substance. Therefore, let her now, in her age, cleave to you, and, upheld by you, let her gently go down into her tomb.

EXERCISES IN COMPOSITION.

Make a simple sentence comprising the words which follow.

Words with their proper Prepositions.

	F. R.*
Abandoned to,	abandon, *surrender*
Abhorrence of,	horre, *stiff with fright*
Abound in,	und, *wave*
Absent from,	ens, *being*
Abstain from,	tene, *to hold*
Accede to,	ced, *to go*
Acceptable to,	cap, *to take*
Access to,	ced, *to go*
Accessory to,	sed, *to go*
Account of,	computare, *reckoned*
Accuse of,	caus, *cause*
Acquaint with,	cognosc, *to know*
Acquiesce in,	quies, *rest*
Acquit of,	quit, *to free*
Adapted to,	apt, *to fit*
Add to,	do, *to give*
Adequate to,	equ, *equal*
Adhere to,	haere, *to stick*
Adjacent to,	jace, *to lie*
Adjudge to,	judec, *a judge*

Questions: What is the difference between accord *with*, and accord *to*? between accountable *to*, and accountable *for*? between admit, and admit of? between address, and address to?

In order that you may clearly see what I require, I give a sentence or two by way of example.

Such conduct draws upon him the abhorrence of all men. Such conduct subjects him to the wrath of God.

The former sentence is constructed on *draws upon*; the latter is constructed on *subjects to*. Suppose that I had given *absence from* and *arrival at*, as the germs of a sentence, then I perform what is demanded, thus:

Your absence from home has given your parents much pain. John's arrival at Portsmouth has inspired all the family with hope

* F. R. signifies Foreign Representatives, that is, the stem in the Latin, French, &c., which forms the root or substance of the word: in these stems, only the essential or radical letters are given.

LITERARY NOTICES.

ALL NOW READY.

Uncle Tom's Cabin Almanack, Illustrated by Cruikshank, &c., 1s.
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A SERIES OF LESSONS ON DRAWING will shortly be commenced, which, in their course, will include the numerous branches of this beautiful art, namely, the Human Figure, Architecture, Landscape, Animals, Machinery, &c. The publication of these Lessons will entail a considerable weekly cost; as it will include not merely the engagement of an eminent artist and teacher to furnish the Lessons, but a heavy outlay for Engravings and Diagrams to illustrate those Lessons. JOHN CASSELL can confidently appeal to the readers of the POPULAR EDUCATOR as to the liberality with which this work has hitherto been conducted. The contributions by the eminent gentlemen who furnish the various Lessons, coupled with the Editing, involve a weekly outlay, the mention of the amount of which would excite the astonishment of readers and students. And to this outlay must be added, still further, the Maps, and the numerous engravings with which the Lessons are illustrated.

We are not disposed to utter one word of complaint, but we do trust that while we are thus labouring to place within the reach of our students and readers every branch of valuable instruction regardless of cost—including several that could not be obtained but at a heavy expense for books, &c.—we do hope, we say, that our friends will strengthen our hands by using every possible means of enlarging the circle of our patrons. There is not one of our subscribers who does not possess influence sufficient to obtain at least one additional subscriber; let that influence be exerted, and he will not only strengthen and enrich the medium of instruction for himself, but will be the means of diffusing the blessings of education to others. We confidently look forward to a considerable increase of subscribers from the date of this announcement. TO ALL NEW STUDENTS, *Volume the First of the* POPULAR EDUCATOR will be found invaluable. It can be obtained of any bookseller, price 3s. 6d., bound in cloth; or, on fine paper, and without the weekly headings, 4s. 6d.

ANSWERS TO CORRESPONDENTS.

MARTYN (Southampton): The best English classical authors are those contained in the series of prose volumes called the "British Essayists," and the series of poetical volumes, called the "British Poets," of which many editions have been published. As to French authors, those whose names are found in the French extracts in the P. E. are the most classical. The other questions we do not know.—A. G. W. (Brompton): We do not see the utility of his question.—H. V. D. L. (Belfast): Thanks for his notice of the error in our Euclid; see p. 77, line 33, for *an angle* read *a right angle*. He is right on the subject of Roman antiquities; it is in prospect. The Life of Wellington, with portraits, battles, &c., is already publishing in the "Working Man's Friend."—ENGLISH SCHOLAR (Dundee): Very well.—Communications received from J. W. S. (Swansea); ALPHA (Sheffield); HENRY RICHARDSON (Manchester); B. X. (Whitby); W. P. D. (Whitechapel); A LEARNER (Victoria-park); ALFRED (Mortimer-road); W. SMITH (Coseley); J. C., Pupil Teacher; SCHULER (Auldbar); LEWIS (Walsal); W. T. G. W. (London); UN IRLANDOIS; W. M. (Newarthill); J. S. (Ayrshire); STUDIOSUS (Eaton-square); J. F. P. O.; EXCELSIOR (Greenwich); T. K. ARNOLD (Belfast); DAWSON (Knaresborough); A SELF-EDUCATOR (Forfar); ARRACES (Lambeth); J. WILKINSON (Earby); W. SPENCER (Colne).

RICHARDSON'S *Dictionary of the English Language*. On the authority of the author of this work, we state that "inter-minable," spoken of in No. 12 of our "Lessons in English," is a misprint for *interminable*. While we cannot set a high value on this dictionary as an Etymological authority, we recognise its superior merits in its historical deductions of the several meanings or applications of words, and have found in its laboriously collected examples useful materials of illustration in the instructions we have given on Prefixes and Suffixes. We are also indebted for quotations, to Todd's Edition of Johnson's Dictionary, and to Webster's English Dictionary. The last we consider most useful for the general student. J. R. B.

STUDENT (Manchester): The "Illustrated Exhibitor" is completed in 1 vol. price 8s. 6d. The "Magazine of Art" will be continued, it is a separate series.—IRISHMAN: Learn Arithmetic and Geometry, if you wish to get into a Normal-school. The SECRETARY of the Bristol Athenæum Essay and Discussion Society has kindly transmitted lists of debating subjects for the use of the Kirkliston Mutual Improvement Society.—B. L. B.: *Fluxions* is another name for the *Differential Calculus*, or the *Doctrine of Variable Quantities*. *Cyclopædia* and *Encyclopædia* both mean the same thing, viz., *Instruction in a circle*, or in a round from A to Z; the *en* which means *in* is usually left out. A *Cyclopædia* embraces the whole circle of learning, arts and sciences, &c.—Y. B.: With the Bible at his right hand and in his heart, he need not be alarmed to read *Volney*, *Voltaire*, or even *Paine*; truth never suffers by honest investigation. The religion of Jesus has stood—and will stand—all the assaults of men and devils till time shall be no more; and its truth shall then be demonstrated to the assembled universe; then "the wicked shall go away into everlasting punishment; but the righteous into life eternal."—T. L. C. (Manchester): The best notes on the New Testament is a copy with parallel or marginal references. "God is his own interpreter, and he will make it plain."

H. P. D. (Ipswich): We are greatly obliged to him for his kind and suggestive letter; and shall gladly avail ourselves of the information it conveys. He says, among other things, "The 2s. 6d. boxes of mathematical instruments of the *Society of Arts* are furnished [we presume by the society] to all Mechanics' Institutions in connexion with the society, according to the new arrangement; also the 1s. box of colours. I have one of each before me, and they are good at the price."—P. MITCHELL (Cambridge): We shall take an opportunity soon of noticing the subject of Euclid's life, &c.—ZENODOTUS: We are not aware of any hospital or institution for diseases of teeth, &c. We recommend the "Pathway" to our correspondents for lessons on religion.—B. H.: The subject of the tides is complex; it will be treated of in the P. E.—J. J. AYLWARD (Wexford Co.): We advise him to study Cassell's Arithmetic.—ROBERT JONES: We advise him to study Cassell's Euclid and the Lectures on Euclid in the P. E. together. We advise him to study the French as given in the P. E.—CALLIGRAPHER (Dundee): We advise him to follow our directions in all the Lessons in Penmanship out and out, beginning with and practising well in the large hand first.—R. G. (Dundee): *Difficile est proprie communia dicere*, is a sentence which must take its colour from the context; it is capable of several meanings; without looking at the context, for which we have not time, we would translate it *freely* thus, *It is not easy to talk politics in a proper manner*. Of the sentence in French we can't make out the writing.—W. J. (City) will find the rule of *Compound Proportion* fully explained in Cassell's Arithmetic, price 1s.—LIZZIE (Camberwell) will soon get Lessons in Stenography in the P. E.—J. B. (Dudley): His remarks are very good and just in general, but we demur to the effects of the "showers of misfortune;" they have very different effects on the two classes of men in the world, the believer and the unbeliever; see Heb. xii. 6—11, and Isaiah i. 5.—TIRO IN GEOMETRIA (Dalbeattie): Right.—T. JENKYNS (Cardiff): We cannot undertake to recommend teachers, however willing to serve our subscribers; it would be invidious.—E. T. (High-street): The P. E. comes out in monthly parts both *with* and *without* the weekly headings; there are only *half-yearly* volumes; see our Literary Notices.

A good yet low-priced Latin Dictionary will shortly be published. We are gratified at the many proofs we receive of the progress made by our pupils in Latin.—W. J., who says, that with the aid of our Lessons and Dr. Beard's "Latin Made Easy," he has learnt to translate Virgil, Cæsar, &c., should translate the passage from Tacitus thus: "For the people, or the aristocracy, or single individuals rule all nations and cities; a form of government chosen from these and made up of these elements may be praised more readily than be found (appear), or if it presented itself it could not be lasting."—N. B.: Forma is the subject to potest, and potest governs laudari, evenire, and esse.—E. G.: We cannot undertake to correct exercises.—W. C.: Numeral adjectives agree with their nouns in number, gender, and case.—ALEXANDER: Dr. Beard's "Latin Made Easy" (of which a key is in the press) was written for children, and has in hundreds of cases proved to be fit for such as are "under nine years of age."—J. B.: A review of English Dictionaries will shortly appear in one of the conversations appended to our English Lessons. N.B. *Booksellers are requested to send specimens of English Dictionaries, with the price, &c., for the purpose of being reviewed*, in order that our readers may have a full choice before them as well as grounds for their selection.

H. V. D. L. (Belfast): We never heard of any reward having been offered for the *Trisection of an angle*; but we believe that any one who should accomplish this problem by Plane Geometry, would be very likely to get the Royal Society's *gold medal*.—JOHN TREVITT (Nottingham): Yes.—A SCHOOL ASSISTANT (Reigate): The Greek term *logos* means neither *the study of*, nor a *research into*, but simply *the laying of*, from the verb *lego*, *to lay*, German, *legen*. It then came to signify *a laying together*, *an arrangement*, *a gathering together*. If this *gathering together* was of *letters*, it then meant a *word*; of *words*, it then meant a *sentence*, a *statement*, a *saying*; of *sentences*, it then meant *a speech*; of *eloquent sentences*, it then meant *an oration*; of *argumentative sentences*, it then *meant ratio*, *or reasoning*; that is, *Logic*, which is the same word, with an adjectival termination. If the *gathering together* was of *historical sentences*, it then meant a *description*, *narrative*, or *account*; it is in this sense, in general, that the term *logy*, which is our English suffix derived from *logos*, is employed in such words as Geology, Physiology, &c; and is thus nearly synonymous with the term *graphy*, which is our English suffix derived from *graphe*, a drawing, writing, or description. The distinction between them is, that *logy* means a description in *spoken* language, and *graphy* a description in *written* language. But it is plain that this distinction is lost sight of in their ordinary application. Thus, Geography means a *description of the earth*, with respect to its surface as inhabited by man; and Geology means a *description of the earth*, as affected by physical changes which have taken place on and below its surface. In the New Testament, the term *logos* is applied not only to the *act of laying together*, or to the *things laid together*; but also to HIM WHO LAID ALL THINGS TOGETHER, and arranged them as it pleased Him; to the *Great Disposer of events*; to the second person of the ever-blessed Trinity, which has existed as Unity from all eternity; to our Lord and Saviour Jesus Christ. Hebrews xi. 3; i. 2. Proverbs viii. 22—36; XXX. 4; Genesis i. 26. Our correspondent will find some account of Rain and Dew in a very popular and well-known work, "Keith on the Globes."

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LESSONS IN ARCHITECTURE.—No. X.

In our last Lesson we spoke of the rise, decline, and fall of Gothic architecture. Its origin, like that of some other styles, has not been so correctly ascertained as to render its historical details of much interest. It is certain that it began to be employed in ecclesiastical edifices about the time that the Goths were settled in Italy, and had been overcome, in their turn, by the nations which superseded the Romans. This system of architecture, as we have already mentioned, was practised during the middle ages, and continued in use till the 16th century, when it was supplanted by the revival of the Roman style. It was then called Gothic from the architects and workmen who were supposed to have been engaged in the planning and erecting the edifices which bear this name; and it was held in contempt by the followers of Palladio, in Italy, and of Jones, in England. The Gothic architecture differs essentially from the Greek, both in construction and appearance. In the latter the arrangement of the materials depended on their strength in masses, which required only to be put together in simple and elegant forms. In the former, on the contrary, small stones and other materials, which would have been deemed useless by a Greek architect, were employed in the construction of edifices of equal strength, and sometimes even of greater magnificence

Fig 32.

Window of the 13th Century.

Fig. 33.

Window of the 15th Century.

than the ancient temples; for they depended as to their stability, not on the vertical pressure of columns, or the strength of lintels from pillar to pillar, but on the correct adjustment of the bearings and thrusts of different arches operating in various directions. Moreover, the Gothic style is easily distinguished from both the Greek and the Roman styles by its slender shafts and clustered pillars, its circular, pointed, or angular arches and groins, its spires and pinnacles, and its decorations, which excel the latter in variety, number, and minuteness.

Among the theories which have been proposed to account for the origin of this style we may mention an ingenious one which has been suggested by Sir James Hall, in his "Essay on the Origin, Principles, and History of Gothic Architecture." He conceives that the forms of this style may have been derived from the imitation of a rustic dwelling, constructed in the following manner: Thrust two rows of posts into the ground opposite to each other, at an interval equal to that between the posts in the rows themselves, each post rising to the height of about three intervals. Apply to each post a set of slender rods of willow, thrusting them into the ground at its base, and tying them in two places, one a little above the ground, and the other within about a third part of the height, leaving them loose from this point upwards, so that they may be freely used in any direction. The rods may be three in number to each of the outside corner posts, and five to each of the others, all being placed so as to cover the inside of the posts, and give it the appearance of a bundle of rods. It will be easy now to form the skeleton of a thatched roof. For this purpose let a rod from each of two

Fig 34.

The Church of Notre-Dame, at Paris.

opposite posts be bent at its loose top, so that they may cross each other, which gives us the form of a pointed arch; and the same being done throughout the whole extent of the two opposite rows, a horizontal rod, or ridge-bar, being at the same time placed along the points of crossing, we have the appearance of

Fig. 35.

The Church of St. Etienne-du-Mont.

a Gothic arcade. Two rods from each post in the same row are now to be treated in like manner, so as to form similar arches in both rows, and these are also to be connected by ridge bars crossing the longitudinal one. Having now employed

two rods of each corner posts, and three of each intermediate one, there still remain one in the former, and two in the latter, which may be disposed of by causing them to pass diagonally from the corners of each rectangle, not crossing, as in the former cases, but applied side by side, so as to form a continued hoop or semicircle. In this manner all the rods are occupied, and a frame is produced capable of supporting thatch or other covering. From the imitation of a dwelling so constructed the three leading characters of Gothic architecture may be traced, namely, the pointed arch, the clustered column, and the branching roof. On principles similar to these the ingenious author endeavours to account for the peculiarities of the Gothic windows, doors, spires, &c. But it is much to be doubted whether any theory so simple and ingenious as the preceding will account for the origin of a style which emanated from the numerous and varied applications of the arch, whether semicircular or pointed, whether composed of segments of circles crossing each other, or of other curves corresponding to Hogarth's celebrated line of beauty, which was evidently traced by him in the ogee or cima (Cymation, Gr. *a small wave*) of the ancient Greek and Roman architecture, as well as in the Gothic. This curve is in the form of the letter S without its top and bottom appendages, thus ∽.

In the churches of the middle ages, there were to be seen, as indicated in the preceding theory, endless groups of small columns, immense domes, complicated buttresses, lofty roofs, with bell turrets, and other appurtenances. The finest examples in Europe of the Gothic, or ogival style of architecture, are the great cathedrals of Notre-Dame at Paris, Bourges, Amiens, Chartres, Rouen, and Rheims. This style, as we have observed, at first pure and simple, and formed of regular curves, became so distorted at the close of the short period of its existence, as to lose its very nature, and it then led to the invention of all the extravagant productions which arose from compound arches, which were only a degradation of the original style, and which soon caused its abandonment. It would be impossible to exhibit, in diagrams, the innumerable details of architecture and of sculpture which the beautiful edifices of the middle ages present, all characterised by the use of the pointed arch. We give, however, two specimens of the rich ornamentation which crowded the windows and capitals of the columns in the Gothic churches of the thirteenth and fifteenth centuries; see figs. 32 and 33. In the sixteenth century, the Greek and Roman arts and architecture returned, but only by such a gradual transition, that for a length of time, the pointed arch was employed in the construction of domes, and of some other important parts of the edifice, of which the churches of St. Eustache, and of St. Etienne-du-Mont, at Paris, are examples. In castles built at this period of the Renaissance, such as those of Ecouen and of Gaillon, the chapel was Gothic, whilst the rest was classical. The ancient architecture has extended its power over the civilised world, from the Renaissance period to the present day.

The severe study of the monuments of Greece and Italy in modern times, tends to preserve and extend the taste for the ancient orders of architecture, as being more durable in their effects, more easy in their construction, and more economical in their expenditure, than the Gothic style. The recent desire to restore the architectural monuments of the Gothic period, has led to an extraordinary study of its ancient examples, and has produced in some enthusiastic minds, a wish to substitute this style of architecture, for those which have regulated the splendid edifices of Europe for three centuries. Without attempting to depreciate a style which is considered particularly adapted to religious edifices, it is difficult to imagine that it will ever prevail over those orders of architecture which, by their strength and solidity, as well as massive elegance, far surpass their resuscitated rival.

In our first page, the reader will find a representation of one of the finest examples of the true Gothic style of architecture already mentioned, viz., the Church of Notre-Dame, at Paris; see fig. 34. This metropolitan church of the French capital is said to have been built on the ruins of a heathen temple, and to have been founded during the first ages of Christianity. Its reconstruction was begun by Maurice Sully, in 1163, and the first stone was laid by Pope Alexander III. Jean De Chilles, master of works, undertook the south front in 1257; the north front was constructed in 1312, by means raised by the knights-templar. Charles V., in 1447, gave considerable sums for the completion of this cathedral. The first stone of the great altar was laid in 1669, by Cardinal Noailles; and the choir, then begun from the designs of Mansard, was only finished in 1714. The celebrated bell of Notre-Dame, the largest in France, is placed in the south tower; it was founded in 1685, and set up by Louis XIV.

In the first page, is also given a representation of one of the finest examples of those churches which belong to the transition period, mentioned above, viz., the Church of St. Etienne-du-Mont; see fig 35. This church was known by the same name in 1221. It was reconstructed about 1517; but the aisle and the south chapel were built in 1588. The western parts were only finished under Charles IX. The communion chapel was built in 1606, and Margaret of Valois, first wife of Henry IV., laid the first stone of the front. These circumstances explain the mixture of the Gothic style with that of the Renaissance which is found in this church. It is the only church in Paris furnished with a gallery; and is decorated with very remarkable windows, the work of Pinagrier, a celebrated artist of the sixteenth century.

LESSONS IN FRENCH.—No. XXXIII.

By Professor Louis Fasquelle, LL.D.

Section LXXII.

use of the subjunctive.—continued.

1. A verb preceded by the conjunction *que* and one of the unipersonal verbs, il faut, *it is necessary*; il importe, *it matters, it is important*; il convient, *it is proper, becoming*; il vaut mieux, *it is better*; il plait, *it pleases, suits*; il se peut, il peut se faire, *it may be*; il est juste, *it is just*; il est bon, *it is proper*; il est nécessaire, *it is necessary*; il est important, *it is important*; il est temps, *it is time*; il est indispensable, *it is indispensable*; il est à propos, *it is proper*; il est fâcheux, *it is sad, it is a pity*; il est urgent, *it is urgent*, or by another verb or expression implying necessity, will, or propriety, must be put in the subjunctive [§ 127 (4)]:—

Il faut que vous restiez ici.	*You must remain here.*
Il est juste que vous soyez récompensé.	*It is just you be rewarded.*

2. The unipersonal verb, *il est*, governs the indicative present or the future, when it is used affirmatively, and followed by *que*, coming after one of the adjectives, sûr, *sure*; certain, *certain*; vrai, *true*; démontré, *proved*; incontestable, *incontestable*; évident, *evident*, and others having a positive and affirmative sense:—

Il est certain qu'il vient ou qu'il viendra.	*It is certain that he comes or will come.*

3. When, however, the verb, *il est*, used in the above connection is negative or interrogative, it is followed by the subjunctive:—

Il n'est nullement certain qu'il vienne.	*It is by no means certain that he will come.*

4. After certain conjunctions, afin que, *in order that*; quoique, *although*, &c. [*see full list*, § 143 (2)], the subjunctive is always used:—

Quoique vous fassiez, quoique vous disiez.	*Whatever you may do, whatever you may say.*

5. Other important rules on the government of conjunctions will be found in said § 143.

Résumé of Examples.

Que faut-il que votre sœur fasse?	*What must your sister do?*
Faut-il que je lui écrive?	*Must I write to him?*
Il est nécessaire que vous lui écriviez.	*It is necessary for you to write to him.*
Il est temps que vous lui donniez son argent.	*It is time that you should give him his money.*
N'est-il pas fâcheux qu'il soit arrivé si tard?	*Is it not a pity that he arrived so late?*
Il est certain qu'il est arrivé.	*It is certain that he is arrived.*
Il n'est point certain qu'il se soit blessé.	*It is not certain that he has hurt himself.*
Restez ici jusqu'à-ce qu'il arrive.	*Remain here until he comes.*
Pourvu que vous finissiez à temps.	*Provided that you finish in time.*

Exercise 143.

Affaire, f. *affair.*	Se lev-er, 1. ref. *to rise.*	Point, m. *point, degree.*
Ainsi, *thus.*	Linge, m. *linen.*	Pourvu que, *provided that.*
Créancier, m. *creditor.*	Manqu-er, 1. *to want.*	Régl-er, 1. *to regulate.*
Se couch-er, 1. ref. *to retire.*	Nécessaire, m. *necessaries.*	Satisfai-re, 4. ir. *to satisfy.*
Emprunt-er, 1. *to borrow.*	Ordre, m. *order.*	Tel, le, *such.*
Fourn-ir, 2. *to furnish.*	Oubli-er, 1. *to forget.*	

1. Que faut-il que je dise? 2. Il faut que vous disiez ce que vous avez entendu. 3. Ne faut-il pas que je finisse cette histoire? 4. Il n'est pas nécessaire que vous la finissiez. 5. N'est-il pas à propos que je satisfasse mes créanciers? 6. Il est à propos que vous le fassiez. 7. N'est-il pas juste que je vous paie ce que je vous ai emprunté? 8. Il est juste que vous me le payiez. 9. Se peut-il que votre frère ait oublié sa famille? 10. Il ne peut pas se faire qu'il l'ait oublié. 11. Est-il certain que votre frère se soit oublié à un tel point? 12. Il est certain qu'il s'est oublié. 13. Il est bien fâcheux qu'il se soit oublié ainsi. 14. Resterez-vous jusqu'à-ce-que j'aie mis ordre à mes affaires. 15. Je resterai jusqu'à-ce-que vous les ayez réglées. 16. Ne faudra-t-il pas que je fournisse des provisions à cette famille? 17. Il faudra que vous lui en fournissiez pourvu que vous en ayez. 18. Ne vaudra-t-il pas mieux que vous lui prêtiez de l'argent, que de la laisser manquer du nécessaire? 19. Il vaudra mieux que nous lui en prêtions. 20. Que faut-il que nous fassions? 21. Il faut que vous portiez ce linge chez moi. 22. N'est-il pas temps que je me couche? 23. Il est temps que vous vous couchiez. 24. Faut-il que je me lève? 25. Il faut que vous vous leviez.

Exercise 144.

1. What must our friend do? 2. He must remain at our house until I come. 3. What must our neighbour do? 4. He must put his affairs in order. 5. Is it not right that you should pay your creditors? 6. It is right that I should pay them. 7. Is it time for your little boy to go to school? 8. It is time for him to go to school, it is ten o'clock. 9. Must I write to your correspondent to-day or to-morrow? 10. You must write to him to-morrow morning. 11. Is it not a pity that your brother has torn his cap (*casquette*)? 12. It is a pity that he has torn it. 13. Is it necessary for your mother to finish her letter? 14. It is not necessary that she finish it. 15. Is it certain that your son has forgotten his money? 16. It is certain that he has forgotten it. 17. It is by no means certain that he has forgotten it. 18. Must you furnish money to that mechanic? 19. I must furnish him some, he has none. 20. Whatever you may do you will not succeed (*réussir*). 21. Whatever your brother may say, nobody will believe him (*croire*, ir.). 22. Must I write to you? 23. You must write to me. 24. Do you wish me to be sick? 25. I do not wish you to be sick. 26. Do you require me to tell you that? 27. It is necessary that you tell me all. 28. Do you wish me to go to your house? 29. I wish you to go there. 30. Must I get up? 31. You must rise immediately (*à l'instant*). 32. Must your brother retire? 33. He must go to bed immediately. 34. It is time for him to go to bed, it is twelve o'clock.

Section LXXIII.

Use of the Subjunctive.—Continued.

1. The verbs croire, *to believe*; dire, *to say*; espérer, *to hope*; gager and parier, *to bet*; penser, *to think*; sentir, *to feel*; voir, *to see*; and others expressing affirmation or something certain and positive, are (when they are conjugated affirmatively, and have *que* after them) followed by the indicative present or future [§ 127 (2) Note]:—

Je pense, je crois, je dis qu'il viendra.	*I think, I believe, I say that he will come.*

2. The above verbs, when used in the same connection and conjugated negatively or interrogatively, are followed by the subjunctive [§ 127 (2)]:—

Je ne crois pas qu'il vienne.	*I do not believe he will come.*

3. A verb, preceded by another verb and by a relative pronoun, is put in the subjunctive while there is an idea of uncertainty, and in the indicative when the idea is certain [§ 127 2) Note]:—

J'ai un homme qui me rendra service.	*I have a man who will oblige me.*
J'ai besoin d'un homme qui me rende service.	*I want a man who will (may) oblige me.*

4. A verb, preceded by a superlative, relative, or by the words, *le seul, le premier, le dernier*, is put in the subjunctive [§ 127]:—

Voilà le seul chapeau que j'aie.	*That is the only hat I have.*
Voilà le meilleur homme que je connaisse.	*There is the best man I know.*

Résumé of Examples.

Je crois que le concert a eu lieu.	*I believe that the concert took place.*
Je ne pense pas que notre ami vienne.	*I do not think that our friend will come.*
J'espère que vous apprendrez cela par cœur.	*I hope that you will learn that by heart.*
Je ne pense pas qu'il puisse apprendre tout cela par cœur.	*I do not think that he can learn all that by heart.*
Je crois que ce marchand s'enrichit aux dépens d'autrui.	*I believe that this merchant grows rich at the expense of others.*
Je ne crois pas qu'il s'enrichisse à vos dépens.	*I do not believe that he enriches himself at your expense.*
Je ne crois pas que vous réussissiez à gagner votre vie.	*I do not believe that you will succeed in earning your living.*
J'ai une carafe qui contient un litre.	*I have a decanter which holds a litre.*
Je cherche une carafe qui contienne un litre.	*I seek a decanter which holds a litre.*
Je vous prête le meilleur chapeau que j'aie, à condition que vous me le rendiez demain.	*I lend you the best hat I have, on condition that you will return it to me to-morrow.*

Exercise 145.

S'asse-oir, 3. ir. ref. *to sit down.*	Fort, *strong.*	Rentr-er, 1. *to come in again.*
Compt-er, 1. *to depend.*	Litre, m. *litre, about a quart.*	Sorte, f. *kind.*
Cristal, m. *crystal.*	Négociant, m. *merchant.*	Suffi-re, 4. ir. *to suffice.*
Debout, *standing.*	Parasol, m. *parasol.*	Tanneur, m. *tanner.*
Dur-er, 1. *to wear, last.*	Portier, m. *porter.*	Tard-er, 1. *to tarry.*

1. Pensez-vous que ce drap dure longtemps? 2. Je crois qu'il durera bien, car il est fort. 3. Croyez-vous que notre portier tarde à rentrer? 4. Je crois qu'il ne tardera pas. 5. Désirez-vous que nous restions debout? 6. Je désire au contraire, que vous vous asseyiez. 7. Croyez-vous que ces étudiants puissent apprendre cinq pages par cœur en deux heures? 8. Je crois que c'est impossible. 9. Espérez-vous que notre ami arrive de bonne heure? 10. J'espère qu'il arrivera bientôt. 11. Quelle sorte de carafe vous faut-il? 12. Il m'en faut une qui contienne un litre. 13. J'en ai une de cristal, qui contient deux litres. 14. Pensez-vous que ce négociant s'enrichisse à vos dépens? 15. Je sais qu'il s'enrichit aux dépens d'autrui. 16. Quel parasol pensez-vous me prêter? 17. Je pense vous prêter le meilleur que j'aie. 18. Le tanneur réussira-t-il à gagner sa vie? 19. Je ne crois pas qu'il y réussisse. 20. Pensez-vous que cet argent suffise à votre père? 21. Je crois qu'il lui suffira. 22. Croyez-vous que ces messieurs comptent sur moi? 23. Je sais qu'ils comptent sur vous. 24. Pensez-vous que le concert ait lieu aujourd'hui? 25. Je crois qu'il n'aura pas lieu.

Exercise 146.

1. Do you believe that the concert has taken place? 2. I believe that it has taken place. 3. Do you believe that your sister's dress will wear well? 4. I think that it will wear well, for the silk is very good. 5. Do you believe that our friend will succeed in earning a livelihood? 6. I believe he will succeed in it (*y*), for he is very diligent. 7. Do you think that the tanner grows rich at my expense? 8. I think that he enriches himself at the expense of others. 9. Does the merchant grow rich at my father's expense? 10. He grows rich at your expense. 11. What kind of a house must you have (*vous faut-il*)? 12. I must have a house which has ten rooms. 13. I have a good house which has twelve rooms. 14. What kind of a decanter do you seek? 15. I seek one which holds three litres. 16. I have one which holds two litres, I will lend it to you. 17. What coat will you send me? 18. I will send you the best I have, take care not to stain it. 19. Do you think that the student will learn all that by heart? 20. I do not think that he will learn it. 21. Do you believe (that) he will come? 22. I believe that he will come soon. 23. Do

you think that your father depends upon me? 24. I know that he depends upon you. 25. Does not that gentleman depend upon me? 26. I think that he depends upon your brother. 27. Will the porter soon come in again? 28. I hope that he will not tarry long. 29. Will you not lend me your umbrella? 30. I will lend it to you with pleasure. 31. Does my brother remain standing? 32. He does not wish to sit down. 33. Do you wish me to sit down? 34. I wish you to remain standing. 35. I wish that he may come.

Section LXXIV.

The Imperfect and Pluperfect of the Subjunctive.

1. The terminations of the imperfect of the subjunctive are in all the verbs, regular and irregular, of the four conjugations, *sse, sses, t, ssions, ssiez, ssent.*

2. The vowel preceding the *t* of the third person singular always takes the circumflex accent.

3. Conjugation of the Imperfect of the Subjunctive of the Regular Verbs.

Que je chant	-asse	fin	-isse	reç	-usse	rend	-isse
That I might sing		*might finish*		*might receive*		*might render*	
Que tu parl	-asses	chér	-isses	aperç	-usses	vend	-isses
That thou mightest speak		*mightest cherish*		*mightest perceive*		*mightest sell*	
Qu'il donn	-ât	fourn	-it	perç	-ût	tend	-it
That he might give		*might furnish*		*might gather*		*might tend*	
Que nous cherch	-assions	pun	-issions	conç	-ussions	entend	-issions
That we might seek		*might punish*		*might conceive*		*might hear*	
Que vous port	-assiez	sais	-issiez	d	-ussiez	perd	-issiez
That you might carry		*might seize*		*might owe*		*might lose*	
Qu'ils aim	-assent	un	-issent	deç	-ussent	mord	-issent
That they might love		*might unite*		*might deceive*		*might bite*	

4. This tense may be formed from the past definite [Sect. 50] by changing, for the first conjugation, the final *i* of the first person singular of the past definite into *sse, sses*, &c., and by adding *se, ses*, &c., to the same person in the other three conjugations. This rule has no exceptions.

J'allai, *j'allasse*; je finis, *je finisse*. *I went, I might go; I finished, I might finish.*

5. All the observations made Sect. 51, on the changes of the stem of the irregular verbs, in the past definite, apply equally to the imperfect of the subjunctive.

6. The pluperfect of the subjunctive is formed from the imperfect of the same mode of one of the auxiliaries *avoir, être*, and the past participle of the verb:—

Que j'eusse fini; que je fusse venu. *That I might have finished; that I might have come.*

7. All the rules given on the use of the subjunctive in the three preceding sections, apply, of course, to the imperfect and pluperfect of the mode.

8. In the same manner as the present or future of the indicative of the first part of a proposition governs, under the above-mentioned rules, the verb of the second part, in the present or past of the subjunctive; so the imperfect and other past tenses of the indicative, and the two conditionals, govern the verb in the second part of the proposition, in the imperfect or pluperfect of the subjunctive:—

Ne fallait-il pas que je lui parlasse? *Was it not necessary that I should speak to him?*

Il faudrait que je lui donnasse ce livre. *It would be necessary for me to give him that book.*

Résumé of Examples.

Voudriez-vous que je donnasse un coup de bâton à cet enfant?	*Would you wish me to give that child a blow with a stick?*
Je voudrais que vous tirassiez un coup de fusil sur cet oiseau	*I would wish you to fire your gun at that bird.*
Exigeriez-vous que nous revinssions de bonne heure?	*Would you require us to return early?*
Que voudriez-vous que ces hommes fissent?	*What would you wish those men to do?*
Que vouliez-vous que je fisse?	*What did you wish me to do?*
Il faudrait que j'eusse mon argent.	*It would be necessary for me to have my money.*
Je ne voulais pas que vous mourussiez de froid.	*I did not wish you to die with the cold.*
Elle craignait que vous ne mourussiez de misère et de faim.	*She feared lest you might die with want and hunger.*
Voudriez-vous que je jetasse un coup d'œil sur ces papiers?	*Would you wish me to cast a glance upon these papers?*

Exercise 147.

Bécasse, *f. woodcock.*	Ivrogne, *m. drunkard.*	Ressembl-er, *1. to resemble.*
Bord, *m. shore.*	Mer, *f. sea.*	Rétablissement, *m. recovery.*
Charg-er, *1. to load.*	Lièvre, *m. hare.*	Santé, *f. health*
Coup, *m. blow.*	Perdrix, *f. partridge.*	Tir-er, *1. to fire, shoot.*
Coup-de-fusil, *m. shot.*	Poste, *m. post.*	
Coup-d'œil, *m. glance.*	Se rend-re, *4. ref. to repair.*	
Demi-usé, *half-worn.*		
Fouet, *m. whip.*		

1. Voudriez-vous que j'achetasse un habit à demi-usé? 2. Je voudrais que vous en achetassiez un neuf. 3. Voulait-on que ce soldat malade se rendît à son poste? 4. On voulait qu'il se rendît à son régiment. 5. Faudrait-il que je demeurasse au bord de la mer? 6. Il faudrait pour le rétablissement de votre santé, que vous vous rendissiez en Suisse? 7. Ne pensez-vous pas que cet enfant ressemble à sa mère. 8. Je ne pense pas qu'il lui ressemble. 9. A qui ressemble-t-il? 10. Il ressemble à sa sœur aînée. 11. Consentiriez-vous que votre fille épousât cet ivrogne. 12. Voudriez-vous que nous mourussions de misère? 13. Je craignais que ces dames ne mourussent [§ 127 (8), Sect. 71, 9] de froid. 14. Ne voulez-vous pas tirer sur ce lièvre? 15. Je tirerais sur cette bécasse si mon fusil était chargé. 16. Combien de coups de fusil voudriez-vous que je tirasse? 17. Si vous aviez de la poudre, je voudrais que vous tirassiez sur cette perdrix. 18. Voulez-vous que je jette un coup d'œil sur cette lettre? 19. Je voudrais que vous la lussiez. 20. Que voudriez-vous que je fisse? 21. Je voudrais que vous fissiez attention à vos études. 22. Faudrait-il que je sortisse? 23. Il faudrait que vous restassiez à la maison. 24. Que voudriez-vous que je fisse à ce cheval? 25. Je voudrais que vous lui donnassiez des coups de fouet.

Exercise 148.

1. What would you have me do? 2. I would have you cast a glance upon this letter. 3. Would you wish me to give that dog blows with a stick? 4. I would wish you to give that horse blows with a whip. 5. Would you require us to return at five o'clock? 6. I would require you to return early. 7. Do you think that your brother resembles your father? 8. I do not think he resembles my father. 9. Whom do you think that he resembles? 10. I think he resembles my mother. 11. How many shots have you fired? 12. I have fired five shots at that woodcock. 13. Would you not have me fire at that partridge? 14. I would have you fire at that partridge, if your gun were loaded. 15. Where would it be necessary for me to dwell? 16. It would be necessary for you to dwell on the sea-shore. 17. Would you have me die with hunger? 18. I would not have you die of hunger. 19. Would you have your brother die with cold? 20. I would not have him die with cold or want. 21. What would you have your son do? 22. I would have him learn his lessons. 23. Would you have him learn German? 24. I would have him learn German and Spanish. 25. Have you fired at (*sur*) that hare? 26. I have not fired at that hare. 27. Would it be necessary for me to go out? 28. It would be necessary for you to go out. 29. Would it be necessary for me to remain here? 30. It would be necessary for you to go to church. 31. What did you wish? 32. I wished you to write to me. 33. Did you wish me to buy a coat half worn out? 34. I wished you to buy a good hat.

LESSONS IN LATIN.—No. XXXII.

By John R. Beard, D. D.

DEVIATIONS IN THE SECOND CONJUGATION.

5. Perfect in i; Supine in sum.

i. Prandeo, prandere, prandi, pransum, *I breakfast.*

ii. Sedeo, sedere, sedi, sessum, *I sit.*

In the same way, are formed the compounds of sedeo which have prefixes of two syllables; as, circumsedeo, circumsedere, circumsedi, circumsessum, *to sit round, enclose, besiege;* the compounds having prefixes of one syllable, change the *e* into *i*; e.g., assideo, assidere, assedi, assessum, *to sit with, or by.*

iii. Strideo, stridere, stridi (no supine), *to make a shrill or hissing sound.*

iv. Video, videre, vidi, visum, *I see;* videor, *I appear.*

The following take a reduplication in the perfect:—

v. Mordeo, mordere, momordi, morsum, *I bite.*
vi. Pendeo, pendere, pependi (supine uncertain), *I hang.*
vii. Spondeo, spondere, spopondi, sponsum, *I vow, become liable for.*
viii. Tondeo, tondere, totondi, tonsum, *I shear.*

The compounds of these reduplicated verbs follow their several primitives, but drop the reduplication; as, admordeo, admordi, admorsum, *to bite at;* praependeo, praependi, *to hang before;* respondeo, respondi, responsum, *to reply;* detondeo, detondi, detonsum, *to shear off.*

6. *Perfect in si; Supine in tum.*

i. Augeo, augere, auxi, auctum, *I increase* (E. R. *augment*).
ii. Indulgeo, indulgere, indulsi, (indultum, rare), *I yield to, indulge.*
iii. Lugeo, lugere, luxi (no supine), *I grieve.*
iv. Torqueo, torquere, torsi, tortum, *I twist, torture.*

VOCABULARY.

Extorquére, *to extort*; pervidére, *to see through, handle, investigate*; residére, *to remain behind*; locuplēto 1, *I enrich*; barba, ae, f. *a beard*; epistŏla, ae, f. *a letter*; lachrўma, ae, f. *a tear*; sica, ae, f. *a dagger*; sicarius, i, m. *an assassin*; collum, i, n. *a neck*; tonsor, ōris, m. *a barber*; tonstricula, ae, f. *a barber-girl*; probitas, ātis, f. (from probus, *good, kind*), *honesty, goodness*; occasus, ūs, m. *a going down, a downfall*; rabies, ei, f. *madness*; rabiosus, a, um, *mad, raging*; extĕrnus, a, um, *external, foreign*; ancillaris, e, (from ancilla, *a maid-servant*), *assisting, menial*; acutē, *sharply*; quoad, *as long as*; capillus, i, *the hair of the head*; ferreus, a, um, *made of iron, iron-hearted*; occupo 1, *I seize*; interrĭtus, ūs, m. *ruin.*

EXERCISES.—LATIN-ENGLISH.

Postquam prandero, ambulabo; nos eras in horto prandebimus; audistine nos eras in horto pransuros esse? quoad ulla spes in animo meo resĕdit, pro patriae libertate dimicavi; jam tres menses obsiderunt hostes nostram urbem; non sum ille ferreus qui (=ut ego) non movear horum omnium lachrўmis, a quibus me circumsessum videtis; multi putant se benĕficos in suos amicos visum iri, si locupletent eos quacunque ratione; cave ne prius de re aliquā judices quam eam diligenter pervidĕris; epistolae tuae valde me momorderunt; si quis a cane rabioso morsus est, rabies eum occupat; quoad tu locutus es, puer ab ore tuo pependit; spopondistine pro amico? spopondi; multa a Laelio et in senatu et in foro vel provisa prudenter, vel acute responsa sunt; Cicero narravit Dionysium ne tonsori collum committeret, tondere filias suas docuisse; ita sordido ancillarique officio regias virgines ut tonstriculas totondisse barbam et capillum patris; tanta vis probitatis est ut, eam vel in iis quos nunquam vidĭmus, vel quod majus est, in hoste etiam diligamus; Callisthĕnem Alexander non tantum necavit, sed etiam torsit; Romanae reipublicae magnitudo atque amplitudo bellis cum exteris gentibus ac nationibus gestis mirum in modum aucta est; sicario sica de manibus est extorta; quo magis indulseris dolori, eo intolerabilior erit; occāsum atque interrĭtum reipublicae Romanae optimi quique maxime luxerunt.

ENGLISH-LATIN.

I have dined; my friends have dined; after my friends have (shall have) dined, they will take a walk; hast thou heard that I am about to dine in the garden? I heard that thou hadst been shaved by a barber-girl; it is not true, the barber shaved me; give me that dagger; take (extorqueo) the dagger from the hands of the assassin; the mother and the father will bewail the ruin of the young man; I have taken the dagger from the hands of the slave; what dost thou see? I see a city besieged; our country has been much increased by wisdom and industry; wisdom and industry are preferable (potior) to (than, abl.) war.

In the word tonsor, *a barber*, we have an instance of the way in which language conveys to posterity a knowledge of customs and manners. Tonsor is properly a *shearer*, from tondeo, *I shear*. The term shows, that among the Romans, clipping the beard prevailed. The Romans, like the Greeks, in the early periods of their history, were too proud of their beards, as a sign of manliness, to think of in any way parting with them; and the love of self-decoration then displayed itself in due trimming and dressing the beard. In time, effeminacy led to the shaving of the beard. Besides being clipped, the chin was also shaven, and the hair was plucked out, so as to promote what was considered a becoming appearance. Thus, three methods of hair-dressing prevailed, clipping (cutting), plucking out, and shaving. Tonsor has a feminine noun, tonstrix, and in the exercise we find tonstricula. Hence we learn that hair-dressing was not confined to men; female hands also took gentlemen by the nose.

7. *Perfect in si; Supine in sum.*

i. Mulceo, mulcere, mulsi, mulsum, *I soothe.*
ii. Mulgeo, mulgere, mulsi, mulsum, *I milk.*
iii. Tergeo, tergere, tersi, tersum, *I rub.*
iv. Ardeo, ardere, arsi, arsum, *I burn.*
v. Rideo, ridere, risi, risum, *I laugh.*
vi. Suadeo, saudere, sausi, suasum, *I advise.*
vii. Maneo, manere, mansi, mansum, *I remain.*
viii. Jubeo, jubere, jussi, jussum, *I command.*
xi. Haereo, haerere, haesi, haesum, *I stick.*

The ensuing are without Supines.

x. Algeo, algere, alsi, *I am cold.*
xi. Fulgeo, fulgere, fulsi, *I shine forth, lighten.*
xii. Turgeo, turgere, tursi, *I swell.*
xiii. Urgeo, urgere, ursi, *I press.*
xiv. Frigeo, frigere (frixi, rare), *I am stiff with cold.*
xv. Luceo, lucere, luxi (lucsi), *I shine.*

8. *Perfect in the passive form (semi-deponents); no Supine.*

i. Audeo, audere, ausus sum, *I dare venture.*
ii. Gaudeo, gaudere, gavisus sum, *I rejoice.*
iii. Soleo, solere, solĭtus sum, *I am accustomed.*

VOCABULARY.

Abstergere, *to wipe away, remove*; detergere, *to wipe down*; affulgére, *to shine upon*; deridére, *to laugh down, or at*; dissuadére, *to dissuade*; elucére, *to shine forth*; permulcére, *to soothe greatly*; remanére, *to remain*; oblectare, *to delight*; convīvor, *I eat in common*; latco, ui 2, *I lie hid* (E. R. *latent*); petpetior, perpĕti, perpessus sum, *I suffer greatly*; scintilla, ae, f. *a spark*; exsilium, i, *exile, banishment*; Carthaginensis, is, m. *a Carthaginian*; Napoleo, ōnis, m. *Napoleon*; caducus, a, um, *falling, frail*; confectio, ōnis, *a making, preparation*; mirificē, *wonderfully*; optari, *to wish for*; comitas, ātis, f. *politeness.*

EXERCISES.—LATIN-ENGLISH.

Dux mitibus verbis excitos militum animos permulsit; legendis Virgilii carminibus animus meus mirifice oblecta us et permulsus est; ita jucunda mihi hujus libri confectio fuit, ut omnes absterserit senectutis molestias; non prius ad te veniam quam luctum omnem meum abstersero; detersane jam est tabula? quadraginta millia librorum Alexandrĭae (at Alexandria) arsērunt; non dubito quin brevi tota Germania bello arsura sit; quis est cui semper arriserit fortuna; nescio cur a te derisus sim; sic mihi persuasi, sic sentio, non esse animos nostros mortales; quis credat cives pacem dissuasuros esse? quis confidit semper sibi illud stabile et firmum permansurum esse, quod fragile et caducum sit? Romanorum gloria usque ad nostram memoriam remansit; Lycurgus convivari omnes cives jussit; non qui jussus aliquid facit, miser est, sed qui invitus facit; persuasum mihi est memoriam hujus atrocissimi belli non modo in hoc populo, sed etiam in omnium gentium sermonibus semper haesuram esse; superātis hostibus, nova spes salutis civitati affulsit; militēs in itinĕribus multos labores perpessi sunt; audaverunt et alserunt; pater litteris me ursit, ut primo quoque tempore litteras ad se darem; quomŏdo in viro latebit scintilla ingenii, quae jam in puero eluxit? tu me tantis beneficiis auxisti, quanta nunquam ausus sum optare; de amici tui comitate valde gavisus sum; Athenis (*at Athens*) optimo cuique accidere solitum est, ut in exsĭlium pelleretur.

ENGLISH-LATIN.

I am accustomed to rejoice at the prosperity of my friends; they have rejoiced; they will rejoice; my sisters have rejoiced; fortune smiles on brave men; dost thou think that fortune will smile on the brave? I deny that fortune always smiles on the brave; he laughs at the philosopher; why is the philosopher derided by a boy? there is no doubt that philosophers have been derided by very foolish persons; orators wish to soothe the excited minds of the citizens; I am persuaded that orators ought to soothe the excited minds of men; in the reign of Napoleon (Napoleon reigning abl. abs.) all Europe burned with war; who knows whether fortune will ever smile on himself? I have not dissuaded peace, and am confident thou wilt not dissuade peace; good men advise good things; they have dared to advise war; I have rejoiced that thou hast ventured to speak; the wisdom of Cicero shone forth in his orations; what beauty of words shine forth in Horace! the seeds of war remain; how long will the seeds of evil remain in the world? I do not know how long my friends will remain in the city; my brother has urged me to send you a letter; my father commanded me to cleave to himself.

HOEDUS ET LUPUS.

Aesopi Fabula.

1 2 3 4 5 7 8 6 1
Hoedus stans in tecto domûs lupo praetereunti maledixit. Cui

2 4 5 3 6 7 9 8 1 2
lupus, "non tu," inquit, "sed tectum mihi maledixit." Saepe locus
3 4 6 7 8 5
et tempus timidos homines audaces reddit.

VOCABULARY.

Hoedus, i, m. *a kid*; lupus, i, m. *a wolf*; praetereo, *I pass by*; maledico 3, *I curse*; inquit, *said*; tectum, i, *a roof*; in tecto, *under the cover or protection*. Maledicère requires its object to be in the dative case.

GRUS ET PAVO.

Aesopi Fabula.

1 5 6 4 3 2 8 9 7
Pavo coram grue pennas suas explicans, "quanta est," inquit,
11 10 12 13 14 1 2 3 5
"formositas mea, et tua deformitas!" At grus evolans, "et
6 7 4 9 8 10 11 12 3 1
quanta est," inquit, "levitas mea et tua tarditas!" Monet haec
2 4 5 6 7 8 11 9 10 13
fabula, ne ob aliquod bonum quod nobis natura tribuit, alios con-
12 14 15 17 18 19 20 16.
temnamus, quibus natura alia et fortasse majora dedit.

VOCABULARY.

Pavo, ónis, m. *a peacock*; grus, gruis, c. *a crane*; formositas, átis, f. *beauty*; deformitas, átis, *f. ugliness*; levitas, átis, *f. lightness, fleetness*; tarditas, átis, *f. slowness*. Quibus refers to alios, or has alios for its antecedent.

LESSONS IN GERMAN.—No. XXIII.

SECTION XLIII.

Sometimes, as in English, a clause or sentence is made to supply the place of an *adjective*; as, Die nie zu vergessende Schlacht bei Leipzig; the never-to-be-forgotten battle by (at) Leipsic. Der immer zu bewundernde Muth Luther's; the ever-to-be-admired courage of Luther. (§ 150).

I. „Anstatt," like the corresponding English word "*instead*," is compounded of a preposition and a noun, which components, may be separated. Ex.: Anstatt seines Vaters; *instead* of his father; or an seines Vaters Statt; in his father's *stead*.

II. The *infinitive* preceded by anstatt, is, in German, used where we use the *present participle* preceded by "*instead of*" Ex.: Er spielt, anstatt zu arbeiten; he plays "instead of" *working*. When preceded by the preposition ohne, it is to be rendered by a participle governed by the corresponding preposition "*without*." Ex.: Er ist krank ohne es zu wissen; he is sick, *without knowing* it. Er ist hier gewesen, ohne uns zu besuchen; he has been here, *without visiting* us. The infinitive is also often used where we employ the *present participle* preceded by *from*. Ex.: Er hindert mich zu schlafen; he prevents me *from sleeping*.

III. The infinitive is also used *substantively* (without zu) (§ 146. 1. *a.*) Ex.: Befehlen ist leicht, Gehorchen, schwer; *to command* is easy; *to obey*, difficult. It is often preceded by the *article*. Ex.: Ich liebe das Schreiben, aber nicht das Zeichnen; I like writing, but not drawing.

IV. After gehen, bleiben, (§ 146, 1. e) &c., the *infinitive* often answers to our *present participle*. Ex.: Er bleibt sitzen; he remained *sitting* (literally, he *continued to sit*). Er bleibt stehen; he remains *standing*. Er ist fischen gegangen; he has gone *a fishing*. In a sentence which is employed as the subject of a verb, the *infinitive* frequently rejects the preposition zu (§ 146.). Ex.: Den Feind vertheidigen ist edel; or, den Feind zu vertheidigen ist edel; to defend an (the) enemy is noble. Zu is generally omitted before such verbs as lehren, to teach; lernen (§ 146. *c.*) to learn, &c. Ex.: Ich lehre ihn schreiben; I teach him to write. Er lernt sprechen; he learns to speak.

V. The past participle, in German, is sometimes used where we use the *present*. Ex.: Dort kommt ein Mann in voller Hast gelaufen; (§ 149. 2. *b.*); yonder comes a man *running* at full speed, (in full haste.)

EXERCISE 46.

Anstatt', instead of;
Benütz'en, to use, make use of;
Bett, *n.* bed;
Beugen, to depress;
Brav, brave, gallant;
Dage'gen, on the contrary;
Denken' to think;
Deste, (Sect. 31. VI.)
Entehr'en, to dishonour;
Erhö'hen, to heighten;
Gele'genheit, *f.* occasion, way;
Gerecht', just;
Glocke, *f.* bell;
Gütig, good;
Hassen, to hate;
Heulen, to howl;
Höflich, polite, courteous;
Kano'ne, *f.* cannon;
Kiste, *f.* chest;
Malen, to paint;
Mannschaft, *f.* crew, forces;
Nahrung, *f.* nourishment;
Polen, *n.* Poland;
Schlachtlied, *n.* war-song;
Schrecklich, frightful, terrific;
Singen, to sing;
Stelle, *f.* place;
Un'angenehm, disagreable;
Vertheidigen, to defend;
Vertre'ten, to take the place of;
Verlo'ren, lost;
Verzweif'lungsvoll, full of despair;
Vor'ziehen, to prefer;
Welle, *f.* wave;
Widerstehen, to resist, withstand;
Wild, wild;
Wurzel, *f.* root;
Zeichnen, to draw;
Zusammen, together.

Das Schreiben und Lesen ziehe ich allen andern Beschäftigungen vor.	I prefer writing and reading to all other employments.
Anstatt' des Weines, trinkt er Wasser.	Instead of wine, he drinks water.
Anstatt zu schreiben, liest er.	Instead of writing, he reads.
Er spricht, ohne zu denken.	He speaks without thinking.
Zwischen Sagen und Thun ist ein großer Un'terschied.	Between saying and doing there is a great difference.
Zwischen dem Hin'gehen und Wie'derkommen verfloß eine Stunde.	Between departing and returning an hour elapsed.
Während seiner Krankheit habe ich die Stelle eines Wächters vertre'ten.	During his sickness I took the place of a watcher.
Seine Weise zu handeln gefällt mir nicht.	His mode of dealing does not please me.
Schweigen ist vernünf'tiger, als unvernünftig reden.	To be silent is more reasonable than unreasonable speaking (to speak unreasonably).

1. Anstatt eines Stockes vertheidigte er sich mit einem Regenschirme. 2. Anstatt mit Freunden zu gehen, war er immer in Gesellschaft fremder Leute. 3. In der Stube hatte man, anstatt des Bettes, eine große Kiste. 4. In Deutschland ist man gegen Fremde sehr höflich. 5. Die Wurzeln des Waldes waren seine einzige Nahrung. 6. Das Wasser hat bei dieser Gelegenheit die Stelle des Weines vertreten. 7. Ein Schüler hat die Stelle des Lehrers vertreten. 8. Anstatt der Federn benützte man Bleistifte. 9. Das Reisen macht mir sehr viel Vergnügen. 10. Meine Kinder haben das Schreiben und Lesen von mir gelernt. 11. Wir wollen gehen; dies lange Warten ist mir unangenehm. 12. Man zieht gewöhnlich das Sitzen dem Stehen vor. 13. Er hat das Arbeiten in seiner Jugend gelernt. 14. Wir haben zusammen das Schreiben gelernt. 15. Ich hasse das Schreiben, dagegen liebe ich desto mehr das Malen. 16. Er versteht das Zeichnen besser als das Malen. 17. Wir hörten das Stürmen der Glocken und das Donnern der Kanonen. 18. Das Heulen des Sturmes und das wilde Toben der Wellen erhöhte noch den Muth des tapfern Kapitäns und seiner Mannschaft, anstatt ihn zu beugen. 19. Gott mehr gütig als gerecht denken, ist eben so viel, als Gott entehren. Gellert. 20. Dies nicht zu entschuldigende Betragen des Schülers kränkte den Lehrer.

1. The never-to-be-penetrated almightiness of God. 2. I am here instead of my brother. 3. The opposition of the Poles was full of despair: terrific was the singing of their war-song: "Not yet is Poland lost." 4. The reading of instructive books enlarges the understanding. 5. To assist the poor is a Christian duty. 6. The changing of times and seasons, and the removing and setting up of kings, belong to Providence alone. 7. He defends his friend without knowing the motive. 8. The danger heightened the courage of the soldiers, instead of depressing it. 9. The student learns drawing and painting from his teacher. 10. This mode of life does not agree with me.

SECTION XLIII.

SUBJUNCTIVE MOOD.

The subjunctive mood is employed to indicate a probability, with repect to which there exists or may be supposed to exist a greater or less degree of doubt. Ex.: Er meinte, sein Freund sei krank; he thought his friend may be sick (i. e. that his friend was probably sick) Er fragt mich, wer ich sei; he asked me who

* For conjugation of haben and sein in the subjunctive, see § 72. 1. 2.

I was (who I might be.) Man ſagt, daß er ein großes Vermögen habe; it is said, that he has a great fortune. For further information on the subjunctive, See §. 143.

The subjunctive in German, is often translated by the English indicative. Ex.:

Man ſagt, er ſei reich.	They say he is very rich
Er meint, es ſei beſſer hier zu bleiben.	He thinks, it is better to stay here.
Sie ſagten mir, er wäre mein Freund.	You told me, he was my friend.
Ich meinte, es wäre ein Spaß.	I thought, it was a jest.
Man glaubte, er wäre auf dem Berge.	It was thought, he was on the mountain.
Er ſagt, der Kaiſer habe ihn begnadigt.	He says the emperor has pardoned him
Man glaubt, er ſei gefallen.	It is thought he has fallen.
Sie glaubten, ich ſei krank geweſen.	They thought I had been sick.
Man glaubte, ich wäre nie da geweſen.	It was thought I had never been there.
Er glaubt, er werde nie wieder glücklich ſein.	He believes he shall never be happy again.
Man ſagt, ſie werde bald die Oberhand haben.	It is said, she will soon have the ascendency.

Exercise 47.

Allgemein', universal, universally;	Geſchich'te, *f.* history;	Rufen, to call;
Barba'riſch, barbarously;	Grenze, *f.* frontier;	Tod, *m.* death;
Behaup'ten, to assert, allege;	Herbei'führen, to produce, bring on;	Ueberſchrei'ten, to cross, pass over;
Drei'ßigjährig, of thirty years;	Langſam, slow, slowly;	Ungarn, *n.* Hungary;
Ein'gedenk, mindful;	Melden, to mention, state;	Verfah'ren, to act, proceed;
Erobern, to conquer;	Ner'venfieber, *n.* nervous fever;	Verſtel'lung, *f.* dissimulation;
Erzäh'len, to tell, narrate;	Ober, upper;	Verwandt', related;
Fallen, to fall;	Rom, *m.* Rome;	Zwar, indeed, it is true.

Er behaup'tet, daß es war ſei.	He asserts, that it is true.
Ich will, daß Du ſpar'ſamer ſeieſt.	I will, that thou be more frugal.
Es ſcheint mir, daß er traurig ſei.	It appears to me, that he is sorrowful.
Man glaubt, daß wir reich ſeien.	It is supposed, that we are rich.
Obgleich' ihr Fremde ſeid, ſo ſeid ihr doch willkom'men	Although you are strangers, you are nevertheless welcome.
Es ſcheint mir, daß ſie Amerika'ner ſeien.	It appears to me, that they are Americans.
Es ſieht aus, als ob er nicht geſund' wäre.	He appears as though he were not healthy.
Ich glaube, daß er krank gewe'ſen iſt.	I think, that he has been sick.
Man ſagt, daß er ſchon hier gewe'ſen wäre.	They say, that he has already been here.
Ich hoffe, daß du glücklich gewe'ſen ſein werdeſt.	I hope, that you will be fortunate.
Er ſagte mir, daß du das Buch des Lehrers habeſt.	He told me, you have the teacher's book.
Ich zweifle, daß der Jäger die Flinte habe.	I doubt, that the hunter has the gun.
Man vermuthet, daß ihr viel Geld habet.	It is supposed, that you have much money.
Man weiß, daß ſie Freude an dieſer Sache haben.	It is known, that they have pleasure in this affair.
Ich hörte, daß er ein großes Vermö'gen hätte.	I heard, that he had a large fortune.
Der Onkel erzählte, daß er eine an'genehme Reiſe gehabt' habe.	The uncle said (narrated) he has had a pleasant journey.

1. Haben Sie auch gehört, ich ſei vom Pferde gefallen? 2. Nein, ich hörte, Sie ſeien aus dem Wagen gefallen. 3. Die Geſchichte meldet, daß Tilly, welcher Magdeburg im dreißigjährigen Kriege eroberte, ſehr barbariſch verfahren ſei. 4. Mein Bruder ſagte, Sie ſeien ſehr gelobt worden. 5. Die Franzoſen behaupten, ſie ſeien die Gebildeſten in der Welt. 6. Ihre Schweſter glaubte, Sie wären in der Stadt geweſen. 7. Die Engländer ſind der Meinung, ſie ſeien die Herren des Meeres. 8. Dieſer Reiſende erzählte, er ſei zweimal in Rom geweſen. 9. Er hofft, er werde in acht Tagen in Dresden ſein. 10. Sie fürchten, ſie ſeien zu langſam im Handeln geweſen. 11. Wir glaubten, Sie ſeien auf dem Lande. 12. Ich glaube, wir wären geſtern zu Euch gekommen, wenn das Wetter ſchöner geweſen wäre. 13. Ich glaubte, er wäre der warnenden Stimme ſeiner Eltern eingedenk geweſen. 14. Er ſagte zwar, er ſei krank, aber Viele behaupten, es ſei Verſtellung von ihm geweſen. 15. Seine Verwandten ſagen, ſein Glück habe ſein Unglück herbeigeführt. 16. Ich hörte mit Bedauern, Sie hätten das Nervenfieber gehabt. 17. In dem obern Zimmer ſeiend, hörte ich Sie nicht rufen. 18. Man erzählt, der Ungar habe bis in den Tod ſein Vaterland treu vertheidiget. 19. Ich hörte, dieſer junge Franzoſe werde ein großes Glück haben. 20. Ich glaube, daß viele Menſchen hier auf Erden ihr Gutes gehabt haben werden

1. People say these gentlemen have been tipsy, but they are mistaken. 2. They say, that residence in Paris is more agreeable than in London. 3. We could not believe that this was true. 4. It is universally believed, that the enemy has crossed the frontier. 5. He asserted, that it was better to stay at home then to go out. 6. I wish that he may be treated with more kindness 7. He tells every one that you are a very rich man; but if you were, you would not be so penurious. 8. Have you heard too, that your friend has fallen from his horse? 9. No, but I have heard that he has fallen out of the coach. 10. I hope, that you will be with your parents in a fortnight. 11. I doubt, that he can be so ungrateful. 12. This stranger says, that he has been twice to India, and was very sick on his last voyage.

LESSONS IN PENMANSHIP.—No. V.

The Lesson for this week contains the following copies:—Text: *Manchester, Nottingham, Okehampton, Pernambuco.* Half-text: *Money commands numerous enjoyments; Nature seldom changes her arrangement; Opinion most commonly guides mankind; Pursue learning with full determination.* Court-hand: *Modesty most commonly charms more than beauty; No monument is at all comparable to virtuous actions; Opportunity neglected commonly brings repentance; Punishment is commonly the companion of guiltiness.*

The learner is particularly requested to attend to the fact that all up-strokes are hair-strokes, or the *finest* that can be made by the pen; and all down-strokes are black-strokes, or the *boldest* that can be made by the pen, according to the breadth prescribed by the copies for each hand. The *finer* that the hair-strokes are, the better; and the nearer the black-strokes are to the breadth and the smoothness of those in the copies, the better.

Our students who can write small or running hand, and who are trying to improve it by imitating the court-hand may write one or other of the following short pieces as nicely as possible by way of specimen.

Experience.

Young man attend, nor stubbornly despise
The kind instructions of the old and wise;
For age, though scorn'd, a ripe experience bears,
That golden fruit unknown to blooming years.

Wisdom.

The wisdom that comes from above
Is peaceful, pure, gentle, and meek;
And all who true wisdom do love
These tempers will constantly seek.

Beauty.

What is the blooming tincture of the skin,
To peace of mind, and harmony within?
What the bright sparkling of the finest eye,
To the soft soothing of a calm reply?
Those, those at first, th' unwary heart may gain
But these, these only, can the heart retain.

Thought.

How fleet is a glance of the mind
Compar'd with the speed of its flight,
The tempest itself lags behind,
And the swift-winged arrows of light.

Manchester

Money commands numerous enjoyments.

Modesty most commonly charms more than beauty.

Nottingham

Nature seldom changes her arrangement.

No monument is at all comparable to virtuous actions.

Okehampton

Opinion most commonly guides mankind

Opportunity neglected commonly brings repentance.

Pernambuco

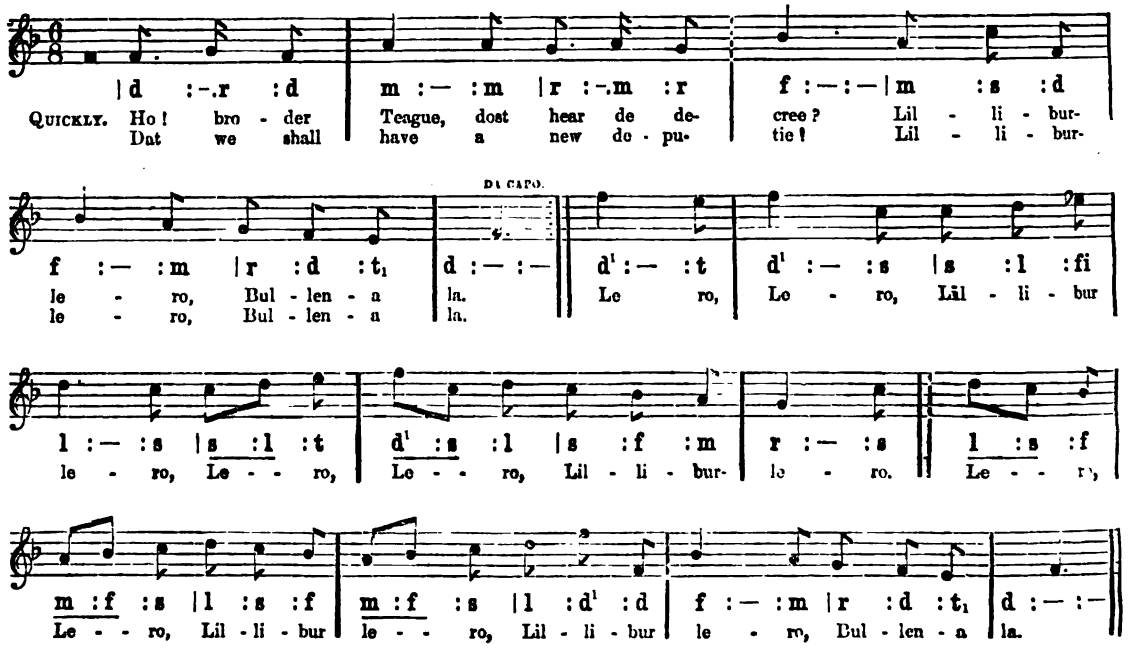
Pursue learning with full determination.

Punishment is commonly the companion of guiltiness.

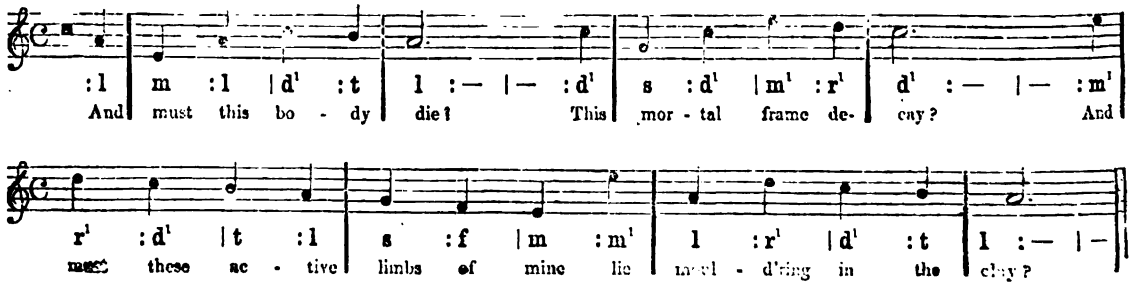
LESSONS IN MUSIC.—No. XII.

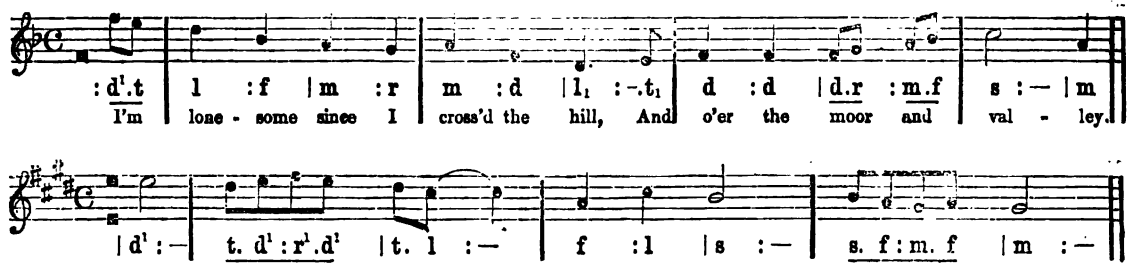
By John Curwen.

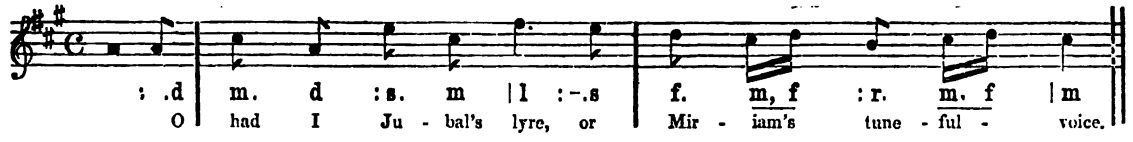
1. In the Last lesson we requested our pupils to study, in the examples given, the proper mental effect of the note FAH. But our attention was specially called to its effect in *slow* music. Let us now take one example of the remarkable manner in which this effect is modified by quickened movement and a lively rhythm. The following is an old song-tune, which was composed by the great Henry Purcell. Meant at first, as it would seem, for the nursery rhyme of "Old Woman, whither so High," it was put to a peculiar use by Lord Wharton in the memorable year A.D. 1688. Wishing to throw ridicule on an unpopular Lord-lieutenant of Ireland, whom King James the Second had just appointed, he composed a doggrel ballad, which by the charm of the music conquered the hearts of the King's own army. Bishop Burnet says:—"A foolish ballad was made about that time, which had a burden said to be Irish words—'Lero, Lero, Lilliburlero'—that made an impression on the king's army that cannot be imagined by those who saw it not. The whole army, and at last, the people both in city and country, were singing it perpetually; and perhaps never had so slight a thing so great an effect." "Lord Wharton," says Mr. W. Chappell, in his valuable 'Collection of National English Airs,' "boasted publicly of having rhymed King James out of his dominions. But he might, with far greater justice, have given the credit to Purcell, without whose irresistibly fascinating tune his lordship's rhymes would, in all probability, have fallen as harmless as his enemies could have wished." But *where lies* the power of ridicule in this tune,—thus so remarkably proved. Undoubtedly the elegant melody, with its various rhythm, forms the magic spell which detains the ear; but the poison of the bowl, the sting of the ridicule, the mockery of the laugh, is in that note FAH—the fourth of the scale—so persistently recurring on the marked accents of the measure,—ever and anon showing itself with cold sarcastic curling lip out of the midst of "wreathed smiles." Every one who sings the song must feel that FAH is the note on which his feelings of *contempt* would find expression, if he can suppose his heart to be filled with the old animosity against "the new Deputie." In a former Lesson, we noticed how the note ME is used to express contempt. But that was the contempt of *pride*, that despises and passes by. This is the contempt that looks long enough at its object to loathe it. Let our pupils, however judge of all these matters for themselves by actual experiment. Let our own opinions be doubted, discussed, even rejected,—anything so that our pupils only observe and think for themselves.


| d :-.r :d | m :— :m | r :-.m :r | f :—:— | m :s :d
QUICKLY. Ho! bro - der Teague, dost hear de de- cree? Lil - li - bur-
Dat we shall have a new de - pu- tie! Lil - li - bur-
D.C.
f :— :m | r :d :t1 | d :— :— | d1 :— :t | d1 :— :s | s :l :fi
le - ro, Bul - len - a la. Le ro, Le - ro, Lil - li - bur
le - ro, Bul - len - a la.
l :— :s | s :l :t | d1 :s :l | s :f :m | r :— :s | l :s :f
le - ro, Le - - ro, Le - - ro, Lil - li - bur- le - ro. Le - - ro,
m :f :s | l :s :f | m :f :s | l :d1 :d | f :— :m | r :d :t1 | d :— :—
Le - - ro, Lil - li - bur le - - ro, Lil - li - bur le - ro, Bul - len - a la.

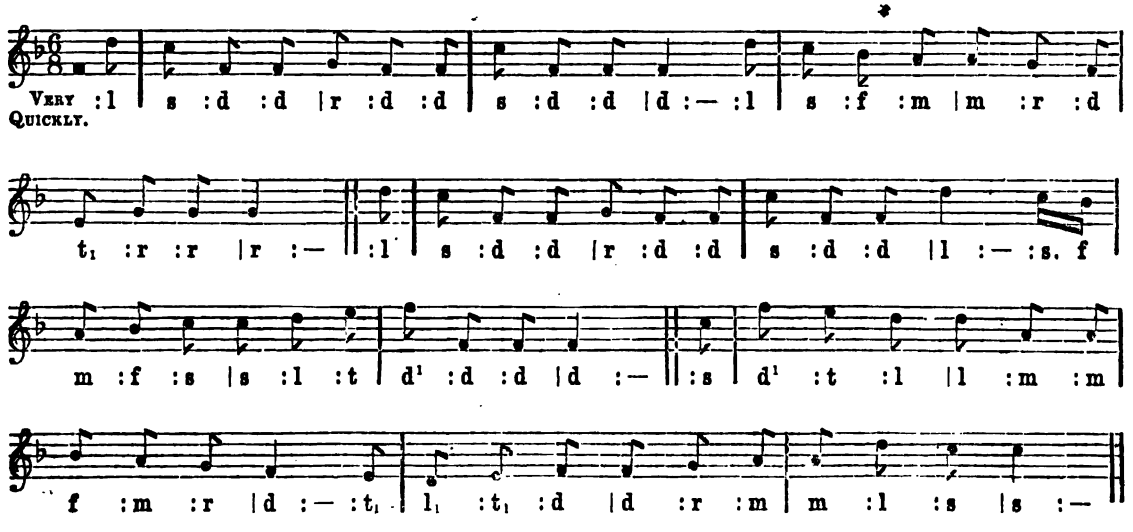
2. In turning to the study of LAH, the sixth of the scale, we would request our pupils to sing the following tune,—the chief characteristic of which is, that it begins with LAH, ends with LAH, and introduces LAH frequently with effect,—and describe to themselves its effect on the mind.


:l | m :l | d1 :t | l :— |— :d1 | s :d1 | m1 :r1 | d1 :— |— :m1
And must this bo - dy die? This mor - tal frame de- cay? And
r1 :d1 | t :l | s :f | m :m1 | l :r1 | d1 :t | l :— |—
must these ac - tive limbs of mine lie moul - d'ring in the clay?

Next, let our pupils mark the effect of LAH in the following phrases from well known sorrowful love ditties,—"I'm lonesome since I crossed the hill," and "Love not."

To illustrate that peculiar abandonment of gaiety which LAH is capable of expressing when sung quickly, sing the last example as quickly as you can, or sing in lively manner the following phrase of Handel to the words, "O had I Jubal's lyre, or Miriam's tuneful voice."



Yet further to illustrate the modification of effect by change in the rate of movement,—sing this last phrase, *very slowly, indeed*, to the words, "And must this body die, This mortal frame decay?" The following phrases of Mr. Lover's song, "Rory O'More," makes use of LAH with that gay and elegant effect which belongs to it when sung quickly. Sing it as quickly and spiritedly as you can.



3. When the pupil has, by help of these examples and others which he may find, learnt to recognise the proper mental effect of FAH and LAH, he will proceed to the exercises which follow, learning to point them on the modulator from memory, and to sing them both to the syllables and to the words. If another person is able to accompany him by singing the second part, they should take notice of the consonance or sounding-together of the notes. In addition to the observations on the consonances of DOH, ME, SOH in a former Lesson, let the following remarks be examined and tested.

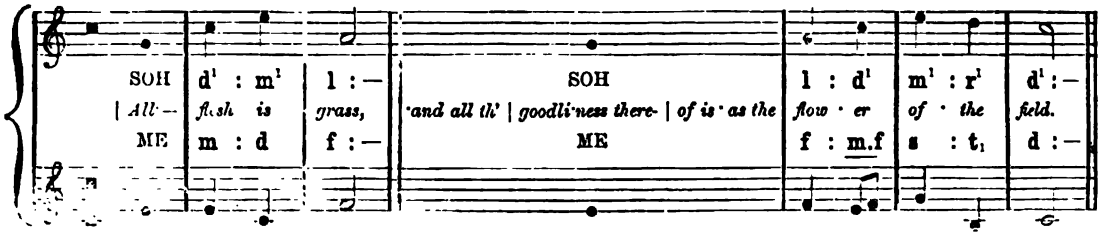
FAH forms a more "perfect" consonance with the key-note than LAH. (It is more *like* it, and has a greater number of coinciding vibrations.) But the consonance of LAH with the key-note is more soft and pleasing.

The best consonances with FAH are RAY and LAH. The best notes to sound with LAH are FAH and DOH¹.

It may be noticed that when the notes of a consonance are in their *closest* position, as DOH with LAH, or LAH with FAH, the proper mental effect of each is sweetly *blended* with that of the other; but when, by raising or lowering one of them an octave, they are more distant, as DOH with LAH, or LAH¹ with FAH, each produces its own effect with greater distinctness, though still with good agreement.

Two persons can easily try these experiments by singing the chord DOH, ME, SOH together, and then "striking out" each into the separate note previously agreed on. There could be no better preparation for the study of harmony.

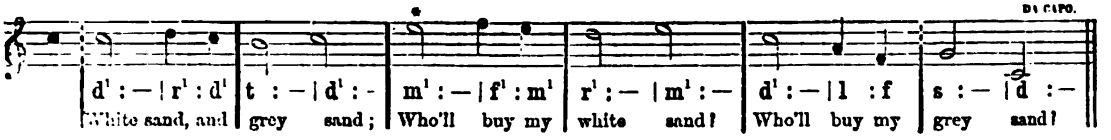
EXERCISE 22. **THE NORWICH CHANT.** KEY C. M. 66.



The | grass· withereth th' || flow·er | fadeth
BUT THE | WORD OF· OUR || GOD · SHALL | STAND · FOR | EVER

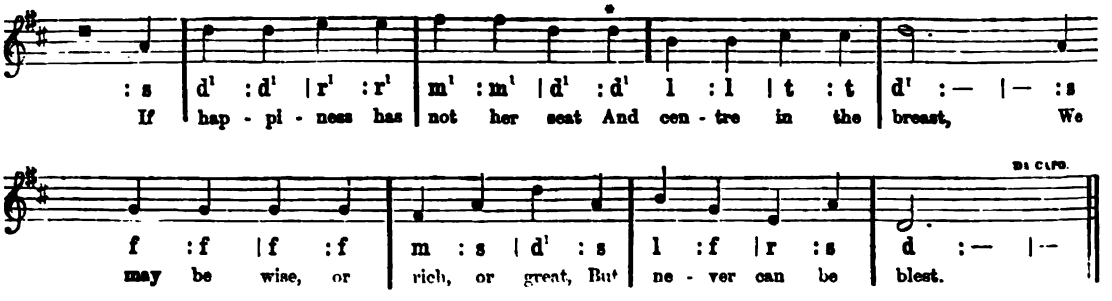
NOTE.—The effect of LAH is beautifully shown in the air, and that of FAH in the second. Look back for the instructions on chanting given in a former Lesson.

EXERCISE 23. **WHITE SAND AND GREY SAND.** KEY C. M. 50.

(A Round for Three Voices.)

NOTE.—This illustrates FAH and LAH when in succession at the close. If three persons can be got to join in singing it, let the first sing alone till he comes to the note over which an asterisk is placed to the words "Who'll." Then just as he strikes that note let the *second* singer strike the first note and follow. When he reaches the asterisk let the *third* voice strike in. When each singer reaches the close let him begin again instantly. And so let them go on, round and round, after one another, until the leader makes a signal for all to stop together. This kind of composition is called a round.

EXERCISE 24. **IF HAPPINESS.** KEY D. M. 60.

(A Round for Four Voices.)


: s
If
d¹ : d¹ | r¹ : r¹ hap - pi - ness has
m¹ : m¹ | d¹ : d¹ not her seat
l : l | t : t And cen - tre in the
d¹ : — | — : s breast, We
D.C. CAPO.
f : f | f : f may be wise, or
m : s | d¹ : s rich, or great, But
l : f | r : s ne - ver can be
d : — | — blest.

NOTE.—In singing this round take care to keep the time accurately. Here *four* voices should follow each other just as three voices did in the last case. FAH is well illustrated here. If you sing the round with four voices, or even with only two, you will have an opportunity of comparing the consonance, FAH with LAH, with the semi-dissonance FAH with TE. Directly the second voice gets on to the bar containing LAH, LAH, TE, TE, the first voice will be singing FAH, FAH, FAH, FAH. "TE with FAH" is usually treated as a *dissonance*. But it is a very piquant and useful one. Notice whether your own taste and ear do not require, what musicians demand, that it should be followed by the consonance "ME with DOH," the FAH descending on ME, and the TE ascending to DOH?

LESSONS IN ENGLISH.—No. XXIV.

By JOHN R. BEARD, D.D.

WORDS THAT ARE BOTH PREFIXES AND SUFFIXES.

SOME of the words which we treated of in the last Lesson as uncombined suffixes, may also be regarded as uncombined prefixes. The same word stands before and after its stem. You may take, [illegible]nce, to cast-*down*, and *down*-cast. In this instance, the [illegible]les, but does not greatly vary; to cast-*down* is used and *down*-cast signifies *dejected, sorrowful*. Besides this there is a difference also as to the function of the two words, for the former is a *verb*, the latter is an *adjective*. Rarely, perhaps, does the import remain the same, if the position of the adverb is altered. Make a prefix a postfix (or suffix), and in general you produce a greater or less modification of meaning. Indeed, some of the most delicate shades and hues of thought expressed in the English language are connected with, if not dependent on, the varied use of these moveable particles. It may, therefore, be proper to go into some little detail on the point.

It is not all the prefixes and suffixes that usage permits to take their stand before or after their principal word. *One* enjoys the privilege, and makes free use thereof. Look at these examples:—

cast-*out*	*out*-cast
bid-*out*	*out*-bid
grow-*out*	*out*-grow
do-*out*	*out*-do
live-*out*	*out*-live
cry-*out*	*out*-cry
laugh-*out*	*out*-laugh
look-*out*	*out*-look
right-*out*	*out*-right

An *out*-cast is one who undergoes the result and consequences of being cast-*out*. Corresponding with *out*-cast, is *out*-law. But though we may say to *out*-law, we cannot say to law-*out*. *Out*-post is again different from *out*-cast, for *out*-post does not make the idea of action so prominent as does *out*-cast. In this respect, *out*-cast is not unlike *out*-lay. *Out*-lay may be reversed; thus, lay-*out*. But while the verb is lay-*out*, the noun is *out*-lay. To bid-*out*, is to bid with a clear, loud voice; but to *out*-bid, is to bid more than another. To grow-*out* is very different from to *out*-grow. A young brother, by becoming taller, *out*-grows an elder brother; and the elder brother, who is thus surpassed, may be grown-*out* at the shoulders so as to be hump-backed. To do a person *out* of anything, is to cheat him; but to *out*-do a competitor, is to excel him. If my children live-*out* the century, they will *out*-live me. By crying-*out* lustily, boys make a great *out*-cry. That shameless man, by laughing-*out* so loud and so long, *out*-laughed all the company. If you look-*out* at the window, you will have a pleasant *out*-look.

"We have taken all the *out-lying* parts of the Spanish monarchy."—*Temple.*

"But for public dormitories, how many a poor creature would have been obliged to *lie-out* of doors in the nights of the last severe winter."—*Anon.*

"O my lord,
You said that idle weeds are fast in growth;
The prince, my brother, hath *out-grown* me far."
Shakspear.

"Albert has *grown-out* of his clothes."—*Anon*

"But breathe his faults so quaintly
That they may seem the taints of liberty;
The flash and *out-break* of a fiery mind." *Shakspear.*

"A fire *breaking-out* in the cellar, consumed the whole house."—*Anon.*

"Nor they which use
To *out-drink* the sea." *Donne.*

"You have *drunk-out* the cask. Children cannot well *drink-out of* goblets."—*Anon.*

"He looked and saw what numbers numberless
The city gates *out-poured*." *Milton.*

"*Pour-out* a glass of wine for the famished woman."—*Anon.*

"The workmen, in *standing out* for the wages, have *out-stood* the appointed time.—*Anon.*"

"Sense and appetite *out-vote* reason." *South.*

"A large majority of the constituency *voted* the old member *out*."—*Anon.*

"Better at home lie bed-rid, idle,
Inglorious, unemploy'd, with age *out-worn*." *Milton*

"This reverent leecher, quite *worn out*
With rheumatisms, and crippled with his gout." *Dryden.*

"By Shakspear's, Johnson's, Fletcher's lines,
Our stage's lustre Rome's *out-shines*." *Denham*

"*Out* of Zion, the perfection of beauty, God *hath shined*."—*Psalm* l. 2.

Over produces many combinations.

look-*over*	*over* look
reach-*over*	*over*-reach
run-*over*	*over*-run
flow-*over*	*over*-flow
persuade-*over*	*over*-persuade
ride-*over*	*over*-ride

You look-*over* your workmen and find faults that you cannot *over*-look. A bad tradesman reaches-*over* his counter and *over*-reaches his customers. Cisterns *over*-run, and drivers run-*over*. A river *over*-flows its banks, and the water flows-*over* the fields. You persuade an opponent *over* to your own party, and so *over*-persuade an associate that he relinquishes your company. If you persuade a person *over* you cannot *over*-persuade him. In attempting to *over*-ride a competitor, take care you do not ride *over* him. The boy having run *over* his companion in the race easily *over*-run him.

Other particles are of less frequent use. But not less curious are they. To *back*-stitch differs from to stitch-*back*. By reckoning his *in*come a man learns how much he has coming *in*. The *out*-goings of a family should be regulated by its *in*come. If I *with*hold my opinions I may continue to hold *with* you. He talks so much of bearing *with* me that I can hardly *for*bear to reprove him. The poor man has been taken *off* as if he were the *off*scouring of the streets. That young girl was taken *off* at the early age of seventeen, being *over*taken by disease. One general made an *on*slaught on the cavalry, while the other fell *on* the infantry.

"Immediately the mountains huge appear
Emergent, and their broad, bare backs *up-heave*
Into the clouds." *Milton.*

"Thou hast made my curdled blood run back, my heart *heave up*, my hair to rise in bristles."—*Dryden*

Along side the cutter we coasted *along* the shore. The *under*takings of your father are *under*-paid. The *under*standing was that you *stand under* the spout. The *under*taker receives funereal arrangements *under* his care.

"An *under*-plot may bear such a near relation to the principal design as to contribute towards the completion of it, and be concluded by the same catastrophe."—*Spectator.*

"In *under praising* thy deserts
Here find the first deficience of our tongue." *Dryden.*

"*Under* two conditions the poet engaged to compose the eulogy."—*Anon.*

"For this assembling all the peers
Whose counsels now must *under-prop* the throne." *Drayton.*

He *placed* a line of props *under* the falling wall. An *influx* of gold causes bank-notes to *flow out* of circulation. The *inlets* are more numerous than the *out-lets*, consequently you will be compelled to *let out* the water by artificial means.

Exercises for Parsing.

Our abodes out-last our bodies. Curtail your outlays if you wish for ease of condition. He laughed out-right. Let thine eyes look right on. You shall be driven out right forth. This way, right down to Paradise, descend. An over-much use of salt, besides that it occasions thirst and over-much drinking, has other ill effects. You have yourself your kindness over-paid. He gained a large fortune over the counter. Parents too often overpraise their children. Come o'er the brook, Bessy, to me. With an over-running flood God will make an utter end of the place. Were it not for the incessant labours of this industrious animal, Egypt would be overrun with crocodiles. Milk while it boils, and wine while it works, run over the vessels they are in. I shall not run over all the particulars that would show what pains are used to corrupt children. Should a man run over the whole circle of earthly pleasures, he would be forced to complain that pleasure was not satisfaction. The zeal of bigotry runs out into all manner of absurdities. The zeal of many outruns their discretion.

COMPOSITION.

As minds are differently formed and capacity varies with every successive individual, I am desirous of making another suggestion or two, which may possibly smooth the way to original composition for some whom the instructions previously given may have left in difficulty. I advise you then to accustom yourself to report as correctly as you can, to a child, something that has struck your attention, whether in what you have heard, what you have seen, or what you have read. I say report the substance by word of mouth. Endeavour to employ suitable words, to pronounce them correctly, and to put them together grammatically. At first you will commit errors; but, in time, perseverance will enable you to overcome all difficulties. Make your report to a child, say a younger brother or sister; I mention a child, because in speaking to a child you will speak readily and naturally. There is another advantage: in order to gain a child's attention you must take a simple subject, and on simple subjects you will not want words. Subjects such as I contemplate are constantly occurring wherever there are human beings. You may take as your theme some accident that has happened in the house where you reside, in a neighbouring mine, on the high road; or you may describe a bird's nest; the peculiar form, colour, and habits of the swallow, the dog tribe, the cat tribe, the daisy, the wild rose, the honey bee, &c.

Well, having described the object to a child, take your pen and write down as well as you can the very things you said, and having carefully corrected them according to the best of your ability, copy out the whole in your composition-book.

Many children would be far better as an auditory than one child. And very desirable for your purpose is it that utility to others should be immediately in your view. For these reasons I advise you to become a teacher in a Sunday-school, or if that is not possible or not convenient, then gather around you a number of children and form a class. By preparing to teach them you will give your mind useful discipline, and in communicating to them what you know you will take effectual lessons in the difficult art of correctly expressing your thoughts. By teaching others you will best teach yourself. To diligence there is nothing impossible. Report to a child or two the following anecdote:

SOUTHEY'S SCHOOLING.

Here one year of my life was past with little profit, and with a good deal of suffering. There could not be a worse school in all respects. Thomas Flower, the master, was a remarkable man, worthy of a better station in life, but utterly unfit for that in which he was placed. His whole delight was in mathematics and astronomy, and he had constructed an orrery upon so large a scale that it filled a room. What a misery it must have been for such a man to teach a set of stupid boys, year after year, the rudiments of arithmetic! And a misery he seemed to feel it. When he came to his desk, even there he was thinking of the stars, and looked as if he were out of humour, not from ill nature, but because his calculations were interrupted. But, for the most part, he left the school to the care of his son Charley, a person who was always called by that familiar diminutive, and whose consequence you may appreciate accordingly. Writing and arithmetic were all they professed to teach; but twice in the week a Frenchman came from Bristol to instruct in Latin the small number of boys who learnt it, of whom I was one. That sort of ornamental penmanship, which I now fear has wholly gone out of use, was taught there. The father, as well as Charley, excelled in it. They could adorn the heading of a rule in arithmetic in a cyphering-book, or the bottom of a page, not merely with common flourishing, but with an angel, a serpent, a fish, or a pen, formed with an ease and freedom of hand which was to me a great object of admiration; but, unluckily, I was too young to acquire the art. I have seen, in the course of my life, two historical pieces produced in this manner; worthy of remembrance they are, as notable specimens of whimsical dexterity. One was David killing Goliah; it was in a broker's shop at Bristol, and I would have bought it if I could have afforded, at that time, to expend some ten shillings upon it. They taught the beautiful Italian, or lady's hand, used in the age of our parents; engrossing (which, I suppose, was devised to insure distinctness and legibility); and some varieties of German text, worthy, for their square, massy, antique forms, to have figured in an antiquarian's title-page.

EXERCISES IN COMPOSITION.

HISTORICAL THEME.

The formation of the Hebrew Tabernacle.

PERSONAL THEME.

What have been my thoughts during this day?

POETICAL THEME.

The stillness of the country.

Form each of the following words into a simple sentence: girl; boy; dove; California; amendment; Adam; England; disturbance.

Describe a butterfly; a robin; a lark a salmon; a mackerel; a sheep; a rabbit.

Supply suitable adjectives in the ensuing sentences:—

Wise men love —— counsels.
—— men must die.
The —— fruit of autumn is delicious.
Small faults produce —— ones.
O how —— is hypocrisy!

Complete the following propositions:—

—— for having been too exacting.
—— to respect the aged.
—— the prevention of evil
—— for having soiled his book.
—— the scholar's negligence.

CONVERSATIONS ON ENGLISH GRAMMAR.—No. II.

"Mr. Mather laughed at me, to-day, when, in conversation with him, I said 'he like reading.'"—"Who is Mr. Mather?"—"The secretary of the Mechanics' Institution."—"An unfit man for his office, I should judge, if he is accustomed to laugh at the mistakes of the members."—"Well, however that may be, I really fancy I shall never be able to speak correct English, for I suppose 'he like reading' is wrong."—"Certainly, it is not good English."—"And yet, brother, I have tried to correct what you term the errors of my bringing-up; and now, alas! I am as far off as ever."—"No, by no means as far off as ever, if only because you are trying to get right; earnest effort never wholly fails; you are a little too impatient; why, one thing you have overcome; you used to say 'I speaks,' and 'they speaks.'"—"Yes, and I someway had got it into my head that by dropping the s I should put all right."—"I have known others make a similar mistake. But come, I will endeavour to give you such instructions and explanations as shall make the case clear to you. Only observe that you must watch and suspect yourself, and you must never cease your self-questioning until you have rigidly applied and know that you habitually apply in practice that which you learn in study. For your comfort I may tell you that I know many persons who once spoke as ungrammatically as you do, nay, as you did, and who now both speak and write our language with neatness as well as strict accuracy. Let us begin. You know what a noun is?"—"Yes, a noun is a name."—"Exactly, the noun may be called *the namer*, for it is the part of speech which gives names to things, to all objects and realities whether they are audible or visible, whether they are thoughts or feelings, whether in the outer world or in the mind. Every real object, and some that are unreal; every thing known, conceived of, felt, or beheld is called a noun; for everything must, for grammatical purposes, have a name. If an idea or a material object has no name, it has, so far as grammar is concerned, no existence."

"You know, also, what a pronoun is?"—"Yes, a pronoun is a for-name, a word that stands in the place, or performs the work of a noun; thus, instead of saying 'he like reading'"—"No, go no farther, please to correct yourself."—"Thank you, I am glad you stopped me."—"Learn to stop yourself when wrong."—"I will try."—"Aye, that's the word; as the children in the infant school sing, 'try, try, try again.' Now proceed."—"Well, then, instead of saying 'he likes reading' I might have said 'Thomas likes reading.'"—"Precisely; then, you see, Thomas is the noun, and he the pronoun. So far, well."

"You know, also, what a 'person' means?"—"Yes, I am a person."—"Well, that is pretty near the mark. Are there any other persons besides you in the world?"—"Yes, certainly, you for instance, and father and mother."—"Very good; now when you speak of yourself you say I, do you not?"—"Yes."—"And when you speak to me you say you?"—"Certainly."—"And when you speak of father and mother you say they?"—"I do."—"Well then, you see there are three ways of speaking of persons, as for instance, I, you, they."—"Exactly so."—"Now of these, which think you is 'number one?'"—"Well, I hope I am not selfish."—"I meant no imputation; I dare say you are no more selfish than other people; however, is not 'the great I' in all cases 'number one?' At any rate, we may, in grammar, call I the *first* person; do you allow that?"—"I suppose I must not object."—"Let us then call you the *second* person. Next to two stands three, and, consequently, he and they may be termed the *third* person. Mark, I represent the speaker, you the person spoken to, he the person spoken of? Do you understand? Here you have the same facts set forth in instances:—

The Three Persons.

1. I love. 2. You love. 3. They love.

Where I is the first person, you the second, they the third."—"Thank you, so far all is plain."—"Observe, then, that as there are (you know) two numbers, the singular and the plural, so each number has pronouns of its own. Here they are in full, the figures denoting the persons.

PERSONAL PRONOUNS. SINGULAR AND PLURAL.

Singular.	*Plural.*
1. I love	We love
2. Thou lovest	You love
3. He loves	They love

"What do you mean by personal pronouns?"—"Pronouns that indicate or relate to persons. They are called personal to distinguish them from other pronouns; but with those other pronouns do not trouble your head just now. Turn back to the form. In that form you see the model of good English, or the pattern which you are to imitate. Mark then, that he, the third person, is the only person that has its verb ending in s. It *was*, then, rather curious that you should have struck off the s there, instead of dropping it in the first person singular, and in all the persons of the plural. In Hampshire, they are so fond of the s, that they put it to all the persons, except the second person singular; or if they make an exception, they do so where of all places they ought not, namely, in the third person singular. However, study what I have said,—study and imitate the example I have given. One word more. I have used and not explained the word verb."—"O, you need not explain that; the verb, I know, is the doer, the verb represents action; for instance, love is a verb."—"Yes, give me some others."—"Well, write is a verb, so is strike, and think, and

run, and stop, and shout."—"Enough, enough. Now study and strive to apply these instructions."—"Cannot you give me some instances to correct?"—"I do not think the proper way to teach you good English is to put before you instances of bad English; as, however, you are accustomed to these blunders, you can hardly be misled by them; probably you may, in my instances of bad English, recognise some old friends, from whose company I advise you to separate yourself now and for ever. Here, however, are some examples of first bad, and secondly good English; correct the former, and parse the latter."—"Parse, what is that?"—"Give the person and number of each instance."

Bad English to be corrected and avoided.

I gives; they gives; you gives; thou gives; he give; we gives; they runs; he run; William cough; William and Mary coughs; why does they laugh? They does not laugh; I does very well; they does badly; Henry ride well; do Henry ride well? Sarah sing sweetly; the Sunday scholars goes to church; the curate read (*present*) the lessons impressively? do the clerk pronounce distinctly; you eats like a sloven; they drinks too much.

Good English to be parsed and imitated.

The girl sings charmingly; the dogs bark; the hen clucks; the wind whistles; the storm rages; the tempest hurries on; you love reading; my father and mother go to church every Sabbath; how will the choristers sing? do the boys sing well? the girls have a beautiful voice; thou singest out of tune; he keeps time very well; I praise diligent scholars; I entreat you to remain here; do you wish me to learn Latin? good boys love learning; here, father is coming; he runs after the hare; hares have swift feet; does he love money? he who loves money is not wise; he learns English; does he learn Latin? they learn German, and you, I hear, learn Italian.

CORRESPONDENCE.

AUTOBIOGRAPHY.

I am a working man; I received my education at an old-fashioned dame-school, so far as to be able to read, and finished at a master's-school, where I learned to write. At twelve years of age, I went into the world to assist to get my living; at fourteen, I was apprenticed, and served my time; at twenty-five, I entered the social relationship of marriage, and became a parent; thus, I arrived at thirty-three, without knowing a noun from an adjective; and having no arithmetic but what my little affairs obliged me to know, and all of the mental kind. I thirsted after knowledge,—but how was I to obtain it? I had long desired to know, at least, what chemistry was, even if it was only the meaning of the word. I purchased, at an old book-stall, Pinnock's Catechism, and learned it by heart. I commenced making experiments, and obtained a respectable elementary knowledge, so far as my small means went, making nearly all the apparatus myself; for, as "Opifex" says of the price of globes, so I say of the price of chemical apparatus, it is extortionate. I next learned arithmetic, as far as the commencement of fractions. I also learned so much of English grammar as gave me a knowledge of the different parts of speech; and a slight knowledge of geometry, which I have found most useful in assisting me properly to mark my work. I had always thought it to be the duty of every man calling himself a Christian, to endeavour to learn the originals of his Bible. I began with Latin, learned the Eton grammar, and commenced with the New Testament. Having made some little way with it (as I was given to understand that the Greek must be learned through the Latin), I commenced the Greek. See how crude all this was! I was labouring hard, both physically and mentally, all to little or no purpose, for the want of a proper guide; for there was no POPULAR EDUCATOR then! If I had had that valuable guide, I could have systematized my studies so as to have made them profitable. But I plodded on, making but little progress, when domestic affliction overtook me; my health failed, and I was under medical treatment for twelve months, being strictly forbid even to study; thus was my educational course put to an end. Not liking, however, to forget what I had learned, I purchased a Greek and Latin Testament, in whose company I spend an occasional hour or two. I wish to know your opinion of my copy; it is an Amsterdam edition, by "Johannes Leusden," with the Latin version of "Arias Montanus." In reading it, I find the Latin differs from the Greek very often in the cases; the Latin nouns being sometimes in the ablative case, while the Greek noun is in the dative case. I am aware that, in the Greek, the dative and ablative are mostly alike; but in the Latin, the ablative is put, where it is evident that it is the dative in the Greek. I have also found the ablative in the Latin put for the genitive in the Greek. On Sunday, I was reading the 11th chapter of Matthew, and found, in the 2nd verse, *tôs desmôtêriôi*, rendered *in carcere*; in the 11th verse, *Ioannou tou Baptistou*, rendered *Joanne Baptista*; and in the same verse, *autou*, rendered *illo*; but in the 12th verse, *John Baptist* in the Latin, agrees in case with the Greek; why not in the preceding verse? I have taken in the POPULAR EDUCATOR, and have gone through the Latin course as far as the 18th number; but as you have advised, on the production of your Key, that we had better go back again, I have done so; and I am working as hard as my weak head will let me, throwing forty-three years into the bargain. I do believe, sir, that the system you adopt, and the advice you give, are most excellent, and I hope the youth of my country will appreciate both; and though you and I may not live to see it, your efforts will not, yea, cannot be lost. I am, sir, yours, A JOURNEYMAN GLASSCUTTER.

27th September, 1852.

[The edition of the New Testament, mentioned by our correspondent, is a very good one, and better than many which have been published since. The discrepancies in syntax which he mentions, are due to the difference in the idioms of the two languages. The Greek noun is generally considered by scholars to have no *ablative*, the *dative* being always used instead. There are some learned men, however, who still consider that the Greek has an *ablative*, and that it is the same with the *dative;* this we believe is the case with the authors of the *Port-Royal* Greek Grammar, a French work translated into English by *Nugent*, and now rather scarce. At all events, as one of our correspondents justly remarks, the addition of the *ablative* to the cases of a Greek noun would greatly simplify the syntax of that language in many cases, especially such as those above mentioned. It is a rule in Latin that "the cause, manner, and instrument are put in the ablative," and the same rule might be admitted into the Greek. As to the use of the *genitive* in the Greek for the *ablative* in Latin, as above exemplified, this is easily accounted for; the *ablative* is used with *comparatives* in the Latin, but with the *genitive* in Greek. Now, in the 11th verse of the 11th chapter of Matthew above mentioned, the phrase is, *a greater than* John the Baptist. In the 12th verse of the same chapter, the Greek and Latin construction agree, because the rule in both languages is that "one noun governs another in the genitive;" the expression being, "From *the days of* John the Baptist."]

SOCRATIC METHOD.

SIR,—I observe a letter from a James Adamson, in a late number of the EDUCATOR, wherein he gives an unfavourable opinion of the Socratic method of disputation. Now, I also have happened to read said treatise on Grammar, in which said example and rules of disputation are given, and they seemed to me MOST ADMIRABLY suited for their professed purpose, viz., to *confute* or SILENCE an adversary, and find out the truth; and in proof of this assertion, I now cite those rules. As I have not the book in my possession at present, I cannot give the exact words, and for the same reason, I cannot give the example, but what will be given will suffice.

1st. To make yourself appear as the scholar—your opponent as the master—put not yourself forward as equal to him, but the reverse. Appear as though you were wishing to learn something from him.

Remark—the value of this rule is obvious—by your appearing as the scholar, your opponent cannot challenge anything that you say; he can ask you for no proofs, &c.; for, by setting himself up as a master, he must be prepared to give those, not to demand them.

2nd. If he uses any word or words of doubtful meaning, or which you do not understand, insist upon his giving a complete explanation of said word or words.

This is a *most important* rule. Let not one word escape to which there is the least chance of a wrong meaning being attached; for a great many men have accustomed themselves to use words which they do not perfectly understand, or if they have an idea in their mind of its meaning, are not able to express that meaning in words, which makes the matter no better. By this plan of insisting on a clear definition of every word as aforesaid, you will soon silence your opponent, or expose him as an ignoramus, who uses language he understands not. When I say silence, I mean that he will get so confused by the numberless explanations required, and questions asked, that he will be obliged to give it up.

3rd. To examine into the several parts of the proposition he advances—and require him to give you an explanation of the foresaid parts—and for a clearer view of the subject, you should use metaphors and similes, and ask him whether he means this or that?

Lastly, ask him what arguments he has to give in support; then if there are any words in said arguments, insist upon their meaning; and in short, examine the arguments in the self and same manner as the proposition.

I have thus given a rough sketch of the Socratic method of disputation, and can any one deny that it is most admirably suited for the purpose of confuting or silencing an opponent? Can any one wonder that Franklin was so much enamoured of it?

I hope you can find room in your periodical for this letter, as I would wish all the readers of the EDUCATOR to be acquainted with it; it is so efficient and so simple.

I am sorry you have no expressed intention of giving a course of Logic. It is a most important art. If working men were well acquainted with it, they would not be so easily led astray by political sophists as they are. I am, sir, your obedient servant, JOHN SCOTT.

Glasgow, 30th September, 1852.

P.S.—Adamson should give the rules, as he has the book.

ANSWERS TO CORRESPONDENTS.

STUDIOSUS (Greenwich): The absurdity in the algebraical question or puzzle arises from supposing x and y *equal* at one time, and *unequal* at another time. By multiplying your equation by the cube of x you may prove that this cube is equal to *nothing*; and a thousand other absurdities may be proved in the same way. Dr. Galle was the *first* man who *saw* Neptune. I suppose this is discovery!—EDAX SCIENTIAE (Carlisle): Thanks for his intelligent letter. As to Ex. 3, Prop. XX., Cassell's Euclid, draw a perpendicular from one of the given points to the given straight line, and produce it beyond the given straight line until the part produced be equal to the part between the point and the straight line; then join the extremity of this produced part to the other given point, and it will cut the given straight line in the point required. The key will be supplied in the Lectures on Euclid in the P. E.—G. F. A. SPILLER (Canterbury): Received.—F. MILLER (Wandsworth): We strongly advise him to study the Lessons in English and in Penmanship, in the P. E., for a long time before he attempts to study bookkeeping,—and we ought to add the Lessons in Arithmetic.—W. J. C. F. S. (Aberdeen) ought decidedly to continue the Lessons in Penmanship. As to pens, he must find out which are the best by trial; this is all we can do ourselves. His French is at fault both in spelling and meaning. As to removing blots of ink out of paper, we believe some of our correspondents will send us a well tried recipe.—EUCLID (Warrington) is informed that *salient* is a term applied to the angles of any polygon when they *jut out* from the two points in the figure from which their legs are drawn, and thereby enlarge the space within the figure; and *re-entrant* is a term applied to the angles of any polygon when they *jut in* from the two points in the figure from which their legs are drawn, and thereby diminish the space within the figure.

SELF-TAUGHT (Duke-street) should make 9 mos. the 2nd term, because 5 mos., being a *longer time*, it requires less principal to produce the same interest in *this time* than it would require to produce it in the *former time*.—W. C. (Weston-super-Mare): We are not lawyers, and therefore we don't know.—JEUNES HOMMES (North Shields): The Royal Astronomical Society of London.—D. H. (Driffield): Try the "Art of Thinking," by Lord Kames, or the "Improvement of the Mind," by Dr. Watts, and then try Whateley's or Watt's Logic, as preparatory to the works you mention.—JOHN SHARPE (Halifax): That the *understanding* and the *affections* do not always go together on many subjects is a very trite truism; and this is all that is meant by the quotation from Hudibras.—G. W. R.: Spiers or Boniface.—J. WALKER (East Bourne) has not come up to all the requirements of the question.—JOHN LILLE (Salop): See Young's "Introduction to Algebra," p. 75.—MINISTER (Charleston): Merely an introductory one.—VEXED: Geometry would be a good study with English. We shall endeavour to meet his wishes as soon as possible.—J. O. (Hampstead-road): The "French Manual" is not at all like the Lessons in the P. E. In negative sentences *pas* is sometimes omitted; this omission implies a feeble negation.—M. J. (Belfast) has thoroughly misunderstood us.—A PAISLEY YOUTH should study Arithmetic, Geometry, Architecture, and subjects connected with them.—J. J. R., and MARTIN PUZZLEDWIT (Burghead): Received.—J. G. THORNLEY (Ballyclare) shall be answered.—F. G. B: See page 16, col. 1, last sentence.—H. R. (Manchester): In his solution of R. C. Typo's problem we do not see the origin of the point m.—IGNORAMUS: See the "Popular Educator Almanack," article headed "Arts and Sciences."—DISCIPULUS (Bywell): We know of no such fund.

JOSEPH MAINE (Wells) is right as to the inaccuracy of the passage in the Lesson in Physiology, but wrong as to the little word "number;" but really we cannot dispute the matter without taking up more space and time than it is worth. He is quite welcome to have his own opinion.—M. H. (Birmingham): The different parts of maps may be coloured in any manner that produces the greatest contrast in the colours of adjacent countries, as the colouring is used merely for the sake of distinctness.—STUDIOSUS (Cork): His case, alas, is too common; we wish we could meet it; perhaps the articles on the Philosophy of Study may go a great way in the required direction; what is wanting when they are finished we shall endeavour to supply.—HENRY PARTRIDGE (Aldersgate-street): Analysing what?—T. T. RHODES (Aldersgate-street): The velocity of light is about two hundred thousand miles per second, and of sound about eleven hundred feet per second. If a penny were dropt from a tower 400 feet high, it would reach the ground in about five seconds.—E. K. and J. S. (Huddersfield): Proper names *only* require to begin with capital letters, in general; but the names of particular subjects are often written in the same way in order to attract attention; there is, however, no particular rule to be observed, but the intention of the writer.—A KNOWLEDGE SEEKER (Mid-Lothian): It cannot be true that 5 grains of calomel would have the same effect as 10 grains; unless it were a case in which such small quantities of calomel would have no effect at all. But beware of calomel!—J. MCLARTY (Greenock): Right.—JAMES JOHN (Lambeth): Wrong.—W. HICKS (Lambeth) should apply to some Mechanics' Institution, say the *London*, near Chancery-lane.—A SUBSCRIBER (Broughton Astley) will oblige us by sending his private address, and a distinct account of what he wishes us to recommend.—ISAAC LOWTHIAN (Brompton) wishes a simple solution to the question, "At what time between 7 and 8 o'clock are the hour and minute hands exactly in opposition and in the same straight line?"—AN ENQUIRER (Newcastle-on-Tyne) shall be answered when he sends us an account of the system he has adopted.—J. OSBORNE (Wolverhampton): We regret that we cannot approve of the lines he has sent us.—T. C. LATHERIDGE (Fitzroy-square) must be in joke; we cannot see the slightest connexion between *popular education* and *curly hair*!—J. H. (Hull) must make himself master of Cassell's Arithmetic, and of Dr. Beard's Lessons in English in the P. E. Perseverantia vincit omnia, i. e., *Perseverance overcomes all things*.—J. A. (Edgware-road): Uncle Tom's Cabin (shilling edition) may be had to any address by sending 18 stamps to this office.—W. A. (South Molton): Logic and Rhetoric as soon. But study Whateley in the mean time.—J. C. T. (Newvary. As to education, English, Mathematics.—R. BROOKS ologie par M. Huot," 2 vols., about 1,500 pages, with an ne, 19 francs; or a small work by the same in 1 vol., 2½ francs. ould study the definitions Book III., Cassell's Euclid. Arithmay not be studied with Geometry. A case of instruments is to the study of theoretical geometry, such as Euclid's Elements. This study is a great strengthener of the reasoning powers. Mechanics cannot be learned well without some knowledge of mathematics. Don't meddle with your eye, except by the *most skilful* medical advice.—J. EVANS (Warwick): Certainly; and to the Lessons in Penmanship add the study of Cassell's Arithmetic.—G. W. C. (Wigtonshire), and H. ROBINSON (Sheerness), have transmitted elegant solutions of E. Jones's query.—M. N. There are no such French exercises as those in the P. E. to be had. It does not appear to us that vol. I. is too large for a school-book; we know it used as such; and every study requires some little trouble and inconvenience, for "learning without labour is granted to none."—A SUBSCRIBER (Arundel): We do not know; if we did we would tell him.—T. AFRICA and X. Y. Z.: Either division will do. We are not taxidermists. Every communication with our contributors, as such, must pass through our hands. We shall be glad of your assistance as proferred.—J. JOHNSON (Liverpool), and S. C. & L. (Louth): We really cannot tell.—R. H. (Southampton): We do not recollect any work that combines both.—C. D. B.: Thanks.—R. B. T. shall be answered.—APPRENTICE (Edinburgh): We have, we fear, mislaid his first communication.—AN ADMIRER (Stockport) should read Cassell's Euclid, Prop. XXXII., Book I.—JOHN PENT should study Cassell's Arithmetic, where the Lessons in Fractions will at once remove his difficulties.—BEN. H. (Huddersfield) should apply to a respectable physician.—W. (Chelsea): Many thanks.—SAMUEL GORDON (Longton): Lennie is right.—WOO YUETEG: We advise him to study Dr. Beard's Lessons in English.—A. RICHARD (Crowhurst): Right; his ingenious communications have reached us, but we are oppressed with the multiplicity of those that we receive, and sometimes are puzzled which to answer first. Of course real addresses are first answered.—KINDER EDWARDS (Huddersfield): Are we to obey him, or ourselves; who is the best judge?—IMPROVER: The French is easier to learn than the German. As to prices, be so good as to write to Messrs. Bagster yourself.—ROBERT DUNN (West Kilbride): We really cannot, on principle, accede to his request.

W. S. M.: The words *area*, *superficies*, *superficial contents* (or rather *content*), are all synonymous as applied to the *surface* of a plane figure measured according to some standard unit of surface. The term *quantity* may be applied to such a surface, but only in a very general manner; that is, in the very same way in which it may be applied to anything weighed or measured, and not without reference to one of the preceding words in the context. The term equal is used in mathematics in several senses. Thus in geometry, it is applied to two figures which are equal in *all respects*, both as to their sides, their angles, and their areas; see Cassell's Euclid, Prop. IV., Book I. It is next applied to two figures which are equal only in *one respect*, viz., in their areas; see Prop. XXXV., Book I. It is also applied to solid figures which are equal as to capacity or volume, but are not symmetrical; that is, which have not all their parts similar and similarly situated with respect to each other. The term *diagram* is applied to any drawing or simple outline of any figure whatever; thus the mere drawing of a *straight line* is called a *diagram*.—THOMAS R. (Glasgow): The nominative *us*, 4th declension, is *short*, and the genitive *us* is long, being a contraction of *uis*; accordingly, emphasis should be put upon the genitive termination.—CYMRO: Be content; rules will be given for the arrangement afterwards. Several dictionaries have already been recommended in the Notices to Correspondents; see the back numbers. The P. E. is put in cloth binding for 1s.—TRUTH SEEKER (Bishop Auckland): We don't know.

PHONOGRAPHIC REPORTER (London): Thanks.—B. S. (London): We don't know.—PUBLICO (Farnby): The "2 rem." in the 15th question of Inv. Prop. Walkinghame, is ½ of 1 nail, because it is 2 nails to be divided by 3. This inquiry shows the propriety of teaching fractions before proportion as in Cassell's Arithmetic.—AGRICOLA (Belfast): A second Lesson on the Philosophy of Study will appear. There is not the slightest reason for discouragement, because the order of the words in your Latin translation differs from that in the key; to us the order of the Latin in the best writers appears exceedingly arbitrary. Dr. Beard will no doubt clear this matter up soon. We are always disposed to remove every serious difficulty, in the way of any of our students; but we do not see the force of your objection to Prop. VII., Book I. Your demonstration of Cor. 2, Prop. XXXVIII., Book I., is quite correct.

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LESSONS IN ARCHITECTURE.—No. XI.

PRIVATE HOUSES.

Homer, in his "Odyssey," informs us that the houses, and even the palaces of ancient Greece, were constructed of wood; and among others, he particularly describes that of Ulysses, at Ithaca. It is stated that the private houses of the early Romans were small, and that the doors were left unclosed during the principal meal. As wealth and luxury increased, the size of their houses became so great, as to accommodate, in no very

Fig. 36.

House at Pompeii.

Fig. 37.

House built of Wood.

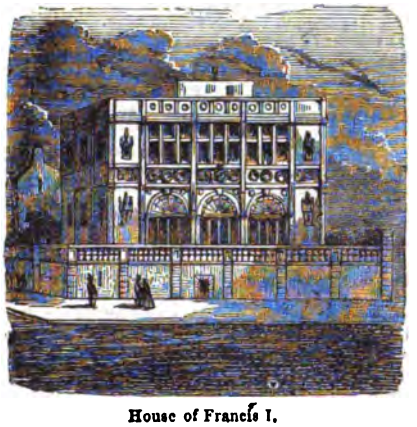
extraordinary cases, no less than four hundred slaves under a single roof. The height of private houses at Rome was restricted by the Emperor Augustus to seventy feet; but the irregularity of the city became so great, that, in one sense, its conflagration by Nero turned out a public good. For, being passionately fond of building, this made way for his architectural plans, and rendered Rome afterwards a regular and splendid city. Notwithstanding these improvements, there was a great want of conveniences in the private architecture of the Romans. There was a general absence of chimneys and of windows; and the only light received in the rooms was through an aperture formed in or over the door. In these respects, therefore, they were little removed from the rude cottages of the poor, still to be seen in the remote parts of our own country. One reason for the neglect of comfort in their private dwellings was, that they were not a domesticated people; they lived in public, and for the public; and their society was to be found in the Forum and public porticoes. A military people are sure to be thus circumstanced; and France, at least in Paris, since the first revolution, has presented a similar spectacle to the observer. Her inhabitants live in cafés, and in clubs or societies, but not at home.

Fig. 38.

House of the Renaissance period.

The arrangement of ancient houses greatly differed from the modern, in the formation of their internal courts. These were usually constructed so that each was surrounded by apartments which, when lighted from within, prevented the domestic concerns of the family from being overlooked by any one not included within the walls. From a passage in Plautus, it does not appear that this construction always answered the purpose; and in Seneca, mention is made of the annoyance to which the neighbours were subject from the disorderly conduct of those persons who changed night into day by indulging in the false refinement and late hours of the age in which he lived. In the Roman houses, also, there appears to have been, after the Eastern fashion, a remote or inner court for the apartments of the females, accessible only by an outer court for those of the males, and of the servants. The information conveyed to us in the works of Vitruvius has received singular illustration and confirmation within a period less than a century, from the excavations at Pompeii, Herculaneum, and Stabia, cities which were overwhelmed by a tremendous eruption of Vesuvius, in A. D. 79, and which contained houses built and inhabited by Romans belonging to the age of Vitruvius. These excavations exhibit curiously paved streets, having the tracks of carriage-wheels marked on them; and houses built of brick and rubble-work put together with mortar, all the materials being of very inferior quality, except the interior coating of plaster, to which

Fig. 39.



House of Francis I.

they appear to have been chiefly indebted for their durability. This plaster was composed of lime and pounded marble, a substitute for stucco, and by its use a perfectly smooth and polished surface was obtained, nearly as hard as marble. With this kind of stucco, the smallest apartments at Pompeii are found to be lined; and this lining is painted with various and brilliant colours, and embellished with subjects either in the centre, or at equal distances, like panels. Painted imitations of variegated marbles, forming, perhaps, a species of scagliola, also decorate the walls of their houses. Few blocks of real marble are found, except in monuments and public buildings; though, in imitation of the wealthy Romans, the Pompeians inserted pieces or slabs of this material in their walls, and employed art to give them higher tints than those they possessed by nature. They also discovered a method of veining slabs with gold; and leaves of this metal covering the beams, walls, and even roofs of the houses, were introduced in great profusion. They covered their floors with cement, in which small pieces of marble or coloured stones were regularly imbedded in geometrical forms; and in their best rooms they used mosaic (inlaid work) with ornamented margins and a device in the centre. The doors of their houses, being formed of wood, have been reduced to

charcoal by the burning lava, and of course are found in an incomplete state; they turned on pivots, and were fastened by bolts which hung upon chains. Bedsteads are found, made both of wood and iron; but their beds were made generally of carpets and vests, spread upon the ground. The articles of household furniture and convenience found in these remarkable ruins, are utensils of every kind in silver, brass, stone, and earthenware, with vases of every size and adapted to every use; trumpets, bells, gridirons, colanders, saucepans, some lined with silver, kettles, ladles, moulds for jelly or pastry, urns for keeping water hot on the principle of the modern tea-urn, horn-lanterns, spits, and, in fact, every article of kitchen or other furniture used by us, except forks; chains, bolts, scourges, dice (some said to be loaded); a complete toilet, with combs, thimbles, rings, paint, pins, earrings, pearls, &c. But for more enlarged details, we must refer to the work of Sir William Gell and J. P. Gandy, entitled "Pompeiana." In fig. 36 there is given a representation of one of the excavated houses of Pompeii.

The excavated towns above mentioned being small, furnished specimens chiefly of houses inhabited by Romans of the middle and lower classes. At Rome itself, the excavations of the villa Negroni have made us acquainted with the nature of purely Roman houses, and of the higher class. To this may be added the following description, by himself, of the winter residence of Pliny the younger, at Laurentinum, situated at the distance of seventeen miles from Rome, which gives us a more distinct conception of the villa of a wealthy nobleman of that city :—

"My villa is large enough to afford all desirable accommodation without being extensive. The porch before it is plain, but not mean, through which you enter a portico in the form of the letter D, which includes a small but agreeable area. This affords a very commodious retreat in bad weather, not only as it is enclosed with windows, but particularly as it is sheltered by an extraordinary projection of roof. From the middle of this portico you pass into an inward court, extremely pleasant, and thence into a handsome hall, which runs out towards the sea. On every side of this hall there are either folding doors, or windows equally large, by which means you have a view from the front and the two sides, as it were, of three different seas; from the back you see the middle of the court, the portico, and area; and by another view you look through the portico into the porch, whence the prospect is terminated by the woods and mountains which are seen at a distance. On the left-hand side of this hall, somewhat farther from the sea, lies a large drawing-room, and beyond that a second of a smaller size, which has one window to the rising and another to the setting sun. The angle which the projection forms with this drawing-room retains and increases the warmth of the sun; and hither my family retreat in winter to perform their exercises. Contiguous to this is a room forming the segment of a circle, the windows of which are so placed as to receive the sun the whole day; in the walls are contained a set of cases, which hold a collection of such authors whose works can never be read too often. Thence you pass into a bed-chamber through a passage, which, being boarded, and suspended over a stove which runs underneath, tempers the heat, which it receives and conveys to all parts of this room. The remainder of this side of the house is appropriated to the use of my slaves and freedmen; but most of the apartments are neat enough to receive any of my friends. In the opposite wing is a room ornamented in a very elegant taste; next to which lies another room, which, though large for a parlour, makes but a moderate dining-room. Beyond is a bed-chamber, together with its antichamber, the height of which renders it cool in summer, as its being sheltered on all sides from the winds makes it warm in winter. To this apartment another of the same sort is joined by a common wall. From thence you enter into the grand and spacious cooling room belonging to the bath, from the opposite walls of which two round basins project, sufficiently large to swim in. Contiguous to this is the perfuming room, then the sweating room, and next to that the furnace which conveys the heat to the baths. Adjoining are the two little bathing rooms, fitted up in an elegant rather than a costly manner. At the other end is a second turret, in which is a room that receives the rising and setting sun. Behind this is a large repository, near to which is a gallery of curiosities, and underneath is a spacious dining-room. It looks upon the garden and the ride which surrounds the garden. Between the garden and this ride is a banquetting room. Two apartments run round the back of it, the windows of which look upon the entrance to the villa, and into a pleasant kitchen-garden. From hence an enclosed portico extends, which, by its great length, you might suppose erected for the use of the public. It has a range of windows on each side, but on that which looks towards the sea they are double the number of those next the garden. Before this portico lies a terrace, perfumed with violets. On the upper end of the terrace and portico stands a detached building in the garden, which I call my favourite; and, indeed, it is particularly so, having been erected by myself. It contains a very warm winter room, one side of which looks upon the terrace, the other has a view of the sea, and both lie exposed to the sun. Through the folding-doors you see the opposite chamber, and from the window is a prospect of the enclosed portico. On that side next the sea, and opposite the middle wall, stands a little elegant recess, which, by means of glass doors and a curtain, is either laid open to the adjoining room, or separated from it. Adjoining to this is a bed-chamber, which neither the voice of the servants, nor the murmuring of the sea, nor even the roaring of a tempest can reach. This profound tranquillity is occasioned by a passage which separates the wall of the chamber from the garden; and thus by that intervening space every noise is excluded. Annexed to this is a small stove-room, which, by opening a little window, warms the bed-chamber to the degree of heat required Beyond this lie a chamber and antichamber, which enjoy the sun, though obliquely, from the time it rises till the afternoon."

The houses of princes, and the palaces of emperors, occupied a great extent; and besides baths, gymnasiums, and gardens, they had sometimes attached to them a basilica, a theatre, or a circus. Before the establishment of the Roman dominion in Gaul, the inhabitants, according to Vitruvius, lived in huts of a cylindrical form, covered with shingle or thatch; and, in Normandy, many vestiges of these are still to be found. The Romans gave to those people whom they conquered their religion, laws, and customs; and the Gauls then built their houses like those of Rome. Numerous villas, or country-houses, and rural engineering residences, were to be seen in Gaul; many of these houses, as well as those built in towns, were constructed of wood placed on foundations of stone. Erected in a climate different from that of Italy, the Gallo-Roman houses, especially in the northern parts, were warmed by subterranean flues, called hypocausts. During the first ages of the monarchy, houses in Gaul or France were made of wood, exactly similar to those of the Roman period. In a description of the palace of Attila, given by the Byzantine historians, some valuable information is to be found on this subject. Some houses in stone, erected during the Roman period, are still to be found in France, with façades very similar to those of modern erection. In the towns of the south, and of the centre of France, such as Nismes, Perigueux, Metz, and Cluny, there remain some ancient specimens of this kind of architecture; and there are some also in Germany and Italy. In the 13th century the Gothic style was used as much in private as in monumental or public architecture. In the town of St. Yrieix, there is a very fine house built in this style; and others are found at Montpasier, in the department of the Dordogne. Rural constructions, farms, and granges, are found at Mealay in Touraine, and near Coulommiers. Both in the 14th and 15th centuries, wooden houses were common all over Europe. Fig. 37 is a representation of one of these, of which many specimens may be seen in England. The stories of these houses were executed in *corbel*, that is, projecting one over the other,—an arrangement by which the upper rooms were enlarged, but which rendered the lower stories unwholesome, the light and the air being prevented from entering freely into the rooms they contained. This system of projecting stories is proved to be of Oriental origin, from the circumstance that it did not make its appearance in Europe until after the time of the Crusades. This system, which was proper in the East, for defending the lower part of the house from the light and heat of the sun, was absurd in climates where these were always welcomed as delightful visitors. After the 13th century, houses were constructed so that the gable-end of the roof fronted the street; and in the middle ages, "to have the gable to the street" indicated the right of citizenship. Built without a regular plan, these houses were, owing to the arrangement of the windows, both dark and inconvenient within; the stairs were constructed outside, and in front of the building; and in the recesses thus formed, turrets were built, which in the 15th century were greatly multiplied, and added to their decoration. Wooden façades were generally more decorated than those constructed of stone; the posts, the beams, and the panels, were covered with a profusion of sculpture in wood; the roofs were decorated with elegant crests and graceful

spires, surmounted with whimsical weather-vanes. During the Renaissance the outward appearance of houses, as well as their internal accommodations, were greatly improved; the façades became more regular, and wood more rare; and when used, it was mixed with brick and stone. From this period, sculptures were spread over the fronts of houses with less profusion, and with more taste. There are many specimens of houses built in the Renaissance style, in France, Germany, and Italy, as well as in England. The ancient towns of Rouen and Moret, in France, furnish some of the finest examples; and in fig 38, there is a representation of a house of this kind at Rheims. Since that time to the present day, private architecture has extensively improved; the outward appearance of our houses has become less fantastical, and the interior arrangements more convenient. Within the present century the improvements in private edifices have partaken of the progress of the arts, and are as great in their decoration as in their adaptation to the comfort of human life. To the illustrations of this article, we have added (in fig. 39) a representation of the house in Paris, occupied as a residence by Francis I., King of France, who ascended the throne in 1515.

LESSONS IN LATIN.—No. XXXIII.

By JOHN R. BEARD, D.D.

DEVIATIONS IN THE THIRD CONJUGATION.

1. *Perfect in* **si**; *Supine in* **sum**.

a. The stem ends in d or t; e. g., claud, mit.

i. Claudo, claudere, clausi, clausum, *I shut*. The compounds have clūdo, clūsi, clūsum; as includo, *I shut up*.

ii. Dividō, dividere, divisi, divisum, *I divide*.

iii. Laedo, laedere, laesi, laesum, *I injure*. The compounds have lĭdo; as, illĭdo, illĭdere, illisi, illisum, *I strike against*.

iv. Lūdo, ludere, lusi, lusum, *I play*.

v. Plaudo, plaudere, plausi, plausum, *I clap my hands*. So applaudo, *I signify approbation by clapping*; the other compounds have ōdo, osi, osum; as explōdo, *I drive out by clapping hands*.

vi. Rado, radere, rasi, rasum, *I graze, shave* (E. R. *razor*).

vii. Rodo, rodere, rosi, rosum, *I gnaw, slander*.

viii. Trūdo, trudere, trusi, trusum, *I thrust*.

ix. Vādo, vadere (no perfect, no supine), *I go*. Both perfect and supine are in the compounds; as, cvādo, evadere, evasi, evasum, *I go out, get away*.

x. Cedo, cedere, cessi, cessum, *I yield*.

xi. Mitto, mittere, misi, missum, *I send*.

xii. Quatio, quatere (no perfect), quassum, *I shake*. The compounds have cutio, cussi; as, decŭtio, decutere, decussi, decussum, *I shake down*.

b. The stem ends in g, c, or ct.

xiii. Mergo, mergere, mersi, mersum, *I dip*.

xiv. Spargo, spargere, sparsi, sparsum, *I scatter, sow*. Compounds, spergo, spergere, spersi, spersum; e. g., conspergo, *I sprinkle*.

xv. Tergo, tergĕre, tersi, tersum, *I wipe*. Another form of tergeo, tergēre.

xvi. Figo, figere, fixi (ficsi), fixum, *I fix, fasten*.

xvii. Flecto, flectere, flexi, flexum, *I bend*.

xviii. Necto, nectere, nexui, nexum, *I tie, knit*.

xix. Pecto, pectere, pexi, pexum, *I comb*.

xx. Plecto, plectere, plexi (rare), plexum, *I weave*. Here may be placed, also, these two:—

xxi. Premo, premere, pressi, pressum, *I press*. Compounds, prĭmo; as, comprĭmo, comprimere, compressi, compressum, *I press together*.

xxii. Fluo, (stem, fluvo; noun, fluvius, *a river*), fluere, fluxi (fluxus as an adjective), *I flow*.

VOCABULARY.

Committĕre, *to commit, do*; concedĕre, *to concede, grant*; connectĕre, *to connect, put together*; corradĕre, *to scrape together*; deludere, *to delude, deceive*; eludere, *to insult, scoff at*; discludere, *to shut apart, separate*; elidĕre, *to dash against*; imprimĕre, *to print, impress*; copulare, *to bind in couples, to bind together*; locare (in. and abl.), *to place*; libra, ae, f. *a pound*; modius, i, m. *a bushel*; regnum, i, n. *a reign*; praecordia, orum, n. *the diaphragm*; cachinnatio, onis, f. *a loud laugh*; histrio, ōnis, m. *a player*; perpetuitas, ātis, f. *perpetuity, duration, durability*; viritim, *man for man, among the men*; Numa, ae, m. *Numa, the Roman king of that name*; Janus, i, m. *Janus (Dianus), a Roman divinity*.

EXERCISES.—LATIN-ENGLISH.

Templum Jani bis post Numae regnum clausum est; si ridēre concessum sit, vituperatur tamen cachinnatio; si concessĕris esse Deum, confitendum tibi est, ejus consilio mundum administrari; in omnium animis Dei notionem impressit Deus ipse; magna vis est conscientiae, ut qui peccārint, pŏenam simper ante oculos versari putent; virtutes ita copulatae, connexaeque sunt, ut omnes omnium particĭpes sint; Caesar populo praeter frumenti denos modios ac totidem olei libras, trecenos quoque nummos viritim divisit; qui diffidit perpetuitati bonorum suorum, ei timendum est, ne aliquando, amissis illis, sit miser; Plato duas partes animi, iram et cupiditatem, locis disclusit; iram in pectore, cupiditatem subter praecordia locavit; omnis Gallia in tres partes divisa est; si quis imprudens (*without intending it*) te laeserit, non decet ei irasci; si vitae molli et effeminatae te dederis, brevi tempore omnes nervi virtutis elisi erunt; cur me elusistis? nescisne a perfido amico me delusum esse? histrionibus qui heri praeclare partes suas sustinuerunt, omnes spectatores applauserunt; Epicūri de vitā beatā sententia ab omnibus acutioribus philosophis explosa est; sunt multi qui in pecuniā corrāsā vitae filicitatem collocatam esse putent.

ENGLISH-LATIN.

My house was shut yesterday; I will shut thy house; the temple is being shut; the temple will have been shut; the boy has been shut out of the school; they concede that there is a God; they must confess that there is a God; God has impressed an idea of himself on all minds; I will divide a hundred bushels of wheat (among them), man for man (100 bushels to each man); are not the virtues united together? he who distrusts in God, must fear that he may sometime be miserable; dost thou distrust in God? good men yield to the will of God; the mouse gnaws the meshes of the net; spectators will applaud good actors; the ships get away out of the enemy's hands; are you ignorant that Gaul is divided into three parts

VOCABULARY.

Concludĕre, *to enclose*; confluĕre, *to flow together*; diffluĕre, *to flow abroad*; defigĕre, *to fasten* (in aliquā re); transfigere, *to pierce, stab*; deflectere, *to bend down, turn on one side*; demergĕre, *to sink, to let down*; emergĕre, *to come up (out of the water), emerge*; detrudĕre, *to push down*; extrudere, *to push out*; discutĕre, *to scatter, frustrate*; dispergere, *to scatter abroad*; dispicio, spexi, spectum, *to open the eyes*; exagitare, *to torture*; exanimare, *to kill*, pass., *to lose one's life, die*; exsibilare, *to hiss off*; fugare, *to put to flight*; ut primum, *as soon as*; hasta, ae, f. *a spear*; nebula, ae, f. *a cloud*; clypeus, i. m. *a shield*; stimulus, i. m. *a goad*; caligo, inis, f. *darkness*; salvus, *safe, saved*; mobĭlis, e, *moveable*; quondam, *formerly*; dissipo 1, *I spread abroad*; apud Mantinéam, *at the battle of Mantinea*.

EXERCISES.—LATIN-ENGLISH.

Te in tantum luctum et laborem detrusum esse graviter doleo; cur aedibus istum extrusisti? spero amicum aegrōtum e morbo evasurum esse; si animus e corpŏre evasĕrit, tum demum vivet et vigebit; sole orto, caligo discussa est; omnia pericula, quae urbi impendebant, ducis fortitudo et consilium discussit; Marius senile corpus paludibus demersum occultavit; animus coelestis ex altissimo domicilio depressus, et in terram quasi demersus est; leges perlongum tempus hostium vi dimersae, tandem emerserunt; Deus immortalis sparsit animos in corpora humana; omnia quae nunc artibus conclusa sunt, quondam dispersa et dissipata fuerunt; Epaminondas apud Mantinéam gravi vulnere cecidit; Epaminondas Lacedaemonios superavit; Epaminondas salvus ne esset clypeus interrogavit; Epaminondas quum superasset Lacedaemonios apud Mantineam, atque ipse gravi vulnĕre exanimari vidēret, ut primum dispexit, interrogavit salvus ne esset clypeus; quum salvum esse a flentibus suis audisset, rogavit, essent ne fugāti hostes; quum id quoque audivisset, evelli jussit eam, quā erat transfixus, hastam; alia omnia incerta sunt, caduca, mobilia; virtus est una altissimis defixa radicĭbus; Cicero omnes suas curas cogitationesque in reipublicae salute defixit; qui semel a veritate deflexit, ei ne verum quidem dicenti fides haberi solet; non credo te unquam de virtutis viā deflexurum esse; dic cui hanc corōnam nexueris; ingens hominum multitudo in urbem confluxit, ludos publicos spectatum.

ENGLISH-LATIN.

Where will Marius hide himself? Marius has hidden himself in the marsh; will the soldiers hide their bodies in the marsh; the minds of men have been let down from heaven to the earth; the men who were sunk have come up; the soldier loses his life by that heavy wound; I saw two men die in battle, being pierced with spears; the dying soldier opened his eyes and asked if the enemy were scattered; all other things but God are perishing, God remains, and ever will remain, fixed in the deep (altus) roots of his own life; the young man has turned aside from the way of virtue; dost thou

think that thy disciples will turn away from wisdom? bad men are sunk in miseries; my sister wove a crown for the poet; I will weave a crown for thee, my dearest mother; a multitude of men will flow into the city; they will come to see the queen and behold the public games; the clouds are scattered; the sun has shone forth; come, let us take a walk, and hear the birds sing their sweet songs; God has scattered the seeds of virtue in all minds.

Pavo.

Aesopii Fabulae.

1 3 2 4 5 7 6
Pavo graviter conquerebatur apud Junonem, dominam suam,
8 10 9 12 11 1 2 3 4
quod vocis suavitas sibi negata esset; dum luscinia, avis tam
5 6 8 7 1 2 4 5 3 7
parum decōra, cantu excellat. Cui Juno, "et merito," inquit; "non
6 9 10 12 13 11 8
enim omnia bona in unum conferri oportuit."

Vocabulary.

Conqueror 3, *I complain*; apud, *before*; Juno, ónis, *Juno, a Roman female divinity, the queen of heaven*; nego 1, *I deny*; luscinia, ae, f. *a nightingale*; et merito, *and deservedly, properly so too*; confero 3, *I bestow*; oportet (perfect, oportuit), *it is right, becoming.*

Anseres et Grues.

In eodem quondam prato pascebantur anseres et grues. Advenienti domino prati, grues facile avolabant; sed anseres, impediti corpŏris gravitate, deprehensi et mactati sunt.—Sic paupĕres cum potentioribus in eodem crimine deprehensi, soli dant poenam, dum illi salvi evādunt.

Vocabulary.

Quondam, *formerly*; pratum, i, n. *a meadow*; pascor, pasci, pastus sum, *I feed*; impedio (pes, *a foot*) 4, *I hinder*; deprehendo 3, *I catch*; macto 1, *I slaughter*; pauper, ĕris, *a poor man*; potentior (comparative of potens), *more powerful*; crimen, criminis, n. *an accusation, crime*; dare poenam, literally, *to give punishment*; that is, *to suffer punishment.*

Construction of Dare Poenam, &c.

Poena, from the Greek poine, originally denotes the sum of money by which impunity was purchased, or satisfaction was given to the injured. Hence it meant, in general, redemption-money, or the means of escape; a penalty, or the suffering undergone in consequence of a crime. But as the root idea is that of a fine, or mulct, so the guilty were said to give the payment or punishment (dare poenam), and the injured to take payment or punishment (sumere poenam). The plural of the nouns is also used. Accordingly, we have two classes of expression, the instances of which come under:—

To give punishment i. e., *to be punished*	To take punishment i. e., *to punish*
dare poenam, or poenas *to give the penalty*	sumere poenam, or poenas *to take the penalty*
solvere poenas *to pay the penalties*	suscipere poenas *to take the penalties*
pendere poenas *to pay the penalties*	petere poenas *seek, or require the penalties*

Vocabulary.

Repeto 3, *I seek, require*; reus, i, m. *an accused person*; Poeni, orum, m. *the Carthaginians*; temeritas, ātis, f. *rashness*; calidus, a, um, *hot*; sceleratus, a, um, *wicked.*

One or two other forms which appear in these exercises will now be readily understood.

Exercises.—Latin-English.

Repetit poenas filio pater justus; reum mulctavit mulctā maximā civem judex; avum annis debilem affecit consul gravi poenā; poenam dignam suo scelere suscipere non potuit Cicero; vobis victi Poeni poenas sufferant; maximas poenas pendo temeritatis meae; pro vestris maledictis poenae pendentur mihi hodie; calido dabis sanguine poenas; poenas gravissimas ex sceleratis hominibus sumserunt judices.

English-Latin.

I will inflict punishment on bad boys; bad boys will be punished; bad boys will have to suffer punishment suitable to their evil deeds; the judge punished the criminals very severely; being conquered you will suffer punishment from (Lat. to) the conquerors; I have been punished; I will punish them.

LESSONS IN GEOLOGY.—No. XX.

By Thomas W. Jenkyn, D.D., F.G.S., &c.

CHAPTER II.

ON THE ACTION OF WATER ON THE EARTH'S CRUST.

SECTION IV.

ON THE CHEMICAL ACTION OF WATER.

In your study of the phenomena produced by water, it is of importance that you should have a distinct conception of the difference between its mechanical and its chemical action.

When a river rubs against a rock, and wears it away by attrition, as if by filing or planing it; when it undermines the rich soil at its brink, as if by excavating it; when it carries along suspended in it, mould, gravel, or wood; and when it leaves such materials behind it on its banks, or deposits them quietly when it comes to a state of comparative rest, as in some deep pool in its bed, or at the bottom of the sea; such effects are ascribed to the *mechanical* action of water. They are all effects which could be produced by the instrumentality of machinery.

You have seen that when a drop of water is left upon polished steel, or when any iron is exposed to moisture and rain, the water produces on the surface of the iron and steel a rust, which is called by chemists the oxide of iron. This is produced by the chemical action of water. If water also be left on the surface of a limestone, it produces, before it evaporates, a small indentation, which by the repeated settling of water upon it, becomes a well-rounded hole. These circular little basins, the result of water eating into the stone, are found everywhere in limestone rocks which are occasionally overflowed by streams and torrents. Some such indentations are found in the surface of rocks near the sea-side, and within reach of the tides. They retain some portion of the salt water after the tide has retreated. In cases where this salt water has had time to evaporate before the tide reaches that indentation a second time, you have found that the exhaled water has left behind it a deposit of salt. All these and similar actions of water in corroding the iron, in dissolving the limestone, and in depositing the salt, are *chemical*. They are effects produced, not by any force or motion of the water, but by the gaseous and other elements which it contains in solution. If, in washing, you leave your soap in the water, the water will act *chemically* upon it, and dissolve it. If you empty the basin with the soap in the water, the water will *mechanically* carry it away, and deposit it at some other spot.

It is necessary also that you should well understand the difference between water holding any matter in suspension, and its holding it in solution. When a clear stream becomes muddy, it holds particles of clay or sand in suspension. When your tea has been sweetened, it holds sugar in solution. All water contains some gaseous and earthy elements in solution. Even the purest springs are impregnated with some foreign ingredients, which, being in a state of chemical solution, are so intimately blended with the water as not at all to affect its clearness. Such mingled ingredients, though invisible, render the water, in general, more agreeable to the taste, and more useful for nutrition than simple rain water. When springs contain earthy elements in great abundance, they are called mineral waters; and many of them are thermal or hot wells, which have been described to you in a previous Lesson.

You have now learnt that the chemical action of water is two-fold. It has the power of corroding and dissolving rocks and materials on which it acts; and it has the power of depositing the ingredients which it has held in solution.

The solvent or dissolving action of water is greatly assisted by the presence of carbonic acid, ammonia, and other elementary substances which combine with it. Even the rain, before it falls on the earth, collects a considerable quantity of carbonic acid from the atmosphere. When such a fluid penetrates into the earth's crust and percolates amid calcareous, siliceous, and ferruginous rocks, that is, amid strata containing lime, flint, or iron, the action of carbonic acid upon such rocks will be very great. When such impregnated water issues again, from deep sources, as a spring on the surface, and at a high temperature, it acts much more readily and extensively than when pure and cold.

Carbonic acid gas is that which you sometimes find bubbling

up like small globules in stagnant pools. This is the gas which accumulates at the mouth of limekilns, and which has been the cause of so many sudden and immediate deaths. This gas has the property of decomposing many of the hardest rocks, especially where felspar is an ingredient, as in granite and gneiss. Its effects are manifest on all rocks, but particularly on limestone. It is only in limestone rocks that the carbonic acid can dissolve all the constituent parts of the mass. This is the reason why calcareous rocks are almost the only ones in which great and lofty caverns, with large winding passages, are found.

The corrosion and destruction of many of the elements of rocks by the dissolving power of carbonic acid, whether in a gaseous state, or combined with spring water, in the crevices and crannies of rocks, is one of the most powerful causes of those internal changes, and of those subsequent re-arrangements of particles, which geologists have detected in rocks and fossils of all ages. As an instance I may remind you that you have often seen in hand specimens an imbedded shell containing a yellow shining substance almost like gold. That yellow shining matter was not originally in the shell. That part was first occupied by calcareous or limy matter, which was removed by the carbonic acid, and then was replaced by the carbonate of iron, of copper, or some other chemical ingredient such as mineral water holds in solution.

As water containing carbonic acid has percolated among beds of lime, flint, iron, &c., so the springs produced by the re-appearance of such water are called calcareous, siliceous, ferruginous, &c., according to the earthy or mineral character of the rocks which have further impregnated the water.

i. *Calcareous Springs.*

Many springs contain limy or calcareous matter in great abundance, and the phenomena of their influence upon rocks are of great interest in geology. It is found that even rain-water has the power of dissolving limestone. This is a wise arrangement designed by the God of nature. It is by this action that even in the smallest pool or streamlet matter is furnished for the earthy secretions of the little shelly animals that live in such water, and also for the growth of certain plants on which they feed.

When springs have gained accession of carbonic acid, by their waters having percolated among limestones, they can dissolve a much larger quantity of calcareous matter than rain-water. When this acid becomes again dissipated in the atmosphere, such water deposits its mineral ingredients in the channel of its current. The matter which it deposits is called tufa and travertin. When the deposit is loose and cellular it is called tufa; when the deposit is compact and hard it is called travertin. The substance of the sediment is, in both cases, precisely the same.

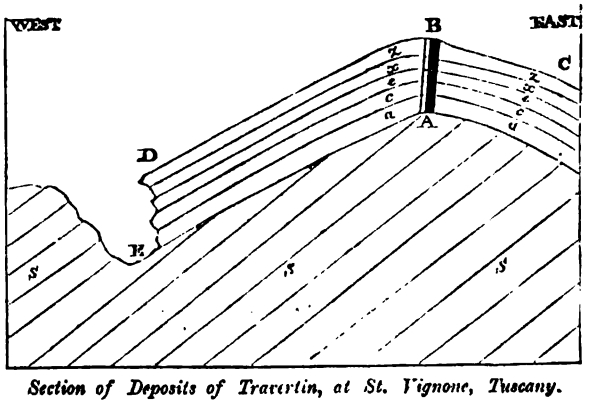
Though calcareous springs abound most in limestone districts, they are by no means confined to them, but flow in rocks of all formations and ages. In Auvergne, in central France, springs copiously charged with carbonate of lime rise up in rocks of granite and gneiss. One of these springs, near Clermont, has formed, by its deposits and incrustations, an elevated mound of travertin; that is, a white concretionary limestone. This sedimentary bed of limestone, formed by the spring, is 240 feet long, 16 feet high at its termination, and 12 feet wide.

In the valley of the Elsa, belonging to the Appenines, in Italy, there are innumerable springs which, in their flow, have precipitated or deposited so much calcareous matter that the whole ground in some parts of Tuscany is coated over with tufa and travertin. This ground sounds hollow beneath the foot. In the same district you can see compact rocks of travertin or limestone descending along the slanting sides of the hill, much like the beds of cooled lava on the sides of Etna, except that these travertins are of white colour. These sloping beds terminate abruptly as they reach the course of a river at the bottom of the hill. Geologists can prove that all these strata of travertin have been formed by calcareous deposits from the springs. Some of these springs are still flowing, others have disappeared.

One of the best illustrations of the action of these calcareous springs is formed at the baths of San Vignone, in Tuscany. San Vignone is on a hill about a hundred feet high. The top of the hill is flat, and stretches in a gently inclined platform to the east and west. The fundamental rock is black slate with serpentine. Near the summit a spring issues. The water is hot, has a strong taste, and is generally of a bright green colour. This well deposits its calcareous ingredients very rapidly. At the bottom of a large conduit pipe for conveying the water from the spring to the bath, a pipe, remember, that has the inclination of 30 degrees, a deposit of travertin, six inches deep, is formed every year. Where the water flows at a less angle and more slowly, the travertin is more compact. And, in winter, when the evaporation is least, the sediment is said to be more solid, but about one-fourth less in quantity than it is in summer." This rock is mostly white, and some of it so hard and compact that it rings to the hammer.

A careful study of the formation of limestone beds at San Vignone will throw much light upon the inquiries of the young geologist. Here you find the underlying rock of black slate coated on each side, east and west, with a white limestone. The beds of travertin descend the hill from the point where the calcareous spring rises. The beds take the slant of the hill, and the planes of the stratification are perfectly parallel to each other, though they all rest unconformably on the ancient rock of black slate. Among these beds there is one remarkable stratum which consists of many small layers or laminated sediments. This stratum is fifteen feet thick, and its structure is so compact as to form a good building stone. Another portion of these beds descends the side of the slate rock towards the west. This is of varying thickness, but in some places it is two hundred feet deep. Its course terminates abruptly, for its progress has been cut off by the current of the river Orcia. As the termination of the travertin is here very abrupt and almost overhanging, it is evident that the beds would have continued further had it not been for the action of the Orcia. This is proved by the facts that the river is constantly undermining the travertin, and that solid fragments of it are found scattered amid the alluvium of the stream.

Fig. 43.



Section of Deposits of Travertin, at St. Vignone, Tuscany.

In fig. 43, which represents a section of the district about the baths of San Vignone, s s s designates the fundamental rock of black slate. A, the point at which the spring began to issue and to deposit its sediments. *a c e x z*, the successive beds of travertin which the spring has deposited on each side until it has reached B, its present position at the baths. C marks the beds to the east. D shows the abrupt and overhanging termination of the beds to the west, where it is stopped by the undermining action of the river Orcia at E.

You perceive that the mass of sedimentary strata precipitated by this one spring must be enormous. After all, even this, is insignificant compared with the quantity which has been carried to the sea, since this spring has commenced its activity. It cannot be ascertained, at what time the spring began to flow: but it is remarkable, that in quarrying some of the beds, Roman tiles have been digged up at the depth of five or six feet.

The limits of our Lesson will not allow us to notice the calcareous springs of San Filippo, of Bulicami, and of Civita Vecchia, and of other places. There is, however, one remarkable phenomenon connected with such springs which it

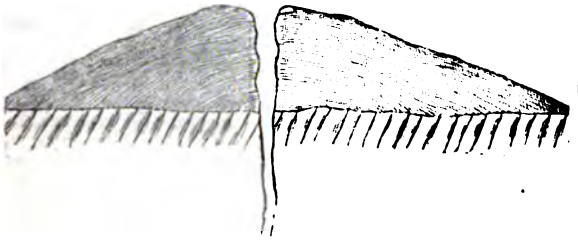
would not be right to leave unnoticed. It is probable that many of these calcareous springs issue in "the dark unfathomed caves of ocean." It is a fair inference that many of the limestones which consist of shells and zoophytes, and constitute the coral reefs of our seas, were supplied with their carbonate of lime, and with other mineral ingredients, from such springs issuing at great depths. It is also likely that the high temperature of these springs, as well as their gaseous, earthy, and mineral impregnations, promoted the development of corals, sponges, and shellfish. See, then, how boundless is the study of the chemical action of calcareous springs.

ii. *Siliceous Springs.*

The chemical substance or element which goes to constitute flint, is called silex or silica. Hence the name siliceous. It is well known that many springs hold in solution a great quantity of silex or flint, and that when their current becomes cooler, they deposit a flinty substance upon the ground. Water must be of a high temperature, like the geysers of Iceland, before it can hold silex in solution; but as its temperature decreases, it precipitates its siliceous ingredients. This deposit is called sinter, as that of calcareous springs is called tufa or travertin.

At St. Michael in the Azores, there are hot springs which precipitate an immense deposit of siliceous *sinter*. The basin of one of the largest of them is nearly circular, and is about twenty or thirty feet in diameter. Around the outward edge of this basin are found alternate layers of coarse sinter mixed with clay, imbedding ferns, grasses, and reeds in different states of petrifaction. Wherever the water has flowed, sinter is found. These layers of sinter rise, in some places, eight or ten inches above the ordinary level of the stream. In the channels of these waters, branches of ferns of the kind now growing on the island are found completely petrified. Also fragments of wood, and, in one instance, a bed of reeds from three to five feet deep, have become perfectly mineralized.

Fig. 44.



A Cone formed by Chemical Depositions from a Well holding Silex in Solution.

The geysers of Iceland, to which your attention has been directed in a previous Lesson, supply one of the most remarkable examples of the deposition of silex by a siliceous spring. The manner in which a flinty sediment is deposited around the well's mouth by a silicious spring is represented in fig. 44.

If you apply your knowledge of siliceous springs to phenomena which take place in the ocean, your interest in geology will be greatly extended and enlivened. When siliceous springs, of high temperature, issue at great depths under the pressure of the sea, they retain their heat much longer than they do when they issue in the open air. The inference is, that such submarine springs may be charged with a greater quantity of silex than the most powerful springs which appear on the surface of the earth. These siliceous springs, which find an outlet at the bottom of the ocean, and the mineral waters charged with silica which flow into the sea, supply, it is probable, certain corals, sponges, and infusorial animals, with matter for their diversified siliceous secretions.

iii. *Carboniferous Springs.*

These are generally called carbonated springs, as they are plentifully charged with carbonic acid gas. These springs are found in almost every country, but especially in the regions of active or extinct volcanoes. In Auvergne, there are springs of this character, in which the water is seen bubbling and boiling up with great noise. This noise is occasioned by the superabundant disengagement of gas, just as you find in a gas burner, there is a fluttering noise when more gas escapes than can be consumed by the flame. Where carboniferous wells abound, the growth of vegetation is greatly promoted by them. It is found that herbs, ferns, and trees flourish more luxuriantly, and grow more rankly, than they would otherwise do in the same climate. The reason of this luxuriant growth is, that the leaves of such herbs and trees absorb, or drink, in the carbonic acid that has been so plentifully disengaged in the surrounding district. This fact is worth knowing, as it will help you to account for the enormous quantity of carbonic acid gas that must have been discharged to produce the coal formations.

We may class, under this head, the springs which are found impregnated with petroleum, naphtha, asphaltum, bitumen, and pitch, and kindred minerals.

These springs are very numerous. They are, no doubt, in many instances, connected with subterranean fire, which sublimate the more subtle parts of the bituminous substance contained in rocks. There are many of these petroleum springs in Italy, but the most remarkable and powerful are found in the East Indies. On one spot on the banks of the Irrawadi, in the Burman empire, there are above five hundred wells of this description, which yield every year four hundred thousand hogsheads of petroleum.

Another spot remarkable for this mineral production is the Island of Trinidad, north-east of South America. On both sides of this island, fluid pitch or bitumen oozes from the bottom of the sea and rises to the surface of the water. In one place near it there is a whirlpool which in stormy weather eddies with violence, raises the water of the sea some five or six feet, and then covers the surface of the ocean for a considerable space with pitch or tar. Trinidad is also distinguished for its celebrated lake of pitch. Many theories have been put forth to account for this extraordinary quantity of pitch in this neighbourhood. The most probable is this. The immense river Orinoco has for many ages been bringing down to the sea great quantities of vegetable and woody substances. When they reach the sea they are by the force of currents and eddies arrested and made to accumulate in particular places. As earthquakes take place very frequently in this neighbourhood, they lead to the inference that these vegetable substances are within the agency of subterranean fire, which effects those transformations and chemical changes which issue in petroleum. Having been thus produced, it is again by volcanic action forced up to the surface, where, on exposure to the air, it forms the different varieties of pure and earthy pitch or asphaltum which abound in the island.

Many geological sections of the earth's crust exhibit bituminous shales, and also many stratified beds or deposits of bitumen and pitch. These facts clearly prove that, at former epochs in the earth's history, springs were as commonly impregnated with bituminous matter as they are now. This matter was carried down by streams and rivers into lakes and seas, which afterwards produced our beds of coal and shale.

iv. *Saliferous Springs.*

These springs contain a great quantity of muriate of soda, or common salt, and are hence called brine springs, or salt wells. Some of them yield one fourth of the weight of their water in salt. Those of Cheshire are reckoned the richest in England, for those at Northwich are almost saturated with salt. There are also rich brine springs at Barton, in Lancashire, and Droitwich, in Worcestershire. These springs rise up through beds of sand-stone and red marl, which contain thick strata of rock salt. They are known to have flowed for more than a thousand years, consequently the quantity of salt, which they must have discharged into their respective rivers and seas, must be enormous.

v. *Ferruginous Springs.*

There are scarcely any springs which do not hold some iron in solution. Some of the phenomena of these springs are very familiar to you. Waters impregnated with this metal are found to stain the rocks, the soil, and even the herbage, through which they pass. Such water, also, binds together sand, gravel, and pebbles, into solid masses, as you may have observed on the south side of the Isle of Wight, and in other places, especially in Hertfordshire, where what is called plum-pudding stone abounds.

Again arises a question: Where does all this iron come from. It is constantly sent up from the interior of the earth, and

conveyed into lakes and seas. There it cannot escape by evaporation, but acts as a colouring and cementing substance in the deposits which are now being formed under water.

Now apply these few facts to every red soil that you have seen, and especially to the immeasurable masses and conglomerates of the old red sand-stone under the coal and to the new red sand-stone above it, and then think and study what incalculable quantity of iron springs must have been brought up from the interior of the earth to colour and to cement enormous mountains of such depth, and of such extent.

LESSONS IN ENGLISH.—No. XXV.

By JOHN R. BEARD, D.D.

THE GREEK ELEMENT.—GREEK STEMS.

THE prefixes and suffixes of which I have treated, are connected with certain roots or stems. So far as these stems are of Saxon birth, you need little instruction in them; they are your mother tongue, and, in general, are as readily understood by you as the words which denote the members of your body, or the food that you eat. With other stems you are not acquainted. Among the words I gave you for exercise in composition in the last lesson, there are words for the meaning of which you have probably had to resort to a dictionary. Such a word is *accessary*. Now *accessary* being made up of the Latin words ad, *to*, cedo, *I go*, and the termination *ary*, would have occasioned you no difficulty had you been familiar with the foreign or exotic stems of our language. In origin, those stems are various. Chiefly they are derived from the Latin, as in the word *accessary*. Some come from the Greek; others are of different parentage. These must all be separately considered. I begin with an example of

GREEK STEMS.

Greek words.	*Stems.*	*English words.*
adelphos, *a brother*	*adelph*	Phil*adelphia*
philos, *a friend, loving*	*phil*	*philo*sophy
sophos, *wise*	*soph*	*soph*ist

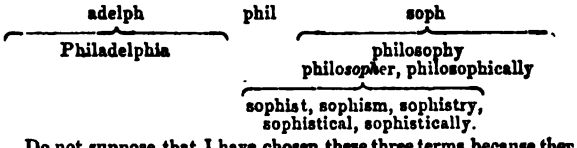
Now let me explain the process I here intend. Adelphos is found in Philadelphia, but not in its full form. It is found as it appears under "Stems;" for adelphos, passing into Philadelphia, loses *os*, and takes *ia*. By this time you know enough of the changes in language to be aware that these changes in the terminations do not affect the root-meaning, or the essential import of the word. Prefixes and suffixes convert verbs into nouns, and adjectives into adverbs; or they may modify the signification; they may even reverse it, but they nevertheless leave the import of the stem still traceable after it has undergone their influence. Philadelphia, then, has clearly something to do with adelphos, *a brother*. What that something is, you find indicated in the next Greek word and its stem, namely, philos, *loving*, and *phil*. Putting the two together, you have *Philadelphia*, and putting the two meanings together, namely, *love* and *brother*, you obtain *brotherly-love* as the import of the word under consideration. Remembering that Philadelphia is the name of a town in the United States, you are reminded that the name, *brotherly-love*, was given to it by its founder Penn, as indicative of the spirit with which he dealt with the original inhabitants of that region. Passing on to the next word, *philosophy*, I find at the beginning of it the same *phil* of which I have already spoken. But I find, also, *sophy*. What am I to do with *sophy*? First, I know that the *y* may represent the Greek *ia*, as is set forth in the remarks on suffixes. Changing the one into the other, I thus get *sophia*. Now, by referring to the next line in my list of words, I see one which is very like *sophia*; that is, *sophos*. I already know enough of the changes which words undergo to find reason for thinking that sophia is connected with sophos in meaning and source as well as in form. This idea is confirmed by my seeing that *soph* is given as the stem of sophos. Now soph is equivalent to our *wise*; here *love* and *wise* must be put together, and so I learn that philosophy is the *love* of what is *wise*, or the *love of wisdom*. Such being the case, a philosopher must be one who *loves wisdom*.

But *soph* is given as the origin of *sophist*. *Sophist* obviously consists of two parts; the part which is given, that is, soph, meaning *wise*, and *ist*. What is this *ist*? Let me think. Have I not had *ist* before? O yes, I remember, *ist* is a suffix, a Greek suffix, and denotes a partisan, one who follows a party in an opinion; like baptist, one who observes baptism. Sophist, then, must be one who pursues wisdom, one who is given to wisdom. Now such is the meaning of the word, and such is the whole meaning of the word as taught by etymology, or the doctrine of tracing out the root-signification of words. And here you have an instance of the short-comings of etymology. So far as I have yet gone you see no difference between philosopher and sophist, for both are students of wisdom. Yet, if you meet with the two in a narrative or a discussion, you find that their meanings are different; at least, a philosopher is spoken of with respect, a sophist is spoken of slightingly.

I have entered into these details in order to show you that history must be taken as an ally to etymology in the study of languages. In the case before us history supplies the lacking information. From history we learn that the sophists were a set of Greek teachers who, not content to be called philosophers or lovers of wisdom, pretended to be sophoi or wise men, and so came to be designated sophistai, *sophists*, disparagingly. A sophist, then, you thus learn, is a pretender to wisdom; and as all pretenders are obliged to resort to trickery, so a sophist is one who, by unsound and cunning arguments or delusive appeals, aims, for his own purposes, to produce a false impression. Knowing what a sophist is you easily infer the meaning of sophism, or a means by which the sophist works; and sophistry, his art. Advanced thus far, you have no difficulty with sophist*ical*, nor with sophist*ically*.

Turn your attention for a moment to the English representatives given above, and observe generally that in representatives, whether designated English or foreign, I mean the radical parts of the words, in each case the radical or essential elements of each word. Now, you have above these three combinations of letters, namely, adelph, phil, and soph. These three parts are the parents of all the words of which I have just treated, and connected with them is all the information I have here set forth. When I have added, that what I have said is only a very small part of what I might have said, you will have some idea of the extent and value of etymological studies.

The branchings of these three stems may be exhibited thus:—



Do not suppose that I have chosen these three terms because they were specially prolific. I took adelph because it begins with the first letter of the alphabet. The other words followed of course. So far from the series being very prolific, one member of it, adelph gives birth to only one word, and that word is etymologically unproductive.

My chief object, however, in going into this detail was to lay before you the principle on which the following list of words is drawn out, and the manner in which you are to study them. If you will faithfully, diligently, and perseveringly study these lists, combining with them the knowledge communicated in previous lessons, you will make rapid progress, and acquire a superior familiarity with the English language in all its elements.

Having done with this triplet of words, and pursuing the order of the alphabet, I come to other Greek terms found in English:—

GREEK STEMS.

Greek words.	*Stems.*	*English words.*
aethlos, *a combat*	*athlet*	*athlet*ic
agogos, *a leader*	*agog*	dem*agog*ue
demos, *the people*	*demo*	*demo*cracy
kratos, *strength*	*krat* (crat)	aristo*cracy*
aristos, *best*	*aristo*	*aristo*cratic.

In these lists I do not give the English meanings of the examples, lest you should be turned away from the efforts by which, from the aids furnished, you ought to be able to gather the significations yourself. When, however, it may appear desirable, I will quote instances from good authors of the employment of the words, and so you will obtain another kind of assistance. The most effectual teaching is that which leads persons to teach themselves.

"David's combat (with Goliah) compared with that of Dioxippus the Athenian *Athlete*."—*Delaney*.

"The legislature of the kingdom (of England) is entrusted to three distinct powers, entirely independent of each other; first, the king; secondly, the lords, spiritual and temporal, which is an aristocratical assembly of persons selected for their piety, their birth, their wisdom,

their valour, or their property; and thirdly, of the House of Commons (the representative of the democracy)."—*Blackstone:* "Commentaries."

Exercises for Parsing.

Philadelphia is the word employed by the Apostle Paul in his epistle to the Romans (xii. 10). Philadelphia, as employed by the Apostle to the Gentiles, is rendered in our English version by "brotherly love." A word of the same origin is used by the Apostle Peter, where (1. Pet. iii. 8) he gives the injunction "love as brethren." Sophos is the Greek term found in that text: "Professing themselves to be *wise* they became fools." (Rom. i. 22) The words just cited accurately describe the character of a sophist. A word derived from sophos is the word employed in this question: "Whence hath this man this *wisdom*?" (Matt. xiii. 54.) Our word *athletic* has a word of the same origin in the words: "Ye endured a great *fight* of afflictions." (Heb. x. 32.) The Greek *demos* is, in the original, used in the passage: "The *people* gave a shout." (Acts xii. 22.) Kratos is in the New Testament represented by these English words,—namely, *strength* (Luke i. 51), *power* (Ephes. i. 10), and *dominion* (1. Pet. iv. 11).

EXERCISES IN COMPOSITION.

Words with their proper Prepositions to be formed into sentences.

	F. R.
Adjust to,	just, *just, right*
Admonish of,	mone, *to remind*
Admission to, into,	miss, *sent* (*mission*)
Admit of,	mitt (miss), *to send*
Advantage over	avant, *before*
Advise of,	vis, *sight, vision*
Advocate for,	voca, *to call*
Affection for,	fici (fac, fec) *making*
Affinity to,	fini, *an end* (*final*)
Agree with, to, on,	grat, *pleasing*
Agreeable to,	grat, *pleasing.*
Alienate from,	alien, *another's* (*an alien*)

Questions: Where is the difference between to agree with and to agree? to also between agree to and agree on? Form illustrative sentences. Where is the difference between admonish and admonish of? Form illustrative sentences. Besides working each term given in this list into a simple sentence, work into simple sentences words formed from them; as, admonition, admission, advocacy, agreement, alienation, taking care to employ the proper prepositions.

Study the following anecdote; write down the substance of it from memory; and then give an account of it to your fireside companions.

A Whaler in a Storm.

About eleven o'clock, I ventured on deck, and, for the first time in my life, saw what the ocean looks like in a storm. I could see nothing all around but heaving mountains of water; each succeeding wave seemed as if it would swallow up the labouring vessel, but it always appeared to melt away gently under us, except when one more rapid, or "cross," would send water and spray washing over her decks and high up into the rigging. The motion of the ship was not uncomfortable, being very different from the short cross pitching we had experienced in the North Sea. I remained on deck about a quarter of an hour, gazing about me in silent wonder and admiration, little thinking that the hitherto harmless waves were upon the very eve of proving their might over man's puny bolts and beams. Feeling it chilly, I went below. I had just entered the cabin and taken my seat, when the ship became motionless, as it were, and seemed to tremble in every beam. A report, like thunder, mingled with the rending and crashing of timber; sudden, and complete darkness, with a rush of water through the skylight, and the ship thrown on her beam-ends, showed me what one has to expect occasionally at sea. I scrambled on deck after the captain as I best could, scarcely knowing what had happened. Here nothing was to be seen but wreck and destruction. The quarter-deck was literally swept of everything, rails and bulwarks; almost all the stanchions, the binnacle, compasses, dog's couch, and nothing could be seen of the wheel but the nave. But the worst was still to come; two poor fellows were missing. One had perished unnoticed; he must have been killed amongst the wreck, washed overboard, and sunk like a stone. The other had been seen by the mate—for an instant only—floating on the binnacle and just sinking. No human assistance could have been rendered to them with such a sea running. Two other poor fellows were rather seriously injured, and took up my attention for some time. The captain, cool and collected, soon restored confidence to his men, and, in a short time, had the wreck cleared away, a long tiller shipped, and the vessel again hove to. Spare spars were lashed to the stanchions that remained, so that we had again something like bulwarks, but for many a day afterwards, the ship had a sadly-damaged and wrecky appearance.—*Goodsir's Arctic Voyage.*

LESSONS IN MUSIC.—No. XIII.

By John Curwen.

While our pupils are continuing the study of fan and lah in connexion with the following exercises, we shall touch a few incidental topics of information and guidance.

1. It will contribute to the confidence of our pupils, and to their hopes of some day singing at sight, to remember that every tune, with the exception of "minor" tunes to be mentioned hereafter, and some few others, begins on doh, me, or soh. So that having taken the key-note from your tuning-fork, and struck the chord, you are sure to be in possession of the right note to begin with. You will also find that the accompanying "parts" of a tune (adapted to lower voices) commence always on some note of this "common chord."

2. For the sake of the *thorough* workers, those who are so diligently following the course in which we are guiding them, it will be well to remind our pupils of the process through which they must pass in connexion with each exercise, and of the reasons for each step of that process. Every exercise should first be—

a. Learnt by pattern from the modulator. This will cultivate the ear and voice generally. It will teach the particular tune along with a pictorial representation of its intervals, and will accustom the mind more and more to that beautiful *language of interval*, which, by giving a *distinct* and *uniform* syllabic name to each interval of the scale, enables us, by the ever renewed association of the syllable with the sound, to sing with increasing ease and confidence. The "second part" should be learnt in the same manner—as though it were a separate exercise—before it is sung with the "air." The exercise should next be—

b. Sol-fa'ed from the book. This will give scope for a more accurate observance of measure, as indicated by the accent marks, and allow the "parts" of a tune to be sung together. It also strengthens the association between the syllables and their proper intervals. But lest the syllables of a tune should come to be sung by mere "rote"—the pupil having no mental picture of their relative position on the modulator, it will be found advisable to require each exercise to be—

c. Pointed on the modulator from memory. This will complete the knowledge of the tune, and greatly increase its teaching power. Every pupil should do this in his private practice, and should be ready to do it at the teacher's call, before the class. But the solfa syllables, though invaluable as the mnemonics and interpreters of interval, and likely to be always useful in learning new tunes, and in studying the difficulties or beauties of particular passages, are only instruments for accomplishing the higher purposes of music. The learner must acquire the power of perceiving the musical "property" of a note, and of producing it, in connection with *any* syllable. With this view, the pupil should not shrink from the mental effort of having each exercise—

d. Figured, or sung to the words one, two, three, &c., according to the number of syllables in each line of the poetry. Thus "common metre" would be sung 1 | 2 : 3 | 4 : 5 | 6 : 7 | 8: 1 | 2 : 3 | 4 : 5 | 6 &c.; and "sevens" | 1 : 2 | 3 : 4 | 5 : 6 | &c. This will make the perception of the characters and intervals of notes more perfectly mental, and independent of syllabic associations. It will also introduce the use of *slurs*—each utterance corresponding with a syllable of the verse, and not, as before, with every note of the music. As this exercise is difficult at first, it is an advantage that the words used (1, 2, 3, &c.) require no attention, and that the mind is left free to study the music alone. But the highest attainment is reached when, the tune itself being perfectly mastered, it is—

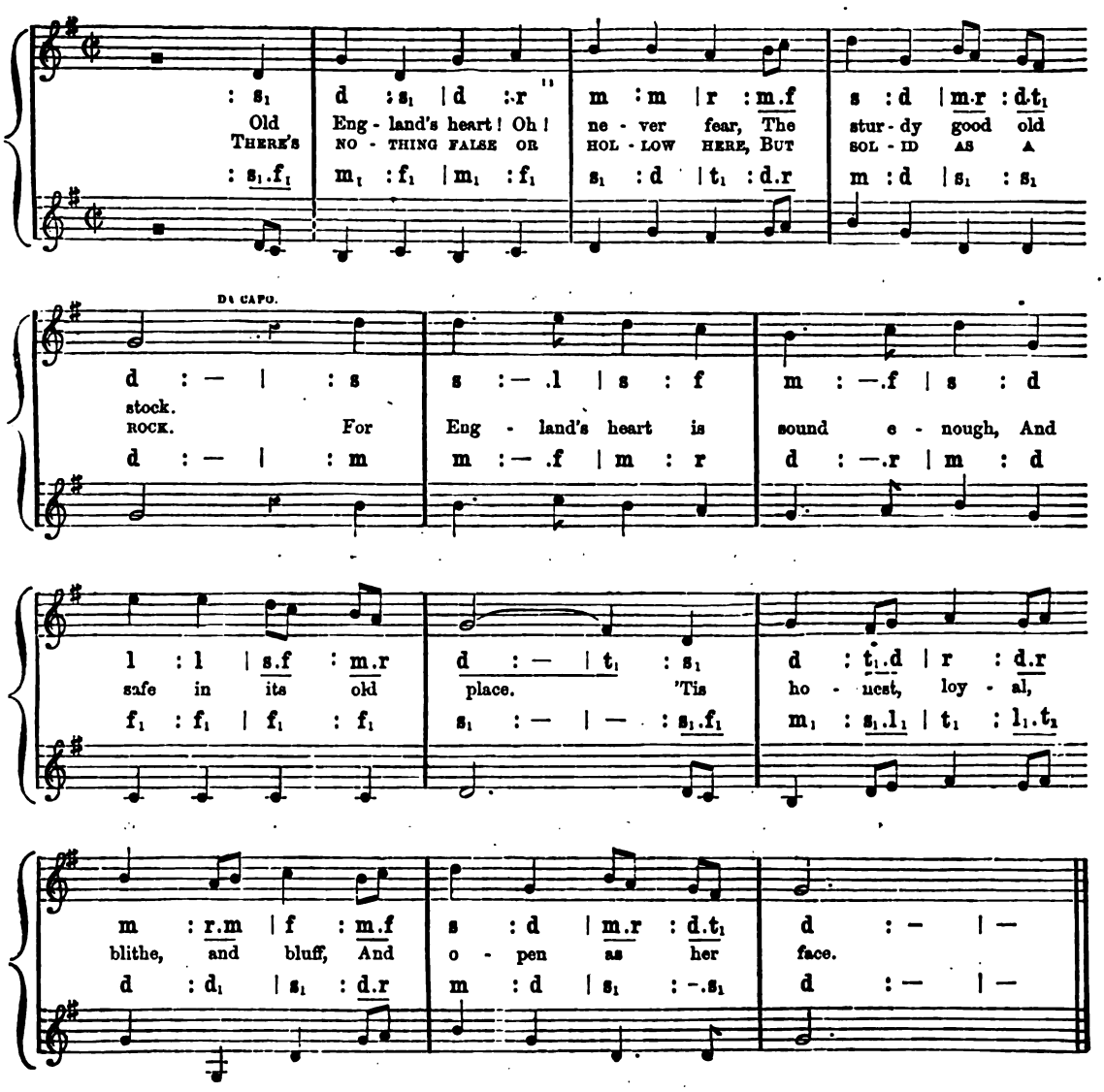
e. Sung to suitable words. This exercise should not commence until the words themselves are thoroughly understood, enjoyed, and loved, and then it should be performed with careful regard to expression. Thus the pupil is introduced to a new study, most elevating and ennobling to the mind, which he will pursue in sympathetic converse with his teacher.

It is not necessary that the pupil should thus make the fullest use of one exercise before he passes to the next. It would be better that, at every season of practice, each of the above employments should have place—some new exercise

being taught by pattern, a previous one sol-faed from books and pointed on the modulator, and an earlier one still "numbered" and sung to words. The pupil should keep a record of progress, both on the book and separately—showing to what extent each exercise has been used. On the book each exercise would be marked with the letters above used in connexion with each employment—*a.* indicating that the exercise had only been learnt by pattern—*a. b.* that it had, also, been sol-faed from the book, &c. A separate entry might be made in this wise—"May 6, Ex. 20. *a.* 19, *b. c.* 18. *d. e.* 13, 14, and 15, *e.*"

EXERCISE 25. **OLD ENGLAND.** KEY G. M. 112.

(The Words from "Ballads for the Times," by MARTIN TUPPER, Esq. Tune, Old English.)

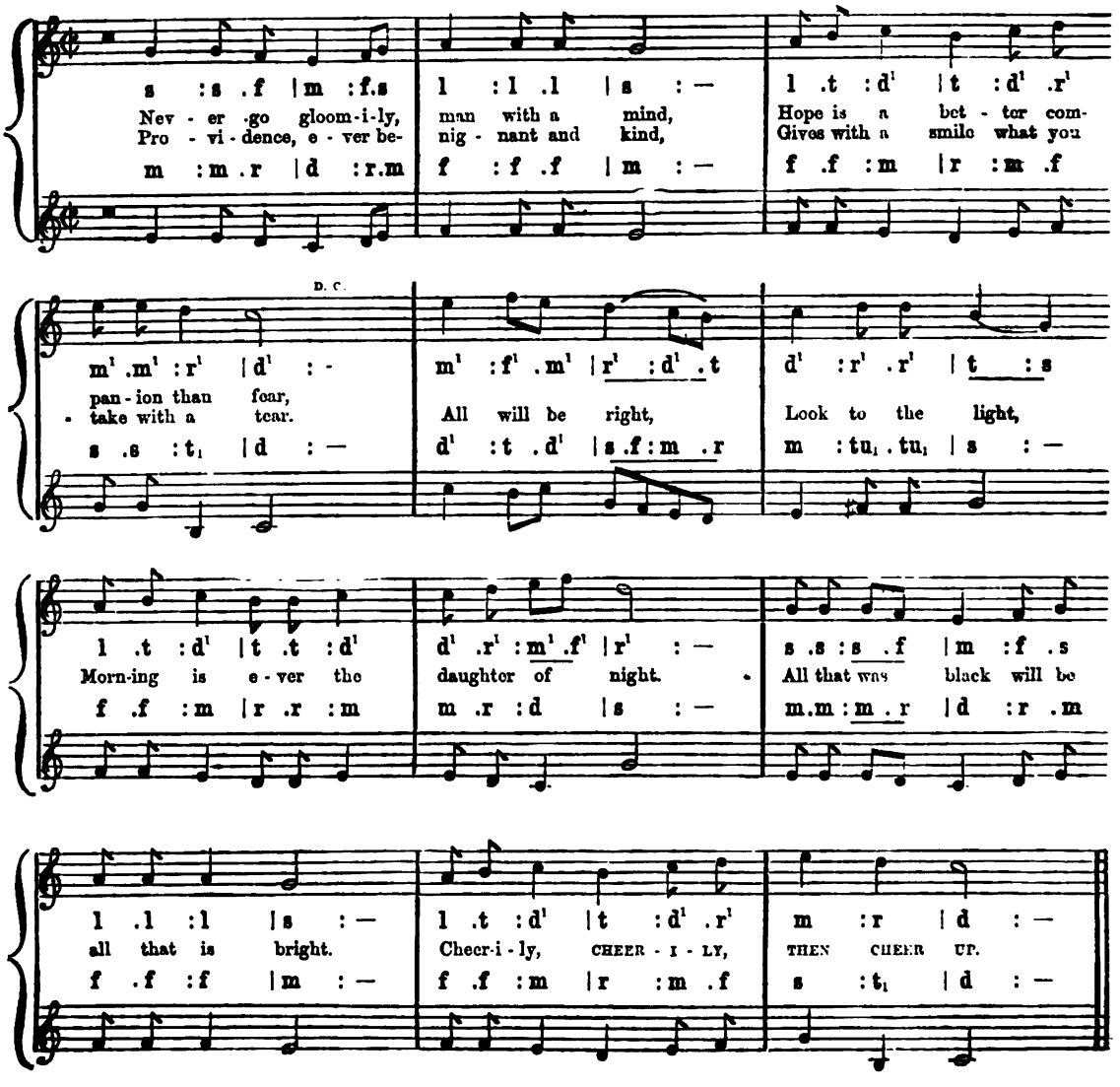

: s1 | d : s1 | d : r
Old Eng - land's heart! Oh!
THERE'S NO - THING FALSE OR
: s1.f1 | m1 : f1 | m1 : f1
m : m | r : m.f | s : d | m.r : d.t1
ne - ver fear, The stur - dy good old
HOL - LOW HERE, BUT SOL - ID AS A
s1 : d | t1 : d.r | m : d | s1 : s1
D.S. CAPO.
d : — | : s | s : — .l | s : f | m : —.f | s : d
stock. For Eng - land's heart is sound e - nough, And
ROCK.
d : — | : m | m : — .f | m : r | d : —.r | m : d
l : l | s.f : m.r | d : — | t1 : s1 | d : t1.d | r : d.r
safe in its old place. 'Tis ho - nest, loy - al,
f1 : f1 | f1 : f1 | s1 : — | — : s1.f1 | m1 : s1.l1 | t1 : l1.t1
m : r.m | f : m.f | s : d | m.r : d.t1 | d : — | —
blithe, and bluff, And o - pen as her face.
d : d1 | s1 : d.r | m : d | s1 : -.s1 | d : — | —

2. Old England's heart with beating nerves,
It rallies for the throne;
And yet, like Luther, well preserves
THE KNEE FOR GOD ALONE.
Old England's heart is sound enough,
Unshaken and serene;
'Tis like her oak-trees, true and tough,
And old—BUT GLAD AND GREEN.

3. *Our England's heart! Aye, God be praised,*
That thus, in patriot pride,
AN ENGLISH CHEER can yet be raised
Above the stormy tide.
'TIS SAFE ENOUGH AND SOUND ENOUGH,
IT THRILLS THE HEART TO FEEL,
A MAN'S A BIT OF ENGLISH STUFF,
AND TRUE FROM HEAD TO HEEL.

NOTE.—When you come to sing this tune to words be careful to observe the LOUD and *soft* phrases, as indicated by the capitals and italics. But a better way still is, to throw your own soul into the sentiment—forgetting yourself and your hearers in the thoughts and feelings you utter—and sing accordingly.

EXERCISE 26. **CROSSCOMBE.** KEY C. M. 80

(The Words from "Ballads for the Times," by MARTIN TUPPER, Esq. Tune, Old English.)

s :s .f |m :f.s
Nev - er go gloom-i-ly,
Pro - vi - dence, e - ver be-
m :m .r |d :r.m
l :l .l |s :—
man with a mind,
nig - nant and kind,
f :f .f |m :—
l .t :d' |t :d' .r'
Hope is a bet - ter com-
Gives with a smile what you
f .f :m |r :m .f
D. C.
m' .m' :r' |d' :-
pan - ion than fear,
take with a tear.
s .s :t, |d :—
m' :f' .m' |r' :d' .t
All will be right,
d' :t .d' |s .f :m .r
d' :r' .r' |t :s
Look to the light,
m :tu, .tu, |s :—
l .t :d' |t .t :d'
Morn-ing is e - ver the
f .f :m |r .r :m
d' .r' :m' .f' |r' :—
daughter of night.
m .r :d |s :—
s .s :s .f |m :f .s
All that was black will be
m.m :m .r |d :r .m
l .l :l |s :—
all that is bright.
f .f :f |m :—
l .t :d' |t :d' .r'
Cheer-i - ly, CHEER - I - LY,
f .f :m |r :m .f
m :r |d :—
THEN CHEER UP.
s :t, |d :—

2. Many a foe is a friend in disguise,
Many a sorrow a blessing most true,
Helping the heart to be happy and wise,
Bringing true love and joys ever new.

Stand in the van, strive like a man,
This is the bravest and cleverest plan—
TRUSTING IN GOD WHILE YOU DO WHAT YOU CAN:
CHEERILY, CHEERILY, THEN CHEER UP!

NOTE.—These two songs will show LAH and FAH in new positions, and with new rhythmical arrangements. The pupil will pay special attention to these two notes wherever he finds them.

The "time" in this tune will be rather difficult, but must be kept *perfectly*. Remember, that with proper care and self-discipline at first, it is *easier* to be perfect than imperfect.

LESSONS IN FRENCH.—No. XXXIV.

By Professor LOUIS FASQUELLE, LL.D.

SECTION LXXV.

REGIMEN OR GOVERNMENT OF VERBS (§ 129).

1. Many verbs come together in French without prepositions, which are in English joined by them. Many others are connected in French by prepositions different from those connecting the corresponding verbs in English. No satisfactory general rules can be given on this point. We shall give in the Second Part of these Lessons [§ 130, 131, 132] copious lists of the verbs in general use, with the prepositions which follow them, when they come before other verbs. We have also hitherto noted the prepositions usually placed after the verbs introduced in our lessons.

2. The student will recollect, that a verb following another verb (not *avoir* or *être*) or a preposition (not *en*) must be in the infinitive.

3. The following verbs, extracted from the list, § 130,

although they, in English, take a preposition before another verb, do not take one in French :—

Aller, 1. ir. *to go*	Falloir, 3. ir. *to be necessary*	Savoir, 3. ir. *to know*
Compter, 1. *to intend*	Mener, 1. *to lead, take*	Souhaiter, 1. *to wish*
Courir, 2. ir. *to run*	Penser, 1. *to think*	Valoir mieux, 3. ir. *to be better.*
Daigner, 1. *to deign*	Pouvoir, 3. ir. *to be able*	Venir, 2. ir. *to come*
Désirer, 1. *to desire*	Prétendre, 4. *to pretend*	Vouloir, 3. ir. *to wish, will.*
Devoir, 3. *to owe*	Préférer, 1. *to prefer*	
Envoyer, 1. ir. *to send*		
Espérer, 1. *to hope*		

Résumé of Examples.

Comptez-vous dîner avec nous ?	*Do you intend to dine with us ?*
Je vais déjeûner chez mon père.	*I am going to dine at my father's.*
Ne voulez-vous pas donner à manger à ce chien ?	*Will you not feed that dog ?*
Désirez-vous monter dans ma chambre ?	*Do you wish to go up to my room ?*
Je préfère descendre chez votre père.	*I prefer to go down to your father's.*
Demeure-t-il en haut ou en bas ?	*Does he live above or below ?*
Préférez-vous demeurer au rez-de-chaussée ?	*Do you prefer to live on the ground floor ?*
Je désire demeurer au premier étage.	*I wish to live in the first story.*
Nous préférons louer le second étage.	*We prefer to take the second story.*
Nous espérons louer une chambre au second.	*We hope to rent a room in the second story.*

Exercise 149.

Cabinet, m. *closet.*	En haut, *up stairs, above.*	Salle, f. *parlour.*
Compt-er, 1. *to explain.*	Faisan, m. *pheasant.*	Touch-er, 1. *to touch, play.*
Demain, *to-morrow.*	Jou-er, 1. *to play.*	Troisième, *third story.*
Déjeûn-er, 1. *to breakfast.*	Lou-er, 1. *to rent, let.*	Violon, m. *violin.*
En bas, *down stairs, below.*	Pinc-er, 1. *to play.*	
	Plaisir, m. *favour, pleasure.*	

1. Combien de chambres comptez-vous louer ? 2. Nous comptons louer une salle au rez-de-chaussée et deux cabinets au troisième. 3. Ne préférez-vous pas louer une chambre-à-coucher au second ? 4. Nous préférons demeurer au rez-de-chaussée. 5. Ne pouvez-vous rester à dîner avec nous aujourd'hui ? 6. Je vous remercie, je préfère venir demain. 7. M. votre père viendra-t-il demain déjeûner avec nous ? 8. Il compte venir demain, de bonne heure. 9. Que voulez-vous leur dire ? 10. Je veux les prier de me faire ce plaisir. 11. Comptez-vous faire ce plaisir à mon frère ? 12. J'espère le lui faire. 13. Préférez-vous demeurer en haut ou en bas ? 14. Nous préférons demeurer en bas. 15. Que pensez-vous faire de ce jeune faisan ? 16. Nous pensons l'envoyer à M. votre beau-frère. 17. Ne savez-vous pas jouer du violon ? 18. Je sais en jouer. 19. Mlle. votre cousine sait-elle toucher le piano ? 20. Elle sait toucher piano et pincer la harpe. 21. Ne savez-vous pas écrire ? 22. Nous savons lire, écrire, et compter. 23. Savez-vous jouer de la guitare ? 24. Nous ne savons pas en jouer. 25. Nous souhaitons trouver un appartement au rez de chaussée.

Exercise 150.

1. Does your brother-in-law intend to rent the ground floor ? 2. He intends to rent two rooms in the second story. 3. How many rooms does your son intend to take ? 4. He intends to take two rooms in the second story. 5. Does he prefer to live on the second floor ? 6. He prefers to live on the ground floor. 7. Does your father wish to come to dinner with us to-morrow ? 8. He intends to come to-morrow at two o'clock. 9. Do you prefer to live up stairs or down stairs ? 10. I prefer to live above. 11. Does your sister know how to play on the piano ? 12. She knows how to play on the piano. 13. Where do you intend to live (*demeurer*) ? 14. We intend to live at your father's. 15. Will you go up to my room ? 16. I will go down to your father's. 17. Do you wish to live on the ground floor ? 18. I wish to live on the second floor. 19. Is it necessary to stay here ? 20. It is not necessary to stay here. 21. What do you think of doing with (*de*) your book ? 22. I think of giving it to my son. 23. What do you wish me to say to that gentleman ? 24. I wish to beg him to do me a favour. 25. Do you wish to send that pheasant to your mother ? 26. I wish to send it to her, she is sick. 27. Cannot your sister play on the violin ? 28. She cannot play on the violin, but she can play on the guitar. 29. Does your sister wish to live up stairs ? 30. She prefers living down stairs. 31. Will you not do me that favour ? 32. I will do it with pleasure. 33. Cannot your brother stay and dine with us today ? 34. He has promised my father to come and dine with him. 35. Our friend knows how to read, write, and cipher.

Section LXXVI.

Government of Verbs.—Continued.

1. Many verbs in French are joined with other verbs following, by means of the preposition de, *of*, where the corresponding verbs in English either take no preposition, or one other than *of*. Besides avoir besoin, &c. [Sect. 20, R. 4], the following verbs, extracted from list, § 132, belong to this class :—

Achever, *to finish*	Dispenser, *to dispense*	Négliger, *to neglect*
Brûler, *to burn, to long*	Empêcher, *to prevent*	Prier, *to beg*
Cesser, *to cease*	Eviter, *to avoid*	Promettre, *to promise*
Commander, *to command*	Se flatter, *to flatter one's self.*	Proposer, *to propose*
Conseiller, *to advise*	Jurer, *to swear*	Refuser, *to refuse*
Défendre, *to forbid*	Manquer, *to fail*	Supplier, *to entreat*
Dire, *to say*	Menacer, *to threaten*	Trembler, *to tremble.*

Résumé of Examples.

Pourquoi n'achevez-vous pas d'apprendre ce métier ?	*Why do you not finish learning the trade?*
Nous brûlons de continuer nos études.	*We burn to continue our studies.*
Il ne cesse de nous tourmenter.	*He does not cease tormenting us.*
Me défendez-vous de faire du bien à cet homme ?	*Do you forbid my doing good to that man ?*
Ne négligez pas de lui faire une visite.	*Do not neglect paying him a visit.*
Me promettez-vous de faire une visite à mon ami ?	*Do you promise me to pay a visit to my friend ?*
Je vous prie d'aller tout droit chez vous.	*I beg you will go straight home.*
Je vous conseille de venir par le chemin-de-fer.	*I advise you to come by the railroad.*
Ne manquez pas de lui faires mes compliments.	*Do not fail to present my compliments to him.*
L'avez-vous menacé de la frapper ?	*Have you threatened to strike him ?*
J'ai refusé de lui faire crédit.	*I refused to give him credit.*
Me proposez-vous de lui confier cet argent ?	*Do you propose to me to trust him with this money ?*
Je vous conseille de le lui confier.	*I advise you to trust him with it.*
J'évite de lui reprocher ses fautes.	*I avoid to reproach him with his faults.*

Exercise 151.

Arros-er, 1. *to water.*	Gard-er, 1. *to keep.*	Tout droit, *straight.*
Arrosoir, m. *watering-pot.*	Jardinier, m. *gardener.*	Rend-re, 4. *to do, to render.*
Au contraire, *on the contrary.*	Lendemain, m. *next day.*	Veille, f. *eve, day before.*
Corrig-er, 1. *to correct.*	Oubli-er, 1. *to forget.*	Voie, f. *conveyance, way,* or *mode of travelling.*
Faire part, *to communicate.*	Se rend-re, 4. ref. *to repair.*	

1. Pourquoi ne cessez-vous pas de lire ? 2. J'aurais tort de cesser de lire avant de savoir ma leçon. 3. Avez-vous défendu à votre jardinier d'arroser ces fleurs ? 4. Au contraire, je lui avais commandé de les arroser. 5. Pourquoi a-t-il négligé de le faire ? 6. Parcequ'il a oublié d'apporter l'arrosoir. 7. Que désire faire M. F. ? 8. Il brûle de continuer l'étude de la médecine. 9. N'avez-vous pas tort de faire des visites à ce monsieur ? 10. J'aurais tort de le négliger. 11. N'avez-vous pas refusé de rendre ce service à votre ennemi ? 12. J'aurais eu tort de refuser de le lui rendre. 13. Quelle voie nous avez-vous conseillé de prendre ? 14. Je vous ai conseillé de prendre la voie du bâteau-à-vapeur. 15. Avez-vous menacé de frapper cet infant ? 16. Je l'ai menacé de le corriger. 17. Avez-vous refusé de vendre des merchandises à mon frère ? 18. J'ai refusé de lui en vendre à crédit. 19. Avez-vous dit à mon fils de se rendre à la maison ? 20. Je l'ai prié d'y aller tout droit. 21. Vous proposez-vous de venir le veille de Noël ? 22. Nous nous proposons de venir le lendemain. 23. Votre compagnon se propose-t-il de garder le secret ? 24. Il se propose de faire part de cela à tout le monde.

Exercise 152.

1. Have you forbidden my cousin to speak to the gardener ? 2. I have not forbidden him to speak to him. 3. Has your mother ordered the gardener to water her roses (*roses*) ?

4. She has ordered him to water them. 5. Has he forgotten to do it? 6. He has neglected to do it, he has not forgotten it. 7. What conveyance will you take to go to Paris? 8. I advise you to take the railroad. 9. Have you told (*à*) your son to take the steamboat? 10. No, Sir, I have told him to take the stage (*diligence*, f.). 11. Is not your brother wrong to neglect paying a visit to his brother-in-law? 12. He is wrong to neglect it. 13. Does not that young German long to read that letter? 14. He longs to continue his studies. 15. Do you propose to trust him with that money? 16. I propose to trust him with it. 17. Do you neglect to reproach him with his faults? 18. I avoid to reproach him with them. 19. Have you threatened to punish your son? 20. I have threatened to strike him. 21. Do not fail to present my compliments to my sister's friends. 22. I will not fail (*je n'y manquerai pas*). 23. Have you refused to sell him goods? 24. I have refused to sell him goods on credit. 25. Which mode of travelling do you advise me to take? 26. I advise you to take the railroad. 27. Do you forbid him to come? 28. I have forbidden his writing. 29. Have you failed to pay your gardener? 30. I have not failed to pay him. 31. I have forgotten to pay you. 32. Do not neglect to write to me. 33. Tell him to go to my father. 34. Do not cease to work. 35. Tell him to come Christmas Eve. 36. I have told him to come the day after.

Section LXXVII.

Government of verbs.—continued.

1. Many French verbs reach their object by means of prepositions, while the corresponding English verbs govern their object directly, that is, without intervening prepositions. Other French verbs reach their object through prepositions different from those used in English. We give here a few verbs coming under those two classes, commencing with the first:—

2. Verbs which have a preposition before a noun in French, but have none in English:—

Abuser de, *to abuse*	Jouir de, *to enjoy*	Plaire à, *to please*
S'approcher de, *to approach*	Manquer à, *to offend, to fail*	Se souvenir de, *to remember.*
Convenir à, *to suit*	Médire de, *to slander*	Se servir de, *to use*
Déplaire à, *to displease*	Se méfier de, *to mistrust*	Ressembler à, *to resemble*
Désobéir à, *to disobey*	Obéir à, *to obey*	Survivre à, *to survive.*
Douter de, *to doubt*	Pardonner à, *to forgive*	
Echapper à, *to escape*		

3. Verbs reaching their object through different prepositions in the two languages:—

S'affliger de, *to grieve for*	Louer de, *to praise for*	Remercier de, *to thank for*
Féliciter de, *to congratulate*	Profiter de, *to profit by*	Rire de, *to laugh at*
Gémir de, *to grieve for*	Penser à, *to think of*	Rougir de, *to blush at*
S'informer de, *to inquire about*	Se passer de, *to do without*	Songer à, *to think of*

Résumé of Examples.

N'avez-vous pas abusé de notre patience?	*Have you not abused our patience?*
Nous en avons abusé.	*We have abused it.*
Vous avez désobéi à vos parents.	*You have disobeyed your parents.*
Vous pardonnerez à vos ennemis.	*You will forgive your enemies.*
Vous penserez constamment à vos devoirs.	*You will think constantly of your duties.*
Vous y penserez constamment.	*You will think of them constantly.*
Ne riez-vous pas de nos erreurs?	*Do not laugh at our mistakes.*
Nous n'en rions point.	*We do not laugh at them.*
Ne ressemble-t il pas à son père?	*Does he not resemble his father?*

Exercise 153.

Arrangement, m. *arrangement.*	Cœur, m. *heart.*	Ne—plus, *no more.*
Circonstance, f. *circumstance.*	Devoir, m. *duty.*	Nouvelle, f. *news.*
Conduite, f. *conduct.*	Faute, f. *fault.*	Peintre, m. *painter.*
Complaisance, f. *kindness.*	S'informer, 1. ref. *to inquire.*	Prochain, m. *neighbour.*
	Malheur, m. *misfortune.*	Sellier, m. *saddler.*
		Succès, m. *success.*

1. Cet arrangement vous convient-il? 2. Il ne me convient pas, mais il convient à notre parent. 3. Cela ne déplait-il pas au peintre? 4. Votre conduite lui déplait beaucoup. 5. Ne craignez-vous pas d'abuser de la patience de votre ami? 6. Je crains d'en abuser. 7. Ne pensez-vous jamais à vos devoirs? 8. J'y pense tous les jours. 9. Avez-vous pensé à votre frère aujourd'hui? 10. J'ai pensé à lui, et je me suis souvenu de ses bontés. 11. A-t-il eu soin de son père, et lui a-t-il obéi? 12. Il lui obéit constamment. 13. Ne lui a-t-il jamais désobéi? 14. Il lui a désobéi plusieurs fois, mais il gémit de sa faute. 15. Ne les remerciez-vous pas de leur complaisance? 16. Je les en remercie de tout mon cœur. 17. Le sellier vous a-t-il félicité de votre succès? 18. Il m'en a félicité. 19. N'avez-vous pas ri de notre malheur? 20. Nous n'en avons pas ri, nous ne rions jamais des malheurs d'autrui. 21. Ne vous souvenez-vous pas des nouvelles que je vous ai apprises? 22. Je ne m'en souviens plus. 23. Votre père ne vous a-t-il pas défendu de médire de votre prochain? 24. Il me l'a défendu. 25. Nous nous sommes informés de toutes les circonstances de cette affaire.

Exercise 154.

1. Have you not abused your friend's kindness? 2. I have not abused his kindness, I have abused his patience. 3. Does not your conduct displease your parents? 4. My conduct does not please them. 5. Why have you not obeyed your father? 6. I have obeyed him (*lui*). 7. Have you not laughed at my mistakes? 8. I have not laughed at your mistakes. 9. Has the young man laughed at the painter's mistakes? 10. He has not laughed at his mistakes. 11. Has your saddler laughed at your cousin's misfortunes? 12. He has not laughed at his misfortunes. 13. Do you ever laugh at the misfortunes of others? 14. We never laugh at our neighbour's misfortunes. 15. Do you remember the lesson which you learnt yesterday? 16. I do not remember it (*en*). 17. Does that young lady resemble her mother? 18. She does not resemble her mother. 19. Have you thanked your friend for his kindness? 20. I have thanked him for it. 21. Has your mother forbidden you to read that book? 22. She has forbidden it (*me l'a*). 23. Why do you not forgive your enemies? 24. I forgive them with all my heart. 25. Do you not think of your duties? 26. I think of them (*y*) every day. 27. Have you congratulated your friend? 28. I have congratulated him on his success. 29. Have you not slandered those gentlemen? 30. I never slander my neighbour. 31. Does that house suit you? 32. It suits me, but it does not suit my father. 33. Does that house suit the painter? 34. It suits him very well, but it is too small for me. 35. My father has forbidden my speaking to that gentleman.

LESSONS IN ARITHMETIC.—No. XIX.

VULGAR FRACTIONS.

1. Our arithmetical students having had the four common rules explained to them at considerable length, we now proceed to instruct them in the important doctrine of Vulgar Fractions. The term *fraction* is derived from the Latin frango (*I break*), and literally signifies *a breaking into pieces*. In arithmetic the term is used to signify *a breaking up*, or rather *a dividing into*, pieces all of the same size. For example, if a quartern loaf is divided into *two* equal parts, each part is called *one-half* of it, and is written in figures thus $\frac{1}{2}$; if it is divided into *four* equal parts, each part is called *one-fourth* of it, and is written in figures thus $\frac{1}{4}$; if divided into *six* equal parts, each part is called *one-sixth* of it, and is written in figures thus $\frac{1}{6}$; and so on, whatever be the number of parts. From these examples it is evident that if we want to express by figures *one single part* of a whole thing, or of a *unit*, as it is called, we must first know into *how many parts* it has been divided, and drawing a line we must put below it the *number* which expresses *those parts*, and above it the number 1. Thus, if we wish to express in figures *one single part* of a loaf which has been divided into 20 *equal parts*, we must put 20 under a line and 1 above it thus $\frac{1}{20}$; and this fraction is read *one-twentieth part*, or simply *one-twentieth*, of the loaf.

2. It is plain from what we have said, and from the nature of the thing itself, that if we wish to express in figures more than *one single part* of any whole thing or *unit* which has been divided into *several equal parts*, we must write above the line the number which expresses just so many of these parts as are required. Thus, if we wish to express in figures *five* parts of a loaf which has been divided into 20 *equal parts*, we must put 20 under a line and 5 above it thus

$\frac{4}{20}$; and this fraction is read *five-twentieth parts*, or simply *five-twentieths*, of a loaf. If we wish to express in figures the *whole of the parts* into which any whole thing or *unit* has been divided, we must write this number of parts above the line as well as below it. Thus, if we wish to express in figures the whole of the parts of a loaf divided into 20 *equal parts*, we must put 20 above the line and 20 under it thus $\frac{20}{20}$; and this fractional expression is read *twenty-twentieth parts*, or simply *twenty-twentieths*, of the loaf. We have called this only a *fractional expression*, and not a *fraction*, because although it is written in the form of a fraction it is not really a *fraction*, but a *whole* or *unit*, seeing that it expresses *all the parts* into which the unit or loaf is supposed to be divided; for it is an axiom that *the whole is equal to all its parts*. If we suppose two equal sized loaves to be divided each into 20 *equal parts*, and we wish to express in figures a number of parts greater than 20 of these parts, say 25 parts, we must write this number above the line and the number of parts into which each loaf is divided below the line thus $\frac{25}{20}$; and this fractional expression is read *twenty-five twentieth parts*, or simply *twenty-five twentieths*, of a loaf. Now, though this expression is written in the form of a fraction, it is plain that it expresses more than a fraction, that it expresses first $\frac{20}{20}$, *twenty-twentieths*, of a loaf, that is, a whole loaf; and then $\frac{5}{20}$, *five-twentieths*, of a loaf, that is, an additional fraction of a loaf.

3. DEFINITION 1.—In every fraction or fractional expression, such as those above considered, the number written above the line is called the *numerator*, because it expresses or shows the *number of parts* of which this fraction or fractional expression consists; and the number written below the line is called the *denominator*, because it expresses or shows the number of parts into which the whole thing or unit is divided, of which the fraction or fractional expression is given, and also because it gives *name* or *denomination* to these parts. Thus, in the fraction $\frac{5}{20}$, the number 5 is called the *numerator*, the number 20 the *denominator*; also, in the fractional expressions $\frac{25}{20}$ and $\frac{25}{20}$, the upper numbers 20 and 25 are called the *numerators*, and the lower number, 20 in each, the *denominator*. The *numerator* and *denominator* of a fraction are called the *terms* of the fraction.

4. DEFINITION 2.—Every real fraction has its numerator *less* than its denominator; and is, therefore, called a *proper* fraction. Thus $\frac{5}{20}$ is a *proper* fraction, because its numerator is *less* than its denominator. A fractional expression, on the contrary, which has its numerator *equal to*, or *greater than* its denominator, is called an *improper* fraction. Thus $\frac{20}{20}$ and $\frac{25}{20}$ are *improper* fractions, because the numerator of the one is *equal to* its denominator, and the numerator of the other is *greater than* its denominator. It is plain from what has been said above that every fractional expression whose numerator is *equal to* its denominator, as $\frac{20}{20}$, or $\frac{5}{5}$, or $\frac{9}{9}$, is just *exactly equal to* unity or 1; and every fractional expression whose numerator is *greater than* its denominator is *greater than* unity or 1; and it is *greater* in proportion as the numerator exceeds the denominator.

5. There is another method of viewing the nature of fractions which must not be omitted, and which, indeed, we have already mentioned in our Lessons in Arithmetic, No. IX., p. 141, vol. I. This method consists in considering every expression denoting the quotient of any given number by a larger number as a fraction. The reason of this is very plain from the following example: Suppose that we have to divide *four* quartern loaves among *five* persons, and that each person is to receive an equal share of the bread, it is evident that we cannot give each person *one* loaf, but something less than a loaf. How then shall we proceed? We must divide each of the *four* loaves into as many parts as will enable us to give an equal share to each person, and therefore all the parts of these loaves taken together must be such as to be exactly divisible by the number of persons, namely, *five*. This can be most easily accomplished by dividing each loaf into *five equal parts*, and consequently the whole four loaves into *twenty equal parts* of the same kind; thus each loaf is represented by the fractional expression $\frac{5}{5}$, *five-fifths*, of a loaf; and the whole four loaves are represented by the fractional expression $\frac{20}{5}$, *twenty-fifths*, of a loaf; for $\frac{5}{5}\times 4=\frac{20}{5}$. If these $\frac{20}{5}$, *twenty-fifths*, be divided by 5, the number of persons, the quotient will be $\frac{4}{5}$ of a loaf to each person; for $\frac{20}{5}\div 5=\frac{4}{5}$. It will be observed in these operations of multiplying and dividing any *number of fifths* by a whole number, such as 4 or 5, that the *denominator* of the fraction is *neither multiplied nor divided*, because it is only the *name* of the fraction; but that these operations are performed only on the *numerator*, because it is the *numerator only* that expresses the *value* of the fraction as so many of the parts denoted by the denominator. We have said that the denominator of the fraction is *neither multiplied nor divided*, but we might have said also that it is *neither added nor subtracted*, but remains simply as the *name* of the fraction in such operations; for to multiply $\frac{5}{5}$ by 4 is the same as to add $\frac{5}{5}$ to itself by repeating it as often as the number 4 denotes; thus, $\frac{5}{5}+\frac{5}{5}+\frac{5}{5}+\frac{5}{5}=\frac{20}{5}$. Here the sum of $\frac{5}{5}$ repeated 4 times is $\frac{20}{5}$, which is the same as multiplying $\frac{5}{5}$ by 4. Again, to divide $\frac{20}{5}$ by 5 is the same as to find the number of fifths which must be subtracted 5 times from $\frac{20}{5}$ in order to leave no remainder. Now, as we know that the number 5 is contained in the number 20 *four times* it is plain that $\frac{5}{5}$ must be substracted from $\frac{20}{5}$ five times in order to leave no remainder; that is, $\frac{20}{5}-\frac{5}{5}-\frac{5}{5}-\frac{5}{5}-\frac{5}{5}=0$, or $\frac{5}{5}$ is contained in $\frac{20}{5}$ five times; hence $\frac{20}{5}$ divided by 5 gives $\frac{4}{5}$ for the quotient.

6. By extending our view of the nature of fractions exhibited in the preceding paragraph, we may say that every expression involving a dividend and a divisor is a fractional expression; and further, that the quotient, whether whole or mixed, is that fraction or part of the dividend which the divisor denotes. Thus, $\frac{34}{17}$ is a fractional expression, in which 34 is the dividend, and 17 is the divisor; in its present form, it is called an improper fraction, according to our definitions given above; but if we take the quotient, which is 2 (for $\frac{34}{17}=2$), we find that the whole number, 2, is that part of the dividend 34, which the divisor 17 denotes; that is, 2 is the *seventeenth* part of 34; or, in a fractional form, 2 is $\frac{1}{17}$ of 34. Again, $\frac{49}{8}$ is another fractional expression, where the quotient of 49 divided by 8; that is, the mixed number $6\frac{1}{8}$ is that part of the dividend 49 which the divisor 8 denotes; in other words, $6\frac{1}{8}$ is the eighth part of 49; or $6\frac{1}{8}$ is $\frac{1}{8}$ of 49. By a mixed number, in contradiction to a whole number, we mean an expression consisting of a whole number and a fraction, as $6\frac{1}{8}$; now as $6\frac{1}{8}$ is the quotient of $\frac{49}{8}$, it is plain, that these two expressions are equivalent to each other, or that $6\frac{1}{8}=\frac{49}{8}$. Therefore, every mixed number is reducible to an improper fraction. We have, in this case, only to reverse the process in order to obtain the expression required; that is, to multiply the whole number 6 by the divisor 8, add to the product 48, the numerator 1, and under the dividend 49 thus obtained, put the divisor 8, which gives $\frac{49}{8}$ for the fractional expression originally proposed.

7. In the case where the dividend is less than the divisor, as in the fraction $\frac{4}{5}$, no other quotient can be obtained than $\frac{4}{5}$, and this expression considered as a quotient, indicates that $\frac{4}{5}$ is that part of the dividend 4 which the divisor 5 denotes; that is, $\frac{4}{5}$ is the *fifth* part of 4. Hence, we justly infer that the *fifth* part of 4, is the same as *four-fifth* parts of 1; or $\frac{1}{5}$ of 4 is equal to $\frac{4}{5}$ of 1. Thus, we see by reverting to article 5. (i. e., the paragraph marked 5 above) that *four-fifths* of *one quartern* loaf is the same as *one-fifth* of *four quartern* loaves; or, that in order to divide 4 quartern loaves among 5 people, we may either divide *each* loaf into 5 *equal* parts, and give away 4 of *each* to 4 persons, when there will be 4 *left* for the 5th person; or, we may divide the 4 *loaves* into 20 *equal* parts, and give 4 parts to *each* person, until the whole 20 parts are exhausted, and the 5 persons have each had their share.

8. DEFINITION 3.—A compound fraction is a part or fraction of another fraction. Thus, we have in the preceding examples, shown how to divide 4 loaves among 5 persons, and we have found that each person's share is $\frac{4}{5}$ of a loaf. Now if one person who had received $\frac{4}{5}$ of a loaf were to divide his share among 3 boys, it might very naturally and properly be asked what part or fraction of a loaf did each boy get? The answer of course would be *one-third* of $\frac{4}{5}$ of a loaf, or $\frac{1}{3}$ of $\frac{4}{5}$. Now this is a compound fraction, and the question is to reduce it to a *single* or *simple* fraction of a loaf. It is to be considered here, first, that each of the $\frac{4}{5}$ of a loaf is $\frac{1}{5}$ of a loaf, and that if this $\frac{1}{5}$ of a loaf were divided into 3 equal parts, one of these parts would be $\frac{1}{15}$ of a loaf; for if all the 5 equal parts of a loaf were each divided into 3 equal parts, there would be 15 such equal parts in a loaf, and of course, each part would then be $\frac{1}{15}$ of a loaf, according to article 1. Hence $\frac{1}{3}$ of $\frac{1}{5}$ of a loaf, is $\frac{1}{15}$ of a loaf; and as there would be *four* of these parts in $\frac{4}{5}$ of a loaf, so there is $\frac{4}{15}$ of a loaf in $\frac{1}{3}$ of $\frac{4}{5}$ of a loaf; and thus, the compound fraction $\frac{1}{3}$ of $\frac{4}{5}=\frac{4}{15}$, a single or simple fraction; thus also we see that the two denominators, 3 and 5 of the single fractions $\frac{1}{3}$ and $\frac{4}{5}$, which form the compound fraction, must be multiplied together in order to find the denominator of the single fraction composed of them; and that the two numerators, 1 and 4, must be multiplied together, in order to find the numerator of the same. In like manner it may be shown that the compound fraction $\frac{2}{3}$ of $\frac{4}{5}$ is

equivalent to the simple fraction $\frac{3}{5}$. But fractions may be still more compounded; for we may divide each of the preceding compound fractions into smaller parts, say each half of the former; and then the expressions will be $\frac{1}{2}$ of $\frac{1}{2}$ of $\frac{4}{5}$, or $\frac{1}{2}$ of $\frac{2}{5}$ of $\frac{4}{5}$; which are respectively equivalent to $\frac{1}{10}$ and $\frac{2}{10}$, as may be found on the same principles as those above developed.

9. Definition 4.—The *value* of a fraction, or a fractional expression of any kind, is the simplest form in which it can be expressed. Thus, the value of the fraction $\frac{5}{10}$ is $\frac{1}{2}$, because if a unit be divided into 10 equal parts, and 5 of these parts be taken in order to constitute a fraction, it is plain that its value must be $\frac{1}{2}$ of the unit, seeing that the number of parts taken is just *one-half* of the whole number of parts. Again, the value of the fraction $\frac{4}{5}$, being simply $\frac{4}{5}$ of a unit, it is already in the simplest form which it will admit of; for to say that its value is $\frac{1}{5}$ of 4 units, is to render the expression more complex than before. But if the nature of the unit of which the fraction is a part be stated, it is then possible to arrive at a simpler expression for the value of the fraction; thus, if the fraction be $\frac{4}{5}$ of a pound sterling, we can now, by a few considerations, arrive at a simpler form of its value; for we know that $\frac{1}{5}$ of a pound is 4 shillings, consequently $\frac{4}{5}$ of a pound is 4 times 4 shillings, or 16 shillings, which is the *value* required; and every one will admit that 16 shillings is a simpler form of expression than $\frac{4}{5}$ of a pound. Next, as to fractional expressions: such as $\frac{15}{3}$, $\frac{15}{4}$, $\frac{1010}{17}$, &c. It is plain that the *value* of $\frac{15}{3}$ is the number 5, an expression much more simple than the fractional expression itself; also the value of $\frac{15}{4}$ is 5 $\frac{2}{4}$, or 5 $\frac{1}{2}$; either of which expressions is more simple and easy to be understood than the original one; and in like manner, the *value* of $\frac{1010}{17}$ is 59 $\frac{7}{17}$; a value of which every one understands the integral part 59, if they do not quite understand $\frac{7}{17}$; but of the original fractional expression $\frac{1010}{17}$, thousands would have no conception; yet with regard to this very expression, there is no mystery in it at all, for it simply means the *seventeenth* part of 1010, or $\frac{1}{17}$ of 1010; and its meaning is clearly understood, when we say that the *seventeenth part* of 1010, is 59 and a fraction; or, 59 and $\frac{7}{17}$; or, 59, and a *seventeenth part of* 7. We come now to three important principles, which must be perpetually kept in mind in the whole of our operations relating to Vulgar Fractions.

10. Principle 1.—If the numerator and denominator of a fraction be both multiplied by the same number, the value of the fraction is not altered, that is, the value of the fraction remains the same as before; and if the numerator and denominator be both divided by the same number, the value is not altered, that is, the value remains the same as before. This principle is the same in effect as that general principle in division laid down in vol. I., p. 380, col. 1, No. V., viz., that if the divisor and dividend are both multiplied or both divided by the same number, the quotient will not be altered. Here we have only to substitute the words *denominator*, *numerator*, and *value* for the words *divisor*, *dividend*, and *quotient* respectively, and the principles are one and the same. But in order to illustrate the former, let us take the fraction $\frac{6}{10}$; if we multiply both numerator and denominator of this fraction by 10 its value will not be altered, for it then becomes $\frac{60}{100}$. Now, whether a unit be divided into 10 equal parts, and 5 of them be taken, or into 100 equal parts and 50 of them be taken, it is plain that half the number of parts is taken in either case, and that the value of these parts is $\frac{1}{2}$ of the whole in both fractions, so that the value of the fraction remains unaltered; that is, $\frac{5}{10}=\frac{50}{100}$. Again, let us take the fraction $\frac{75}{100}$; if we divide both numerator and denominator of this fraction by 25, its value will not be altered, for it then becomes $\frac{3}{4}$. Now whether a unit be divided into 100 equal parts and 75 of them be taken, or into 4 equal parts and 3 of them be taken, it is evident that *three-fourths* of the number of parts is taken in either case, and that the value of these parts is $\frac{3}{4}$ of the whole in both fractions; for 25 parts is $\frac{1}{4}$ of 100 parts, and as 75 is 3 times 25, therefore 75 parts is $\frac{3}{4}$ of 100 parts; also, 1 part is $\frac{1}{4}$ of 4 parts, and 3 parts is $\frac{3}{4}$ of 4 parts; so that the value of the fraction remains unaltered; that is $\frac{75}{100}=\frac{3}{4}$.

11. Principle 2.—If the *numerator* only of a fraction be multiplied by any number, the *denominator* remaining the same, the *value* of the fraction is *increased* as many times as that number denotes; or, if the *denominator* only of a fraction be divided by any number, the *numerator* remaining the same, the *value* of the fraction is *increased* as many times as that number denotes. This principle combines two of the general principles in Division, laid down in vol I. p. 380, col. 1, Nos. I. and IV., viz.:—If the divisor remains the same, to multiply the dividend by any number is in effect multiplying the quotient by that number; and, if the dividend remains the same, dividing the divisor by any number, is in effect multiplying the quotient by that number. Here we have only, as before, to substitute the words *denominator*, *numerator*, and *value*, for the words *divisor*, *dividend*, and *quotient* respectively, and the principles are one and the same, as before. To exemplify the former, let us take the fraction $\frac{3}{8}$, and let its numerator be multiplied by the number 4, its denominator remaining the same; the result is $\frac{12}{8}$. Now, taking any unit of which the value of the fraction $\frac{3}{8}$ can be easily found, say a pound Avoirdupois; it is plain that as $\frac{1}{8}$ of a pound is 1 ounce, so $\frac{3}{8}$ of a pound is 3 ounces, and $\frac{12}{8}$ of a pound is 12 ounces; but 12 ounces are 4 times 3 ounces; therefore, multiplying the numerator of the fraction $\frac{3}{8}$ by any number, 4 increases its value, viz., 3 ounces, as many times as that number denotes, viz., to 4 times 3 ounces or 12 ounces. Again, let the denominator of the fraction $\frac{3}{16}$ be divided by the number 4, its numerator remaining the same; the result is $\frac{3}{4}$. Now, taking the same units as before, we find that $\frac{3}{16}$ of a pound is 3 ounces, and $\frac{3}{4}$ of a pound is 12 ounces ($\frac{1}{4}$ of a pound being 4 ounces); but, as before, 12 ounces are 4 times 3 ounces; therefore, dividing the denominator of the fraction $\frac{3}{16}$ by any number 4, increases its value 3 ounces, as many times as that number denotes, viz., to four times 3 ounces, or 12 ounces. Besides, we know that $\frac{12}{16}=\frac{3}{4}$; for if both the numerator and denominator of the fraction $\frac{12}{16}$ be divided by any number, say 4, its value will not be altered. Whence, multiplying the *numerator only* of a fraction, or dividing its *denominator only*, by the same number, *multiplies* the fraction by that number.

12. Principle 3.—If the *numerator* only of a fraction be divided by any number, the *denominator* remaining the same, the *value* of the fraction is *diminished* as many times as that number denotes; or, if the *denominator* only of a fraction be multiplied by any number, the *numerator* remaining the same, the *value* of the fraction is *diminished* as many times as that number denotes. This principle combines the two general principles of Division laid down in Vol. I., p. 380, col. 1, Nos. II. and III., viz. If the divisor remains the same, dividing the dividend by any number, is in effect dividing the quotient by that number, and if the dividend remains the same, multiplying the divisor by any number is in effect dividing the quotient by that number. Here, again, if we substitute the words *denominator*, *numerator*, and *value* for the words *divisor*, *dividend*, and *quotient* respectively, the principles will be found to be identical. To exemplify the former, let us take fraction $\frac{12}{16}$, and let its numerator be divided by the number 4, its denominator remaining the same; the result is $\frac{3}{16}$. Now, if we suppose the unit to be a pound Avoirdupois as before, then it is evident that $\frac{12}{16}$ of a pound is 12 ounces, and $\frac{3}{16}$ of a pound is 3 ounces; but 12 ounces divided by 4 gives 3 ounces; therefore, dividing the numerator of the fraction $\frac{12}{16}$ by any number 4, diminishes its value, viz., 12 ounces, as many times as that number denotes; for 12 ounces $\div 4 = 3$ ounces. Again, let the denominator of the fraction $\frac{12}{16}$ be multiplied by the number 4, its numerator remaining the same; the result is $\frac{12}{64}$, which by principle 1, Art. 10, is $\frac{3}{16}$; for $\frac{12}{64}=\frac{3}{16}$, by dividing both numerator and denominator by 4. Hence, multiplying the denominator only of the fraction $\frac{12}{16}$ by any number 4, diminishes its value as many times as that number denotes, for, $12 \div 4 = 3$, and $\frac{12}{64}=\frac{3}{16}$ as before. Whence, dividing the *numerator only* of a fraction, or multiplying its denominator only, by the same number, divides the fraction by that number.

LESSONS IN GERMAN.—No. XXIV.

Section XLIV.

I. Gern, gladly, freely, fain, &c., (comparative lieber, rather, See § 106. 1.) with an appropriate verb, forms the equivalent of our phrase, "to be fond of, to like," &c. Ex.: Er trinkt gern Wein; he *is fond of* (drinking) wine. Er raucht gern, he *is fond of* smoking; or, he *likes* to smoke. Er trägt gern ſchöne Kleider; he *likes* (to wear) fine clothes. Ich möchte* gern wiſſen, ob mein Freund noch lebt; I would *fain* know whether my friend is still living. Ich möchte lieber gehen, als bleiben, I

* For conjugation of dürfen, können, mögen, &c., in the subjunctive See § 83, 2, &c. See also remarks connected with these conjugations.

would *rather* go than stay. With haben, it may often be rendered by "*dear*." Ex.: Ich habe meine Freunde gern; I hold (have) my friends "*dear*."

II. Nöthig haben, signifies, *to need, to have need of*. Ex.: Haben Sie dieses Buch nöthig; *Do* you *need* (have you need of) this book? Er hat Geld nöthig; he needs money; or, has need of money.

III. Im Stande sein, signifies, to be able; literally, to be in the position or situation. Ex.: Sind Sie im Stande zu schreiben? Are you able to write? In this construction the verb dependent upon „im Stande sein" is often omitted and the pronoun es, is introduced. (Sect. 36. VI.) Ex.: Ich bin es nicht im Stande; I am not able.

IV. Several words, as doch, ja, schon, vielleicht, wohl and zwar &c. are often used with a signification different from their primary one, or where no corresponding one is employed in English. Ex.: Sind Sie vielleicht krank? Are you (perhaps) sick? Werden Sie wohl morgen abreisen? Shall you (probably) depart to morrow? Er wird uns schon finden; he will already (doubtless) find us. Wenn er krank ist, so kann er nicht kommen; if he is sick, (then) he cannot come. Er liest nicht und zwar, weil er kein Buch hat; he does not read, (and indeed) because he has no book. Gehen Sie ja nicht; do not go by any means. Es dürfte (See note) wohl so kommen; it might indeed so happen (come). Wollen Sie schon gehen? Are you going already? Jawohl; yes, (certainly) or, yes, indeed. Ich glaubte, er könnte uns schon heute besuchen; I thought he could (already) visit us to-day. Er glaubte, er könne sich wohl jetzt an ihm rächen; he thought he could now (indeed) avenge himself upon him.

V. The causative adverbs, deshalb or deßwegen (therefore) dadurch, (thereby) &c., are frequently introduced into a leading sentence where the corresponding English word is omitted. Ex.: Er ist deßhalb unzufrieden, weil sein Freund nicht hier ist; he is (therefore) discontented because his friend is not here.

VI. Schuldig with sein, signifies "to be indebted, to owe;" the word denoting the amount being put in the accusative. (§ 132. 3.) Ex.: Er ist mir nur einen Gulden schuldig; he owes me but one florin. Verdanken also signifies to owe, but only in the sense of "to be obliged for, to ascribe to." Ex.: Ich verdanke meine Genesung der reinen Luft der Schweiz; I owe my recovery to the pure air of Switzerland.

Exercise 48.

Ab'geben, to deliver;	Führen, to conduct, guide;	Sicher, safe, safely;
Aus'führen, to carry out;	Ge'genstand, *m.* subject;	Stand, *m.* position, (III.);
Befehl', *m.* command;	Gern, willingly, (I.);	Stu'diren, to study;
Beherr'schen, to govern, rule;	Grund, *m.* ground;	Ueberse'tzen, to translate;
E'duard, *m.* Edward;	Heilen, to heal;	Ungern, unwillingly;
Erfah'rung, *f.* experience, knowledge;	Lei'denschaft, *f.* passion;	Unnütz, useless, fruitless;
Erklä'rung, *f.* explanation;	Leihen, to lend;	Vollen'den, to finish, complete;
Fähig, able;	Nachen, *m.* boat, skiff;	Vorschlag, *m.* proposal;
Fami'lie, *f.* family;	Nöthig, necessary?	Warm, warm;
Folgen, to follow;	Nun, now;	Wunde, *f.* wound;
	Rauh, rough;	Zeichnung, *f.* drawing.

Er kommt nicht, und zwar weil er krank ist.	He does not come, (and indeed) because he is sick.
Mein Onkel fischt und meine Neffe jagt gern.	My uncle is fond of fishing, and my nephew of hunting.
Ich möchte gern wissen, wie viel Uhr es ist.	I would like to know what o'clock it is.
Freiheit, Gerech'tigkeit und Wahrheit sollten alle Menschen gern haben.	Liberty, righteousness, and truth, all men should love.
Wieviel' bin ich Ihnen schuldig?	How much do I owe you?
Er verdankt' sein Leben der Schnel'ligkeit seines Pferdes.	He owes his life to the fleetness of his horse.
Es ist Niemand im Stande, die Dauer seines Lebens voraus zu bestim'men.	There is no one able to predetermine the duration of his life.
Wohl läßt der Pfeil sich aus dem Herzen ziehen, doch nie wird der Verlet'zte mehr gesun'den.	The arrow may indeed be drawn out of the heart, yet the injured (one) will never recover.
Wohl beff're Männer thun's dem Tell nicht nach. (Schiller).	Better men do it not after the manner of Tell (as Tell did).
Es war ein gutes Jahr, der Bauer kann schon wieder geben. (Schiller.)	It has been a good year; the peasant can even (now) give again.
Den Mörder wird die gerech'te Strafe schon erei'len.	The righteous punishment will certainly overtake the murderer.

1. Sehen Sie meinen Schwager gern? 2. Ja, ich sehe ihn gern. 3. Der Oheim möchte gern eure Zeichnungen sehen. 4. Ich habe gern Freunde in meiner Nähe. 5. In meiner Jugend studirte ich sehr gern, aber nun thue ich es ungern. 6. Er spricht gern von seinen Reisen und seinen Erfahrungen. 7. Wenn sie die Bücher nöthig haben, so leihe ich Ihnen dieselben von Herzen gern. 8. Er trennt sich ungern von seiner Familie. 9. Ich habe gern ein warmes Zimmer. 10. Könnt ihr uns sicher über diesen Strom fahren? 11. Nein, wir sind es nicht im Stande denn dieser Nachen ist zu klein. 12. Wenn Sie fähig sind, diese Zeitungen zu übersetzen, so thun sie es. 13. Da ich die englische Sprache vollkommen verstehe, so will ich gern Ihren Vorschlag annehmen. 14. Wenn er fähig ist, die Arbeit gut zu machen, so soll er zu mir kommen; ist er es aber nicht im Stande, so wäre es unnütz. 15. Er glaubte nicht, daß ich im Stande sein könnte, all seine Befehle auszuführen. 16. Wenn du deine Leidenschaften ganz zu beherrschen weißt, so bist du zu beneiden. 17. Mein Freund Eduard war so schwach, daß er nicht im Stande war, allein zu gehen, und er bat mich deßwegen, daß ich ihn führen möchte. 18. Er glaubte, daß Niemand im Stande sein könne, auf dieses rauhe Papier zu schreiben. 19. Er hatte gestern Geld nöthig, deßhalb bat er mich, daß ich ihm einiges geben möchte. 20. Er ist mir zwar schon einige Thaler schuldig, aber da er das Geld nöthig hatte, so gab ich ihm welches. 21. Es ist Niemand im Stande auszugehen, weil es zu stark regnet. 22. Er wird bald im Stande sein, sein Werk zu vollenden. 23. Er kann sein Wort nicht halten und zwar aus folgenden Gründen.

1. If he had not been able to perform the work, he would not have undertaken it. 2. Will he be able to fulfil his promise? 3. He has not been able. 4. We ought not to promise more than we are able to perform. 5. Are you able to deliver a better explanation upon this subject? 6. I am indeed able, but I have no time now. 7. Does the boy go for my stick freely? 8. When he does, it is unwillingly; I would rather go myself. 9. Do you like to see your relations? 10. Yes, I do like to see them. 11. When you have need of those books, then I will lend you them freely. 12. He needed money yesterday, therefore he desired me that I would give him some. 13. Therefore it is useless to ask for more, when you already owe so much. 14. Who would not freely heal the wounds of a wounded heart.

Section XLV.

Conditional Mood.

The conditional mood is used where a condition is supposed which may or may not be possible. It is also sometimes used in exclamation and interrogation. Ex.: Wenn sie noch lebte, wäre ich glücklich; if she were still living, I should be happy. Ich hätte die Sache anders gemacht; I should have arranged the matter differently. Wäre es doch noch am Leben! O, that he were still alive! Wäre es möglich, Vater? could it be possible, Father? (See §. 144.)

Exercise 49.

An'forderung, *f.* claim, demand;	Brücke, *f.* bridge;	Heim'suchen, to visit;
An'gelegenheit, *f.* transaction, affair;	Ein'lassen, to engage;	Hier'bleiben, to remain here;
An'haltend, persevering, continual;	Entspre'chen, to answer;	Mit'theilen, to impart;
An'sicht, *f.* view, opinion;	Erspa'ren, to spare, avoid;	Schweigen, to be silent;
Auf'treten, to step forth, appear;	Ferne, *f.* distance;	Schwerlich, hardly;
Behal'ten, to keep, retain;	Fest, *n.* feast;	Schwie'rigkeit, *f.* difficulty;
	Fort'reißen, to carry (tear) away;	Strand, *m.* strand, shore;
	Ge'genwart, *f.* presence;	

Un'annehmlichkeit, *f.* disagreeableness; Verdruß', *m.* vexation; Verſchönern, to embellish, improve; Verſpſlich'ten, to oblige; Verſchwin'den, to vanish; Widerſpre'chen, to contradict; Zöllner, *m.* tollgatherer

Ich würde das Buch noch haben wenn ich es nicht verlo'ren hätte.	I should still have the book, if I had not lost it.
Du würdeſt jetzt Freude haben, wenn Du keine Schul'digkeit gethan' hätteſt.	Thou wouldst now have comfort, if thou hadst done thy duty.
Er würde beſ'ſere Freunde haben, wenn er auf'richtiger wäre.	He would have better friends, if he were more upright.
Wir würden Geld haben, wenn wir ſpar'ſamer wären.	We should have money, if we were more economical.
Ihr würdet Trauer ſtatt Freude haben, wenn das Kind geſtor'ben wäre.	You would have sorrow, instead of joy, if the child had died.
Sie würden mehr Klugheit haben, wenn ſie mehr Verſtand hätten.	They would have more prudence, if they had more understanding.
Er würde ein großes Glück gehabt haben, wenn er we'niger träge geweſ'en wäre.	He would have had a great fortune, if he had been less slothful.

1. Ich hätte mir ſchon machen Verdruß (Syn.) erſparen können, wenn ich, ſtatt zu widerſprechen, geſchwiegen hätte. 2. Ich möchte wiſſen, was Sie gethan hätten, wenn Sie an meiner Stelle geweſen wäre. 3. Wenn das Schickſal mich nicht heimgeſucht hätte, würde ich ſchwerlich zu dieſen Anſichten gekommen ſein. 4. Er hätte glücklich ſein können, wenn er die Gelegenheit zu benutzen verſtanden hätte. 5. Hätte das Waſſer die Brücke mit fortgeriſſen, ſo wäre der Zöllner verloren geweſen. 6. Hätte ich zu Dir kommen können, ſo würde ich gewiß nicht hier geblieben ſein. 7. Es würden nie große Männer aufgetreten ſein, wenn ſie ſich durch Schwierigkeiten und Unannehmlichkeiten hätten aufhalten laſſen. 8. Wenn ich das hätte erreichen wollen, was ich wünſchte, ſo hätte ich fleißiger und anhaltender arbeiten müſſen. 9. Wennn er gerufen hätte, würde ich ihn gehört haben. 10. Wir wollen nicht ausgehen, es möchte regnen. 11. Wenn Sie mir etwas Näheres über dieſe Angelegenheiten mittheilen (Syn.) möchten, ſo würden Sie mich ſehr verpflichten 12. Es wäre meine größte Freude, alle Menſchen glücklich zu ſehen. 13. Ich hätte ohne Verſtand (Syn.) ſein müſſen, wenn ich mich auf dieſe Sache hätte einlaſſen wollen. 14. Verſchwunden iſt der Strand in der Ferne, o wie gerne, wär' ich noch im Vaterland! 15. Wenn er wäre, wie ich ihn wünſche, und wenn er allen meinen Anforderungen entſprochen hätte, würde ich ihn behalten haben.

1. Had your friend not become ill, he would certainly have embellished the feast by his presence. 2. If you were more prudent, you would not have met with this inconvenience. 3. I would have settled your business, if you had mentioned it to me. 4. His brother would have been better received, if he had had letters of recommendation. 5. He would have better friends, if he were more agreeable. 6. You would have had more difficulties, if you had not followed the advice of your friends. 7. I should not have the least doubt, that you would have succeeded, if you acted more prudently. 8. We should set sail for Holland, if we had a fair wind. 9. He would be the first among our merchants, if he were more sociable. 10. If I had had the power, I should have acted in another manner, because I should not have had so much patience. 11. What would be the felicity of man, if he always sought his happiness in himself? 12. You would be richer, if you were more enterprising.

ANSWERS TO CORRESPONDENTS.

JUVENIS DISCIPULUS (Wigton) should consult a variety of works on the [illegible] laws to which he refers. He will get information in some of the large [illegible] Dictionaries recently published.—COS: His solution is right. [illegible] be glad to see his *perpetual calendar*.—J. W. D. (Lambeth): [illegible]ce M. N. measures 245 equal parts, and the distance P. M. measures [illegible] parts.—CHARLES HUGHES (London) has made a good selection of [illegible]t him go on and prosper. Cassell's Arithmetic is intended for [illegible]o are desirous of progressing more rapidly with that subject than [illegible] other.—B. P. (Islington): See Bradshaw's "Continental Guide," [illegible]lloch's "Commercial Dictionary."—J. A. (Leicester): The "Spectator" *was* an old "standard periodical work." Complete copies of it may now be had in any bookseller's shop, or at any book-stall.

THOMAS M'LAREN (Grandtully): We have already said Liddell and Scott's Lexicon.—L. W. F.: Correct.—E. P. (Wigan) should study Dr. Beard's Lessons in English first, and then the French. Exercises must of course be written out, and we would advise the rules also to be written out in a book; for by carefully writing out anything, *even once*, you thereby fix it in the memory.—SIMN PRECEPTORN (Fife) is right; there are some misprints and inaccuracies in the places to which he refers. We shall take an opportunity of rectifying them.—FENELON (Stockwell): Thanks for the following corrections: in vol. I., p. 76, col. 2, line 20 from bottom, *for* mauvais *read* mauvaise; p. 78, col. 1, line 32 from top, *for* boiteaux *read* boiteux; col. 2, line 2, *for* amusunt *read* amusant; p. 171, col. 1, line 25 from bottom, *for the first* chantons *read* chansons; p. 261, col. 2, line 1, *for* barber *read* barbar, in the German.—SIGMA (Dollar): Thanks for his observations and suggestions; they will be attended to.—CÆSAR (Walworth): Thanks.—C. W. STYRING (Doncaster): Soon.—APPRENTICE (Edinburgh): Only two errors in 1 and 5.—R. H. HAMMOND: We can't exactly say.—P. (Milford Haven): Her verses are very creditable indeed.—J. J. NEWTON (Bridgewater): Right.—D. D. (Kincardineshire): Rue St. Honore.—J. W. (Wacer): Thanks for his suggestions.—H. WILSON: On the different kinds of galvanic or hydro-electric batteries, see Peschell's Physics, vol. III., p. 75—91.

AN ALGEBRAIC STUDENT has proposed two questions which, from their manner of statement, are literal absurdities, thus: 1. "To find the side of a square whose area is equal to twice the sum of the sides; and 2. To find the side of a cube whose solid content is twice its surface." *An area* or a number of *square* inches can never be equal to *a length* or number of *long* inches; and *a solid*, or a number of *cubic* inches, can never be equal to a *surface* or a number of *square* inches! Yet the *number* which expresses *an area* may be equal to the *number* which expresses *a length*; and the *number* which expresses *a solid content* may be equal to the number which expresses *a surface*. In these senses, and in those only, can the preceding questions have any meaning; their solution is quite easy. 1. Put the square of x (the side of the square), equal to twice four times x, or twice the sum of the sides, and you find x is equal to 8, the *first answer*. 2. Put the cube of x (the side of the cube), equal to 6 times the square of x, or the surface of the cube, and you find $x = 6$, the second answer.—QUADRANT: Really we cannot say.—GEORGE AMBROSE DAMERHAM: Riddle's Young Scholar's English-Latin Dictionary 5s., and Latin-English Dictionary 7s. Both together 12s.—R. J. (Tavistock): Right.—SUSANNE (Newington): It is by no means necessary to go back to *pothooks and strokes*; many persons would admire *her writing*; we admire *her desire for improvement*; and recommend her to write two or three copy-books of the *text*, or large hand, from A to Z; then two or three copy-books of the *half-text*, or next size of writing, from A to Z; and lastly, two or three copy-books of the *court-hand* from A to Z; and if she will attend to the method of holding the pen, and of sitting at the table, which we have recommended in Lesson I. of Penmanship, we feel quite certain that her next letter to us will both astonish her and ourselves.

A SUBSCRIBER: There is an "express" almanack for the P. E., and it is not the same as the one for the "Illustrated Exhibitor,"—see *Literary Notices*.—J. BRIGGS (Neverston): Thanks for his suggestions; he should try and give each an hour or two a-week, and *not alternately*.—UN SOLDAT ANGLO-INDIEN; *Quand* and *lorsque* are very nearly, if not entirely synonymous, when applied to the *indicative* mood; *quand*, when applied to the *subjunctive*, is a synonyme for *si*; your note is pretty correct.—J. A. F. (Bristol): We recommend J. S. Knowles as a teacher of Elocution, and of course his book on that subject.—F. P. F. (Hounslow): See p. 288, vol. I., col. 2, line 49.—S. G. (London): Terpsichore, pronounced terp-sick'-o-re.—ISAAC DAYKIN (Leicester): There is some truth in his remarks; they will be attended to.—J. T. (South Shields) need not expect to find corresponding terms for *life-boat* and *wreckers* in any common French dictionary.—J. B. (Wolverhampton): A *scalene* triangle may also be *a right angled* triangle. To prove this; make a triangle of which the sides shall be respectively 3, 4, and 5 inches in length; and it will be a *scalene right angled triangle*.—JUVENILE CHEMIST, &c. (Notting-hill): We do not see the application of his citation from Newton. Right in the arithmetical question. But his own must lie over at present.

LITERARY NOTICES.

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UNIVERSITY OF LONDON.—No. I.

Numerous applications having been made to us regarding the inquiry whether SELF-TAUGHT students are permitted *to Matriculate* at the University of London—that is, *to enroll their names in the list* of UNDER-GRADUATES of the said University,—we have made special inquiry into this matter, and we are enabled to announce to our students that it is quite competent for any of them, whether *self-taught or not*, to become a member of the *University of London* by passing the *Examination for Matriculation*, and even *to take honours* at the said Examination. The following are the REGULATIONS of the University on this head, which we extract from the "University Calendar for 1853."

ARTS.

MATRICULATION.

The Matriculation Examination shall take place once a-year, and commence on the first Monday in July.

No Candidate shall be admitted to the Matriculation Examination unless he have produced a Certificate showing that he has completed his Sixteenth year.

This Certificate shall be transmitted to the Registrar at least fourteen days before the Examination begins.

A Fee of Two Pounds shall be paid at Matriculation. No Candidate shall be admitted to the Examination unless he have previously paid this Fee to the Registrar. If a Candidate fail to pass the Examination, the Fee shall not be returned to him, but he shall be admissible to any subsequent Examination for Matriculation without the payment of any additional Fee.

The Examination shall be conducted by means of Printed Papers; but the Examiners shall not be precluded from putting, for the purpose of ascertaining the competence of the Candidates to pass, *viva voce* questions to any Candidate in the subjects in which they are appointed to examine.

Candidates for the Matriculation Examination shall be examined in the following subjects:

[PASS EXAMINATION.]

MATHEMATICS.

ARITHMETIC AND ALGEBRA.

The ordinary rules of Arithmetic.
Vulgar and Decimal Fractions.
Extraction of the Square Root.
Addition, Subtraction, Multiplication, and Division of Algebraical Quantities.
Proportion.
Arithmetical and Geometrical Progression.
Simple Equations.

GEOMETRY.

The First Book of Euclid.

NATURAL PHILOSOPHY.*

MECHANICS.

Explain the Composition and Resolution of Statical Forces.
Describe the Simple Machines (*Mechanical Powers*), and state the Ratio of the Power to the Weight in each.
Define the Centre of Gravity.
Give the General Laws of Motion, and describe the chief experiments by which they may be illustrated.
State the Law of the Motion of Falling Bodies.

HYDROSTATICS, HYDRAULICS, AND PNEUMATICS.

Explain the Pressure of Liquids and Gases, its equal diffusion, and variation with the depth.
Define Specific Gravity, and show how the specific gravity of bodies may be ascertained.
Describe and explain the Barometer, the Siphon, the Common Pump and Forcing-Pump, and the Air-Pump.

ACOUSTICS.

Describe the nature of Sound.

OPTICS.

State the Laws of Reflection and Refraction.
Explain the formation of Images by Simple Lenses.

CHEMISTRY.

The Atmosphere. Its general nature and condition; its component parts. Oxygen and Nitrogen; their properties. Water and Carbonic Acid. Proportions of these substances in the air.
Chlorine and Iodine, as compared with Oxygen.
Water. Its general relation to the atmosphere and earth; its natural states and relative purity. Sea-water, river-water, spring-water, rain-water. Pure water: effects of heat and cold on it; its compound nature; its elements.
Hydrogen. Its nature and proportion in water; its presence in most ordinary fuels; its product when burnt.
Sulphur, Phosphorus, and Carbon generally.
Nitric Acid, Sulphuric Acid, Carbonic Acid; their elements.
Hydrocholoric or Muriatic Acid.
Alkalies, Earths, Oxides generally.
Salts. Their nature generally; Sulphates, Nitrates, Carbonates.
Metals generally. Iron, Copper, Lead, Tin, Zinc, Gold, Silver, Platinum, Mercury.
Powers of Matter. Aggregation, crystallization, chemical affinity, definite equivalents.
Combustion. Flame; nature of ordinary fuel; chief results of combustion, i. e., the bodies produced.
Heat. Natural and artificial sources; its effects. Expansion; solids, liquids, gases. Thermometer; conduction; radiation; capacity; change of form; liquefaction; steam.
The chief elements of Vegetable bodies; of Animal bodies.

CLASSICS.

THE GREEK AND LATIN LANGUAGES.

One Greek and one Latin subject, to be selected one year and a-half previously by the Senate from the works of the undermentioned authors:*

Homer ....One Book.
Xenophon.. One Book.
Virgil ....One Book of the Georgics, or the Sixth Book of the Æncid.
Horace....One Book of the Odes.
Sallust....The Conspiracy of Catiline, or the War with Jugurtha.
Cæsar ....The Civil War, or the Fifth and Sixth Books of the Gallic War.
Livy.....One Book.
Cicero ....The Treatises De Senectute and De Amicitiâ; or two of the shorter, or one of the longer Orations.

THE ENGLISH LANGUAGE.

The Grammatical Structure of the Language.
Proficiency in Composition will be judged of by the style of answers generally.

THE FRENCH LANGUAGE OR THE GERMAN LANGUAGE.

OUTLINES OF HISTORY AND GEOGRAPHY.

History of England to the end of the Seventeenth century.

The papers in Classics shall contain questions in History and Geography.

Easy Grammatical questions shall be introduced in the Classical Papers.

Simple and easy sentences to be translated from English into Latin, shall be introduced in the Latin Paper.

It shall be indispensable for passing the Examination that each Candidate answer the questions and translate the sentences in a manner generally satisfactory to the Examiners in Classics.

* A popular knowledge only of these subjects in Natural Philosophy will be required, such as may be attained by attending a Course of Experimental Lectures.

* The Classical Subjects for 1853 are, Homer: Odyssey, Book XI., and Livy, Book III.

Candidates shall not be approved by the Examiners unless they show a competent knowledge in

1. Classics;*
2. Mathematics;
3. Natural Philosophy;
4. Chemistry;
5. Either French or German.

In the first week of examination the Examinations shall be conducted in the following order:

Afternoon.

Monday .....French, 2 to 4.
Monday .....German, 4 to 6.
Tuesday .....English History, 3 to 6
Wednesday.....Chemistry, 3 to 6
Thursday .....Natural Philosophy, 3 to 6.
Friday .....The English Language, 2 to 5.

Morning.

Tuesday.....Mathematics, 10 to 1.
Wednesday .....Greek Classic and History, 10 to 1
Thursday .....Mathematics, 10 to 1.
Friday .....Roman Classic and History, 10 to 1.

On Monday Morning at Nine o'clock in the week next but one ensuing, the Examiners shall arrange in Two Divisions, each in alphabetical order, such of the Candidates as have passed.

EXAMINATION FOR HONOURS.

Any Candidate who has passed [the previous Examination] may be examined for Honours in Mathematics and Natural Philosophy, Classics, Chemistry, and Natural History.

Candidates for Honours in MATHEMATICS AND NATURAL PHILOSOPHY shall be examined in the following subjects:

ARITHMETIC AND ALGEBRA.
GEOMETRY.
PLANE AND SPHERICAL TRIGONOMETRY.
CONIC SECTIONS.
THE ELEMENTS OF STATICS AND DYNAMICS.
THE ELEMENTS OF HYDROSTATICS.
THE ELEMENTS OF OPTICS.

This Examination shall take place on Tuesday, Wednesday, and Thursday, in the week next but one after the Matriculation Examination; in the Morning from Ten to One, and in the Afternoon from Three to Six.

In determining the relative position of Candidates, the Examiners shall have regard to the proficiency in Mathematics evinced by the Candidates at the Matriculation Examination.

The Examiners shall publish in the course of the following week a list of the Candidates who acquit themselves to their satisfaction, in the order of proficiency; and Candidates shall be bracketed together unless the Examiners are of opinion that there is a clear difference between them.

Candidates for Honours in CLASSICS shall be examined in the following subjects:

THE GREEK AND LATIN LANGUAGES.

Homer .....The First Six Books of Iliad, and Books IX.—XII. of the Odyssey.
Æschylus....Prometheus.
Euripides....Medea.
Sophocles....Antigone.
Thucydides..Book I.
Herodotus....Book II
Demosthenes..The Olynthiacs and Philippics.
Plato .....Apology of Socrates and Crito
Xenophon....The Memorabilia.
Virgil. .....[All the Books.]
Horace.....[All the Books.]
Sallust ..... The Wars with Catiline and Jugurtha.
Livy .....Books XXI. and XXXI.
Cicero .....De Senectute; De Amicitiâ; the Orations against Catiline, Pro Milone, Pro Archiâ, and the 2nd Philippic.
Tacitus.....Agricola; Germania; and Annals, Book I

COMPOSITION IN LATIN AND IN ENGLISH.

Latin Prose. Translation and retranslation.
English Prose. Analysis of any of the subjects selected for examination; original composition upon questions arising out of the classical authors selected for examination.

The papers in Classics shall consist of passages to be translated, accompanied by questions in Grammar, History, and Geography.

This Examination shall take place on Tuesday, Wednesday, and Thursday, in the week following the Examination for Honours in Mathematics and Natural Philosophy; in the Morning from Ten to One, and in the Afternoon from Three to Six.

In determining the relative position of Candidates, the Examiners shall also have regard to the proficiency in Classics, History, and Geography, evinced by the Candidates at the Matriculation Examination.

The Examiners shall publish in the course of the following week a list of the Candidates who acquit themselves to their satisfaction, in the order of proficiency; and Candidates shall be bracketed together unless the Examiners are of opinion that there is a clear difference between them.

Candidates for Honours in NATURAL History shall be examined in one or both of the following subjects:

BOTANY.*
ZOOLOGY.

The Examination for Honours in CHEMISTRY shall take place on the Friday in the week next but one after the Pass Examination, in the Morning from Ten to One; and the Examination in Natural History on the same day, in the Afternoon from Two to Five.

Such Candidates for Honours in Chemistry and in Natural History as acquit themselves to the satisfaction of the Examiners, shall be arranged in the order of proficiency in each subject.

If, in the opinion of the Examiners, any Candidate shall possess sufficient merit, the Candidate who shall distinguish himself the most in Mathematics and Natural Philosophy, and the Candidate who shall distinguish himself the most in Classics, shall each receive an Exhibition of Thirty Pounds per annum for the next Two Years, if continuing during that period Students at one of the Institutions in connexion with this University. Under the same circumstances, the Candidate who shall distinguish himself the most in Chemistry, and the Candidate who shall distinguish himself the most in either branch of Natural History, shall each receive a Prize of Books to the value of Five Pounds."

Hitherto we find in the list of under-graduates who *passed* the Matriculation Examination, no less than 165 names to which are attached the words *Private Tuition*; and in the list of those who took honours at that Examination, no less than 23 names to which are attached the same words. From the date of this announcement, we hope and trust that some of our SELF-TAUGHT students will endeavour to get their names enrolled as members of the University of London, next year, and that their names will appear in the register with the words SELF-TUITION attached to them. It is quite possible that of those who have been already enrolled in the list with the words *Private Tuition* attached to their names, many may have been *self-taught*, and that, consequently, this term is included in the former. But the fact that self-taught students are admissible into the University, is now placed beyond a doubt. The *Examination for Matriculation*, whether *with* or *without honours*, takes place in July. This year, 1852, it took place *for passing* on the 6th, 7th, 8th, and 9th of July, and *for honours* on the 20th, 21st, 22nd, 23rd, 27th, 28th, and 29th of the same month. We add the following important notification from the Calendar:

"Candidates for Degrees are requested to take notice that it is necessary for them to attend in person at the Apartments of the University at Somerset House, before the commencement of the Examinations, for the purpose of entering their names on the Register."

LESSONS IN FRENCH.—No. XXXV

By Professor LOUIS FASQUELLE, LL.D.

SECTION LXXVIII.

REGIMEN OF ADJECTIVES (§ 87).

1. The regimen or complement of an adjective is generally a noun or a verb completing its signification. This regimen is usually connected with the adjective by means of a preposition.

2 That preposition is often different in French from that connecting the corresponding English adjective with its regimen.

3. When an adjective follows the verb *être* used unipersonally, the preposition *de* connects that adjective with its regimen:—

Il est nécessaire de travailler pour vivre. — *It is necessary to labour in order to live.*

* Including the English Language, History, and Geography.

* A list of Botanical terms is given in the Calendar, which the Candidate must be able to explain if required.

4. The following adjectives, reach their regimen through prepositions different in French and English :—

Amoureux de, *in love with*	Mécontent de, *displeased with*	Propre à, *fit for*
Chéri de, *beloved by*	Reconnaissant de, *grateful for*	Rebelle à, *rebellious towards*
Content de, *pleased with*	Rempli de, *filled with*	Bon pour, *kind towards*
Désolé de, *grieved for*	Bon à, *good for*	Insolent avec, *insolent towards*
Fâché de, *sorry for*	Cruel à, *cruel towards*	Poli envers, *polite to.*
Inquiet de, *uneasy about*	Exact à, *exact in*	
Ivre de, *intoxicated with*		

Résumé of Examples.

N'êtes-vous pas content de vos progrès ?	*Are you not pleased with your progress ?*
J'en suis fort content.	*I am very much pleased with it.*
Votre domestique est-il exact à remplir ses devoirs ?	*Is your servant exact in fulfilling his duties ?*
Avez-vous rempli de vin cette bouteille ?	*Have you filled that bottle with wine ?*
Avez-vous rempli d'argent votre bourse ?	*Have you filled your purse with money ?*
Je l'en ai remplie.	*I have filled it with it.*
Il est très facile de blâmer les actions d'autrui.	*It is very easy to blame the actions of others.*
Il est glorieux de mourir pour sa patrie.	*It is glorious to die for one's country.*
Il est plus agréable de voyager en été qu'en hiver.	*It is more agreeable to travel in summer than in winter.*

Exercise 155.

Abatt-re, 4. ir. *to cut down.*	Bois-à-brûler, m. *fire-wood.*	Nettoy-er, 1. *to clean.*
Achat, m. *purchase.*	Chagriné, e, *vexed.*	Peuple, m. *people.*
Arrach-er, 1. *to pull up*	Encre, f *ink.*	Pommier, m *apple-tree.*
Aubergiste, m. *innkeeper.*	Fend-re, 4. *to cleave, split*	Prunier, m. *plum-tree.*
	Gloire, f. *glory.*	Roi, m. *king.*
	Liberté, f *liberty.*	Sci-er, 1. *to saw.*
		Tonneau, *cask.*

1. Ce héros n'etait-il pas amoureux de la liberté et de la gloire ? 2. Il en était amoureux. 3. Ce roi n'était-il pas chéri de son peuple ? 4. Il en était chéri. 5. Ces négociants ne sont-ils pas contents de leur achat ? 6. Ils n'en sont pas contents. 7. N'êtes-vous pas chagriné de ne pouvoir nous accompagner ? 8. J'en suis désolé. 9. Savez-vous de quoi l'aubergiste a rempli ce tonneau ? 10. Il l'a rempli de vin. 11. De quoi ferez-vous remplir cette bouteille, quand vous l'aurez fait nettoyer ? 12. Elle est déjà remplie d'encre. 13. N'êtes-vous pas bien fâché d'avoir fait abattre vos pommiers ? 14. J'en suis bien content, car ils n'étaient bons à rien. 15. N'est-il pas nécessaire de faire arracher ces pruniers ? 16. Il n'est pas nécessaire de les faire arracher. 17. Est-il possible de fendre ce morceau de bois ? 18. Il est possible de le fendre. 19. Etes-vous exact à nettoyer vos habits ? 20. J'y suis très exact. 21. De quoi avez-vous rempli votre bourse ? 22. Je l'ai remplie d'argent. 23. Est-il nécessaire de faire scier votre bois-à-brûler ? 24. Il est nécessaire de le faire scier. 25. N'êtes-vous pas reconnaissant des services qu'on vous rend ? 26. J'en suis très reconnaissant.

Exercise 156.

1. Are you not grieved with having lost your money ? 2. I am vexed that I have lost my purse. 3. With what will you fill that bottle ? 4. I will have it filled with ink. 5. Is it not necessary to have our wood sawed ? 6. It is necessary to have our fire-wood sawed. 7. Your garden is too small, is it not necessary to have some plum-trees pulled out ? 8. It is necessary to have some plum-trees cut down. 9. Have you filled your friend's purse with silver ? 10. I have filled it with gold. 11. Are all your bottles filled with wine ? 12. They are all filled with ink. 13. Are you sorry to have filled your bottles with ink ? 14. I am glad to have filled them with ink, for I want ink. 15. Are you pleased with this book ? 16. I am pleased with it. 17. Is that land good for anything ? 18. It is good for nothing. 19. Is that lady beloved by her children ? 20. She is beloved by her friends and by her children. 21. Are you grateful for those services ? 22. I am grateful for them. 23. Is it not possible to split that piece of wood ? 24. It is not possible to split it. 25. Is it agreeable to travel in winter ? 26. It is not so agreeable to travel in winter as in summer. 27. It is easy to blame others. 28. Is it not glorious to die for one's country ? 29. It is glorious to live and to die for one's country. 30. Have you filled the inkstand (*encrier*) with it ? 31. I have filled it with it. 32. Would it not be necessary to pull up all those trees ? 33. It would not be necessary to pull them all up, for my garden is very large. 34. Henry the Fourth (*quatre*) was beloved by his people.

Section LXXIX.

Government of Prepositions, etc. (§ 139.)

1. Some prepositions govern the nouns which follow them without the aid of other prepositions. Avant, *before* (*at an earlier period*), [§ 142 (1), devant, *before* (*opposite place*), [§ 142 (1)], derrière, *behind* ; chez, *at the house of* ; concernant, *touching* ; excepté, *except* ; outre, *besides* ; selon, *according to* ; voici, *here is* ; voilà, *there is*, &c. [§ 139 (1)].

2. Others, being rather prepositional phrases, govern their object by means of the preposition *de* :—hors de, *out of* ; loin de, *far from* ; à fleur de, *even with* ; à force de, *by dint of* ; à l'égard de, *with regard to* ; à l'insu de, *without the knowledge of, unknown to* ; à raison de, *at the rate of* ; au deçà de, *this way of* ; au delà de, *that way of* [§ 139, 2].

3. Others take à—quant à, *as far* ; jusqu'à, *as far as*, &c. [§ 139, 3].

4. Two or more verbs, adjectives, or prepositions may in French have a regimen in common, provided they govern in the same manner or case :—

Nous aimons et nous louons nos enfants.	*We love and praise our children.*
Ce jardin est utile et agréable à notre père.	*That garden is useful and agreeable to our father.*
Au dedans ou au dehors du royaume.	*Within or without the kingdom.*

5. When, however, two or more verbs, adjectives, or prepositions, coming together in the same sentence, do not govern their regimen in the same manner, they cannot have a regimen in common. The regimen must be repeated, or replaced by a pronoun, or another turn must be given to the sentence. The following sentences could not, therefore, be translated literally into French :—

That man is useful to and loved by his family—I write to and receive letters from my brother—To be exposed to or sheltered from the rain. We must say :—

Cet homme est utile à sa famille, et il en est aimé.	*That man is useful to his family, and he is beloved by them*
J'écris des lettres à mon frère, et j'en reçois de lui.	*I write letters to my brother, and receive some from him.*
Etre exposé à la pluie, ou en être à l'abri.	*To be exposed to the rain, or to be sheltered from it.*

Utile and aimé, écrire and recevoir, exposé and à l'abri, take different regimens.

Résumé of Examples.

Nous sommes arrivés avant la bataille.	*We arrived before the battle.*
Vous vous asseyez toujours devant moi.	*You always sit before me.*
Les avez-vous placés sur la table ?	*Have you placed them upon the table ?*
Je les ai placés dessous.	*I have placed them under.*
Je les ai mis sous la chaise ou dessus.	*I have put them under the chair or upon it.*
Ils demeurent derrière notre maison.	*They lived behind our house.*
J'ai loué une chambre de derrière.	*I have rented a back room.*
Nous occupons le devant de la maison	*We occupy the front of the house.*
Je les ai recontrés derrière votre jardin	*I met them behind your garden.*
Vous avez acheté cette terre à l'insu de votre père.	*You have bought that estate without the knowledge of your father.*
J'ai payé ce jardinier à raison de deux francs par jour.	*I paid the gardener at the rate of two francs per day.*

Exercise 157.

Assiette, f. *plate.*	Dessous, *under, under it.*	Hors, *out.*
Coût-er, 1. *to cost.*	Dessus, *above, upon it.*	Plat, m. *dish.*
Dedans, *inside, within.*	S'enrich-ir, 2. *to become rich.*	Pomme-de-terre, f. *potato.*
Dehors, *outside, without.*	Hectolitre, m. 100 *litres.*	Sur, *upon, about.*
Derrière, m. *back.*		
Devant, m. *front.*		

1. N'avez-vous pas fermé la porte de devant? 2. Nous l'avons fermée, mais nous n'avons pas fermé la porte de derrière. 3. Qui est arrivé avant moi? 4. Le monsieur qui est assis devant la fenêtre. 5. Qui demeure derrière votre maison? 6. Il n'y a point de maison derrière la nôtre. 7. Ne pensez-vous pas qu'à force de travailler, il s'enrichira? 8. Je ne crois pas qu'il s'enrichisse, s'il vend ses marchandises à si bon marché. 9. Apprend-il la musique à l'insu de ses parents? 10. Il l'apprend à leur insu. 11. Vous êtes vous marié à l'insu de votre sœur? 12. Je me suis marié à son insu. 13. Notre ami n'est pas dans la maison, il est dehors. 14. Il n'est pas hors de la ville, il est dedans. 15. Avez-vous de l'argent sur vous? 16. Je n'ai pas d'argent sur moi. 17. Demeurez-vous sur le derrière ou sur le devant de la maison? 18. Nous demeurons sur le devant. 19. La cuisinière a-t-elle mis les assiettes sur la table ou dessous? 20. Elles a mis les assiettes, les plats, les cuillères et les fourchettes sur la table. 21. Combien ces pommes-de-terre vous coûtent-elles? 22. Je les ai achetées à raison de cinq francs l'hectolitre. 23. Avez vous fait réparer le dedans ou le dehors de la maison? 24. J'ai fait réparer l'intérieur et l'extérieur.

Exercise 158.

1. Have you bought that house without your father's knowledge? 2. I have bought it without his knowledge. 3. Have you forgotten to shut the front door? 4. I have shut the front door and the back door. 5. I have brought all my books except two or three. 6. Does your brother occupy the front of your house? 7. He occupies the back. 8. Whom have you met behind that house? 9. I met nobody behind the house. 10. Does that gentleman live behind your house? 11. Nobody lives behind our house. 12. There is no house behind yours. 13. Have you a knife about you? 14. I have no knife about me. 15. Do you carry a knife about you? 16. I never carry a knife about me. 17. Has not your brother money about him? 18. He has no money about him. 19. Will you put these pencils upon the table, or under it? 20. I will put them in the drawer (*tiroir*). 21. How much have you given for that wheat? 22. I bought it at the rate of twenty-five francs per hectolitre. 23. Is that lady's house out of the city? 24. It is not out of the city; it is within. 25. Has not your sister placed the plates upon the table? 26. She has put the plates upon the table, and the spoons under it. 27. Have you had your house repaired? 28. I have had the inside repaired, but not the outside. 29. How much does that silk cost you? 30. I have bought it at the rate of five francs per metre. 31. Did you marry without your father's knowledge? 32. I married without his knowledge. 33. Have you sold my books without my knowledge. 34. I sold them without your knowledge. 35. I sold them without my sister's knowledge.

LESSONS IN LATIN.—No. XXXIV.

By John R. Beard, D. D.

DEVIATIONS IN THE THIRD CONJUGATION.

2. *Perfect in ui; Supine in tum, sum, xum.*

i. Alo, alĕre, alui, altum, *to nourish.*

ii. Colo, colĕre, colui, cultum, *to cultivate, honour.*

iii. Consŭlo, consulĕre, consŭlui, consultum, *to consult*; with acc., *to take the advice of any one*; with dative, *to care for any one.*

iv. Occŭlo, occulĕre, occului, occultum, *to hide.*

v. Răpio, răpĕre, rapui, raptum, *to carry off by force, snatch, seize*; compounds are in ripio, as corripio, corripere, corripui, correptum, *to seize quickly.*

vi. Sero, sĕrĕre, serui, sertum, *to put in rows, set.*

vii. Depso, depsĕre, depsui, depstum, *to knead.*

viii. Texo, texĕre, texui, textum, *to weave* (E. R. *texture*).

ix. Cumbo, cumbĕre, cubui, cubĭtum, *to lie along.* The simple word is out of use; instead, employ the compounds, as ...mbere, *to lie down.*

Elicio, elicĕre, elicui, elicitum, *to entice out* (E. R. *elicit*).

Fremo, fremĕre, fremui, fremĭtum, *to rage.*

Gĕmo, gemĕre, gemui, gemĭtum, *to groan.*

x. Gigno, gignĕre, genui, genĭtum, *to beget.*

xi. Molo, molĕre, molui, mollĭtum, *to grind.*

xv. Pinso, pinsĕre, pinsui, pinsitum (and pinsum), *to bray, pound.*

xvi. Pono, ponĕre, posui, posĭtum, *to place.*

xvii. Vomo, vomĕre, vomui, vomĭtum, *to spew.*

xviii. Frendo, frendĕre, frendui, fresum or fressum, *to grind or gnash the teeth.*

xix. Meto, metĕre, messui, messum, *to mow.*

Several verbs, having the perfect in *ui*, want the supine, as tremĕre, *to tremble*; excellere, *to be high, to surpass* (excelsus, *lofty*, is used as an adjective); and the other compounds of the obsolete cellĕre, connected with celsus, *high*; percello has perculsum, *to shake.*

Vocabulary.

Arripĕre, *to seize, get*; diripĕre, *to pillage, plunder*; conserĕre, *to plant*; conserĕre manus, *to fight*; demĕtere, *to mow down*; demittere, *to send or let down*; disserĕre, *to discuss*; ingignere, *to beget in*; praeponĕre, *to put before, place over*; depugnare, *to fight out a quarrel*; jurare 1, *to swear*; suo, suĕre, sui, sutum 3, *to sew*; progredior, progrĕdi, progressus sum 3 dep., *to advance*; caerimonia, ae, f. *sanctity, ceremony*; praetorium, i, n. *the general's tent*; sepulchrum, i, n. *a sepulchre, tomb*; tegumentum, i, n. *a covering, roof*; commutatio, ōnis, f. *an exchange*; migratio, ōnis, f. *migration, wandering*; recordatio, ōnis, f. *remembering, recollection*; mutus, a, um, *dumb, mute*; suprémus, a, um, *the last*; matūre, *quickly*; consultum, i, n. *consultation*; opus est, *there is need* (with ablative); fortitudo, Inis, f. *bravery*; in unâ virtute, *in virtue only*; verum, i, n. *truth.*

Exercises.—Latin-English.

In omnibus negotiis, priusquam aggrediare, consulto opus est; ubi autem consulueris, matūre rem ipsam aggredĕre; Socrates supremo vitae die multa de immortalitate disseruit; Manibus consertis, milites nostri fortitudine excelluerunt; animus movet id corpus cui est praepositus; Zeno in unâ virtute beatum vitum posuit; natura ingenuit homini cupiditatem verum inveniendi; omnibus animalibus a naturâ ingenitus est amor sui; Alexander, victor tot regum atque populorum, irae succubuit; spero te semper maximo studio in litteras incubiturum esse; caerimonias sepulchrorum homines, maximis ingeniis praediti, coluerunt; haerebat in eorum mentibus mortem non interitum esse omnia delentem, sed quandam quasi migrationem vitae; mors in claris viris et feminis dux in coelum est; caerimonias sepulchrorum homines, maximis ingeniis praediti, non tantâ curâ coluissent, nisi haereret in eorum mentibus mortem non interĭtum esse omnia delentem, sed quandam quasi migrationem commutationemque vitae, quae in claris viris et feminis dux in coelum soleret esse; si ingenium tuum artibus, litterisque excultum erit, et tibi et aliis utilis eris; dux, ne milites animum demitterent, vulnera sibi inflicta occuluit; quis credat ullum peccatum Deo occultum manēre? Tegumenta corporum vel texta vel suta sunt; quis pulchram illam vestem texuit? oratio tua totos nos ad se rapuit; Quaerit Socrates unde animum arripuerĭmus, si nullus fuerit in mundo; expugnata urbs ab hostibus direpta est; Scipio pugnavit cum Hannibăle, prope nato in praetorio patris, fortissimi ducis, alto atque educato inter arma; cui non locus ille mutus, ubi altus aut doctus est, cum grata recordatione in mente verseter? Agriccolae frumentum non solum jam demessuerunt, sed etiam demessum in horrea congesserunt; ipse Hector toto pectore tremuit, quum Ajax multa cum hilaritate progrederetur depugnaturus cum illo.

English-Latin.

Hast thou consulted thy father? take care of thy children; when they have well consulted, they may approach the business (res); the soldiers joined hands (come to close fight); which of the soldiers excelled in the fight? God has set the mind over the body; by wise men, life is placed in virtue alone; I place happiness in the love of God; hast thou a desire for (of) finding truth? nature has produced (ingignere) such a desire in all minds; the love of self is born in the rich and in the poor; thy brothers yielded to anger, and, coming to close quarters, fought; he applies to letters with diligence; my father hopes that I shall apply to letters with diligence; he has planted many trees; (there) cleaves to (in) the minds of men an idea that death is not the end of life; thy mind has been cultivated with arts and letters; the generals concealed their wounds lest the king should lose his courage; they sow and weave; garments are woven and sewed; whence did we get our soul? the origin of our soul is in God; God is the origin of all things; the city will be taken and pillaged; thou hast been bred and educated in arms; when will the husbandmen have cut down the corn? the soldier advances to fight with thee; my father will advance to besiege the city; the forces have advanced, and are pillaging the houses; he swore that he would quickly advance to the fight; the city being taken, the enemies slew the citizens.

The verb colo may serve as a subject for illustrating the natural growth and expansion of words. In Latin, as in all

languages, words originally denoted material objects and their operations. Hence we learn that civilisation began at the lowest end of its scale. Colo, the root of which is found in the Greek, as in the term bucolics, or songs on rural topics, has reference primarily to the operations of husbandmen. It is a word belonging to the farm, and relates generally to the care and labour bestowed on it. Accordingly, it (*culture*) is found in the compound term agriculture, or field-tilling. In general, then, colere has for its primitive meaning, the idea of working or tilling the land—a farm, a field, a garden. But those who till the land, live on the land; and so colere came to mean *to occupy the land, to dwell in the country;* and, in a wider sense, to dwell generally. Care is another idea involved in agriculture. Consequently, colere means *to care for*. But you may care for a person as well as for a thing; and you show your care for a person by attention, by love, by respect; the highest attention rises into homage and even worship; and thus colere, which in its birth signifies *to till a piece of ground*, in its full development signifies *to adore the Almighty*. After this verbal genealogy, let no one be led astray by the fancy of Hamilton, that words have but one meaning. Every word has a root-meaning, and that root-meaning may, with care and skill, be traced in all its secondary applications. But those applications are various and numerous. I shall give instances of the several applications of the verb colo, leaving you to translate them with the aid of a vocabulary.

Applications of Colo, *I till.*

1. *To till.*
   - "Villicus agri colendi causâ est constitutus."—*Varro.*
   - "Agri non omnes frugiferi sunt qui coluntur."—*Cicero.*
2. *To inhabit.*
   - "Urbem, mi Rufe, cole et in istâ luce vive."—*Cicero.*
   - "Homines qui has nobiscum terras colunt."—*Cicero.*
3. *To care for.*
   - "Jupiter, qui genus colis alisque hominum."—*Plautus.*

     5 3 2 4 6 1
   - "Ingenuas pectus coluisse per artes, cura sit."—*Ovid.*
   - "Nihil mihi unquam gratuis accidit quam quod meam Tulliam suavissimei et diligentissime coluisti."—*Cicero.*
   - "Jovis omnia plena; ille colit terras."—*Virgil.*
4. *To study.*
   - "Studium philosophiae a primâ adolescentiâ coluit."—*Cicero.*
   - "Artes liberales studiosissime coluit."—*Cicero.*
5. *To pursue.*
   - "Nunc plane nec ego victum nec vitam illam colere possum."—*Cicero.*
6. *To esteem, regard, respect,*
   - "Amo vos quia me colitis."—*Plautus.*
   - "A quibus diligenter observari videmur et coli."—*Cicero.*
   - "Quam civitatem meus frater colit atque diligit."—*Cicero.*
   - "Neque solum colent inter se amici ac diligent sed etiam verebuntur."—*Cicero.*
   - "Vis te, sexte, coli; volebam amare.
     Parendum est tibi; quod jubes, colĕris:
     Sed si te colo, Sexte, non amabo."—*Martial.*
7. *To honour, worship.*
   - "Quid est cur deos ab hominibus colendos dicas, quum dii non modo homines non colant sed omnino nihil curent?"—*Cicero.*
   - "Hos deos et venerari et colere debemus."—*Cicero.*"

Vocabulary to the Examples of Colo.

Villicus, i, m. *a steward, bailiff*; frugifer, ĕra, erum, *fruit-bearing*; victus, ûs, m. *food, victuals*; observo 1, *I pay attention to*; after amare, supply, te; parendum est. tibi, *you must be obeyed*; quod jubes, *as you command.*

Deviations in the Third Conjugation.

3. *Perfect in vi; Supine in tum.*

The stem of the present is strengthened by *n* or *r*.

i. Li-n-o, linere, levi, litum, *to besmear.*
ii. Si-n-o, sinere, sivi, situm, *to allow, permit.*
iii. Se-r-o, serere, sevi, satum, *to sow, plant.* The compounds have situm; as, consero, consĕrere, consevi, consitum.

In the following the *er* of the present undergoes inversion, thus, *cre* becomes *cer*.

iv. Cer-n-o, cernere (crevi, cretum only in compounds), *to separate, determine.*
v. Sper-n-o, spernere, sprevi, spretum, *to despise.*
vi. Ster-n-o, sternere, stravi, stratum, *to spread out* (E. R. *stratum*).

Hither may be referred the following in *sco*:—

vii. Cre-s-co, crescere, crevi, cretum, *to grow*; so, accrescere, *to increase*; excrescere, *to grow out*; recrescere, *to grow again*; concrescere, *to grow together*; the other compounds want the supine.
viii. No-sc-o, noscere, novi (notus as an adjective), *to become acquainted with.* Nosco has no participle future active. After the same manner internosco, *to distinguish*; ignoscere, *to pardon*; pernoscere, *to learn thoroughly*; praenoscere, *to learn beforehand.* But agnoscere (part. fut. act. agnoturus), precognoscere, recognoscere, form the supine in ĭtum, as recognĭtum.
ix. Pa-sc-o, pascere, pavi, pastum, *to feed.*
x. Quie-sc-o, quiescere, quievi, quietum, *to take rest.*
xi. Sci-sc-o, sciscere, scivi, scitum, *to enquire.*
xii. Sue-sc-o, suescere, suevi, suetum, *to grow accustomed to.*

Vocabulary.

Decernĕre, *to resolve, decree*; secernĕre, *to separate*; inserĕre, *to sow in*; oblinere, *to besmear, defile*; prosternere, *to cast down, prostrate*; consternere, *to astound*; substernere, *to lay under*; importare, *to bring in, import*; concionari, *to address the people*; invidia, ae, f. *envy, hatred*; vinea, ae, f. *a vine*; butyrum, i, n. *butter*; comitia, orum, n. *the public assembly of the people*; messis, is, f. *the harvest*; obtrectatio, ónis, f. *blame, reproach*; venustas, átis, f. *agreeableness, loveliness*; corporeus, a, um, *crorporeal, belonging to the body*; edo, edere, edi, esum 3, *to eat.*

Exercises.—Latin-English.

Insita est nobis corporis nostri caritas; ibi messis non est, ubi satum non est; omne quod erat concretum atque corporeum Deus substravit animo; vitâ tuâ malevolorum obtrectationes et invidias prostravisti; imperator Probus Aureum montem apud Moesiam vineis consevit; praelio commisso, omnia longe lateque telis, armis, cadaveribus constrata erant; sceleratum hominem conscientia spretae virtutis exagitat; dic cur consilium meum sprevĕris; audi, puer, mater te rogat cur panem butyro oblitum oblitus sis edere; displicit qui se externis moribus oblevit; rem dubiam decrevit vox opportuna emissa; Venustas et pulchritudo corporis secreta non est a valetudine; Cato concionatus est; Cato negavit se comitia habere siturum esse; Galli vinum ad se omnino importari non siverunt; cur desisti (desivisti) istum librum legĕre? Thebanorum potentia, quoad iis Epaminondas et Pelopidas praefuerunt, mirum in modum, crevit; amicitia nostra cum aetate accrevit; non dubitamus quin flumen quod subito accrevit, etiam subito decreturum sit.

English-Latin.

The love of our children is planted in our breasts; they despised my counsel; my counsel was despised by them; I will despise no one's counsel; my boy, butter thy bread; my bread, mother, has been buttered; he has determined not to follow thee; I shall determine quickly what to do (what I may do); they will defile themselves with bad morals; the good must be separated from the bad; I have separated the boys from the girls; the young have been separated by thee from the old; Cicero will speak in the public assembly; the consul declares that he will allow the Comitia to be held; the power of Britain has wonderfully increased under Victoria (Victoria reigning, abl. absolute); our friendship will grow with our age; after labour, the mind takes rest gladly (libens).

LESSONS IN GERMAN.—No. XXV.

Section XLVI.

Sich erinnern corresponds, in signification, to the English verb "remember." Ex.: Er erinnert ſich meiner (§ 126.); he remembers me (literally, he remembers himself of me.) Ich erinnere mich jener ſchönen Zeit; I remember (remind myself of) that sweet time.

In referring to a thing already learned, the verb „behalten," to keep, to retain, is generally used. Ex.: Ich kann die Wörter nicht (im Gedächtniß) behalten; I cannot retain or remember (keep in memory) the words. Er kann nicht lernen, weil er die Regeln nicht behält; he cannot learn, because he does not retain (remember) the rules.

I. The dative of a *personal* pronoun is frequently used in stead of a *possessive* pronoun. Ex.: Ich habe mir in den Finger geſchnitten; I have cut my finger (I have to me in the finger cut.) Er gab es mir in die Hände; he gave it into my hands (he gave it to me in the hands.)

II. The phrases „es fällt schwer, „or" es hält schwer," are nearly synonymous, and signify "to be hard, to be difficult." Ex.: Diesem armen Manne fällt es schwer, zu betteln; it is hard (it comes hard) for this poor man to beg. Es hielt schwer, ihn zu beruhigen; it was difficult to pacify him.

Exercise 50.

Ankunft, *f.* arrival;
Auf'sehen, to appear;
Begrei'fen, to comprehend;
Diebstahl, *m.* theft;
Drücken, to press;
Ei'genschaft, *f.* quality;
Erin'nern, to remember;
Erzäh'lung, *f.* narrative;
Faul'lenzer, *f.* idler;
Gedächt'niß, *n.* memory;
Gründlich, fundamentally;
Hülfe, *f.* help, assistance;
Spielen, to play;
Verbre'chen, *n.* crime;
Zuwei'len, sometimes.

Er erin'nert sich noch des alten Matro'sen. — He still remembers the old sailor.

Napo'leon hatte ein so gutes Gedächt'niß, daß er die Namen seiner meisten Solda'ten behal'ten konnte. — Napoleon had so good a memory that he could remember (retain) the names of most of his soldiers.

Er flüst'erte ihm etwas in's Ohr. — He whispered something in his ear.

Es hält schwer, einen Ei'gensinnigen zu überzeu'gen. — It is difficult to convince an obstinate (person).

Es fällt den meisten Menschen schwer, sich dem Schicksal geduldig zu unterwer'fen. — It is difficult for most people to submit patiently to their destiny.

1. Können Sie sich des Tages meiner Ankunft nicht mehr erinnern? 2. O ja, ich erinnere mich desselben noch sehr gut. 3. Es giebt viele Menschen, die sich lieber ihrer schlechten, als ihrer guten Eigenschaften erinnern. 4. Es hielt schwer, ihn von der Wahrheit dieser Erzählung zu überzeugen. 5. Es hält zuweilen schwer etwas zu glauben, was wir nicht begreifen können. 6. Es fällt dem armen, aber fleißigen Manne schwer, die Hülfe fremder Leute in Anspruch nehmen zu müssen. 7. Die englische Sprache fällt mir schwerer, als die französische. 8. Bei seinem Gelde, seinen Verwandten und seinen Kenntnissen, fiel es ihm nicht schwer, eine eben so gute, als angenehme Stelle zu finden. 9. Warum lernt Ihr Bruder so viel schneller, als Sie. 10. Weil er ein besseres Gedächtniß hat und die Wörter besser behalten kann. 11. Können Sie sich nicht mehr erinnern, wem Sie die Bücher und das Papier gegeben haben? 12. Ich kann mich dessen nicht mehr erinnern. 13. Der Faulenzer behält die Regeln nicht, weil er dieselben nicht gründlich lernt und lieber spielt als arbeitet. 14. Der Diebstahl ist ein Verbrechen. 15. Er drückte dem armen Manne einen Thaler in die Hand. 16. In der Ferne erinnern wir uns gern der Freunde. 17. Junge Leute tragen zuweilen Brillen, um gelehrt auszusehen

1. Do you remember the day of the arrival of your friend? 2. Yes, I remember the day very well. 3. Most people remember the years of their youth with pleasure. 4. There are many who remember their follies with shame. 5. It is difficult to remember every rule of a language. 6. It is not so difficult to convince a learned as an unlearned man. 7. Is it difficult to submit to the destinies of life? 8. Yes, it is very difficult; but the thinking man conquers them. 9. Can you not remember to whom you have lent my book? 10. No, I cannot remember. 11. To lie is a sin.

Section XLVII.

Verbs governing the genitive.

Some verbs in German govern the genitive, (§ 125) while those in English of corresponding signification require the objective. Ex.: Gedenke meiner; remember me (or, think of me.) Ich achte seiner nicht; I do not regard (notice) him. Er bedarf or braucht des Geldes; he needs (wants) money. Er denkt or gedenkt meiner; he thinks of me. Er erwähnte unser; he mentioned (spoke of) us. Wir genießen des Lebens; we enjoy life. Das Haus entbehrt des Vaters; the house lacks (misses) the father (master.) Der Unglückliche harrt besserer Zeiten; the unfortunate (waits for) expects better times. Schonet mein (§ 57. 1.); spare me. Sie spotten meiner, Prinz; you mock me, Prince! Vergesse meiner nicht; forget me not. Er pflegt seines Vaters; he nurses (takes care of) his father.

Some verbs of the above class (§ 125.) more commonly take the accusative. Ex.: Er bedarf or braucht das Geld; he needs or wants money.

Exercise 51.

Altersschwäche, *f.* decrepitude;
Bedür'fen, to need, want;
Bekümmern, to grieve, trouble;
Bereu'en, to repent, regret;
Beschei'den, considerate;
Bitte, *f.* request, petition;
Californien, *n.* California;
Cholera, *f.* cholera;
Dann, then;
Dumm, stupid;
Endlich, at length;
Entbeh'ren, to be in want of, dispense with;
Erwäh'nen, to mention;
Gefäl'ligkeit, *f.* complaisance, kindness;
Harren, to hope, wait for;
Hierfür', for this, for it;
Jammern, to distress, grieve;
Längst, long since (ago);
Leid, *n.* pain, sorrow;
Lohnen, to reward;
Nach'läßigkeit, *f.* negligence, remissness;
Rede, *f.* speech, harangue;
Regie'ren, to govern, rule;
Regiment', *n.* regiment;
Sehnsucht, *f.* longing;
Schonen, to spare;
Spotten, to mock, scoff at;
Sterben, to die;
Strenge, severely:
Ueberste'hen, to overcome, endure;
Unentbehr'lich, indispensable;
Unleid'lich, insufferable;
Un'wahrheit, *f.* falsehood;
Verwei'sen, to reprimand;
Wahr'nehmen, to observe;
Zuletzt', at last.

Bedür'fen Sie noch ferner meiner Dienste? — Are you still further in need of my assistance?

Ja, mein Herr! ich bedarf' noch etwas Geld, denn ich entbeh're selbst (Sect. 63. I.) der nothwendigsten Le'bensmittel. — Yes, sir; I still need some money, for I am in want even of the most necessary provisions.

Der'jenige, der ein Vergnü'gen nicht entbeh'ren kann, zeigt, daß er nicht versteht, dasse'be zu genie'ßen. — He that cannot dispense with a pleasure, shows that he does not know how to enjoy it (the same).

Ich würde seiner gar nicht erwäh'nen, wenn er nicht mein Verwand'ter wäre. — I would by no means speak of him, if he were not my relative.

Genie'ße des Lebens, aber mit Ehren! — Enjoy (the) life, but with honour!

Sie jammern mich, und Ihres Kindes jammert mich. — You distress me, and your child distresses me.

Vergessen Sie meiner nicht; — Do not forget me!

Ich vergaß meinen Bleistift, geben Sie mir einen Augenblick den Ihrigen. — I forgot my pencil; give me yours a moment.

1. Wer alte Leute nicht achtet, ist nicht werth, selbst geachtet zu werden 2. Wenn man jeder Rede achten wollte, hätte man sich um viele Sachen zu bekümmern. 3. Der Dumme entbehrt nicht eines stolzen Betragens, sondern des Verstandes. 4. Wer wird sich meiner annehmen, wenn ich verlassen bin? 5. Wenn er seine Fehler bereut, so will ich ihrer auch nicht mehr gedenken. 6. Ich würde noch viel mehr Sachen bedürfen, wenn ich nicht gewohnt wäre, die Gegenstände zu entbehren, die (Sect. 22. III.) viele Leute für unentbehrlich halten. 7. Der General erwähnte ihres Sohnes, als einen der tapfersten Männer in seinen Regimentern. 8. Gewähre meine Bitte, o Herr! und schütze mich vor meinen Feinden. 9. Gedenke meiner Bitte. 10. Nichts ist unleidlicher, als auf Jemanden lange zu harren, der zuletzt gar nicht kommt. 11. Längst schon harrte ich Ihrer mit Sehnsucht, als ich Sie endlich kommen sah. 12. Jammert dich nicht des Kindes, das verlassen auf der Straße läuft? 13. Wenn den Fürsten das Volk jammern würde, so würde er anders regieren. 14. Aber das Volk wird ihn hierfür noch lohnen und dann seiner nicht schonen. 15. Es könnte wohl der Mühe lohnen, nach Californien zu reisen. 16 Ich würde gern diese Kleider schonen, wenn ich andere hätte. 17. Ich wünsche keines andern Todes zu sterben, als den Tod der Altersschwäche. 18. Vergiß meine Worte nicht. 19. Vergiß der überstandenen Leiden, aber vergiß nicht die genossenen Freuden. 20. Wenn die Fürsten könnten, so schonten sie weder der Freiheit, noch sonst eines Rechtes ihrer Völker.

1. She nursed her father in his old age, and nursed me when I had the nervous fever. 2. He mocked me, but observed not how the people mocked him. 3. Has he accepted my present?

4. No, he told me he needed not the present. 5. Do not mention his kindness. 6. The teacher dares not spare the negligence or falsehood of his scholars, but must reprimand them severely, when he observes it. 7. Forget not the warning voice of your parents. 8. Remember the Sabbath-day. 9. Who can believe a man, who sneers at everything and scoffs at everybody? 10. We waited with longing for the arrival of our friends. 11. When thou repentest of thy faults, than shall I remember thee with pleasure. 12. Conscientious people make no vain speeches, nor make parade of qualifications which they do not possess.

Section XLVIII.

ADJECTIVES REQUIRING THE GENITIVE.

Adjectives, in German, that require the *genitive*, generally, answer to our adjectives *followed* by the preposition "*of*." (§ 124.). Ex.: Ich bin der Sache gewiß; I am sure *of* the matter. Er ist seiner Pflicht eingedenk; he is mindful *of* his duty. Sie sind deiner Freundschaft unwürdig; they are unworthy *of* thy friendship. They are sometimes best rendered by adjectives followed by the preposition "*with*" or "*to*." Ex.: Er ist des Weges kundig; he is acquainted *with* (has knowledge of) the road. Sie ist des Schreibens gewohnt; she is accustomed to (in the habit of) writing.

Some of these adjectives are also used with the accusative (§ 124. 2. Obs.). Ex.: Ich bin das Gehen nicht gewohnt; I am not accustomed to walking. Er ist es müde; he is tired of it.

Exercise 52.

Ack'erbau, *m.* argriculture;	Fromm, devout, pious;	Schuld, *f.* fault, offence;
An'klagen, to accuse;	Geizig, covetous;	Schuldig, guilty;
Bär, *m.* bear;	Geschwätz, *n.* gossip;	Summe, *f.* sum;
Bedürf'tig, wanting, needy;	Geständ'ig, confessing;	That, *f.* deed;
Beglei'ten, to accompany, guide;	Handwerk, *n.* handicraft, trade;	Thron, *m.* throne;
Benö'thigt, necessary;	Haut, *f.* skin, hide;	Ue'berdrüssig, weary, disgusted;
Beute, *f.* booty, prey;	Helfen, to help;	Un'gewohnt, unaccustomed;
Bevor', before;	Kundig (sein), (to be)	Un'kundig, unacquainted with;
Bewußt', conscious (of);	acquainted (with);	Un'werth, unworthy;
Boden, *m.* ground, soil;	Landgut, *n.* farm;	Verdäch'tig, suspected;
Böse, *m.* wicked (person);	Land'leben, *n.* country-life;	Vertrin'ten, to spend (for drink);
Dienst, *m.* assistance, service;	Nächste, *m.* neighbour;	Verü'ben, to commit;
Freundschaft, *f.* friendship;	Niemals, never, at no time;	Werth, worthy;
	Richter, *m.* judge;	Zukunft, *f.* future.
	Schießen, to shoot;	

Die der Ketzerei angeklagten Perso'nen mußten in der Vorzeit den Tod des Feuers erlei'den.	The persons accused of heresy, were compelled in (the) former times to suffer death by fire.
Der Arme, der einer Sache bedürf'tig ist, ist gewöhn'lich auch einer andern benö'thigt.	The poor (man) who is destitute of one thing is commonly also (needy) in want of another.
Wenn das Pferd seiner Stärke bewußt' wäre, könnte es Niemand bändigen.	If the horse were conscious of his strength, none could control him.
Nur der'jenige, der seines Erwer'bes fähig ist, kann seines Lebens froh werden.	Only he (the one) who is master (capable) of his calling, can (be glad of) enjoy his life.
Ich bin meiner Sache gewiß' und des Weges kundig.	I am sure of my cause, and acquainted with the road.
Des Fahrens gewohnt', bin ich bald des Gehens müde.	Accustomed to ride, I am soon tired of walking.
Schuldig oder nicht schuldig eines Verbrech'ens, jeder wurde verurtheilt.	Guilty or not guilty of a crime, every one was condemned.
Der Jäger ist seines Zieles sicher.	The hunter is sure of his aim.
Ich bin jetzt meines Lebens überdrüssig	I am now weary of my life.
Der Dieb ist des Diebstahls, der Mörder des Mordes, und in einem despo'tischen Lande, eine frei'heitsliebende Seele, des Hochverraths schuldig.	A thief is guilty of (the) theft. a murderer of (the) murder. and, in a despotic country, a liberty-loving soul, of high treason.
Mancher Mensch verbringt' sein Leben un'eingedenk seiner e'wigen Bestim'mung.	Many a man wastes his life unmindful of his eternal destiny.
Wenn er nur seiner Schuld geständig wäre, ich wollte ihm gern verzei'hen.	If he would only confess (were confessive, &c.) his guilt, I would gladly pardon him.

1. Ich bin einer solchen Arbeit ungewohnt und würde sie nicht thun, wenn ich nicht des Geldes bedürftig wäre. 2. Ich bin einer großen Summe Geldes benöthigt; helfen Sie mir, ich bin Ihrer Hülfe gewiß nicht unwerth 3. Wenn er eingedenk meiner Wohlthaten wäre, würde er nicht so handeln. 4. Dieser Mensch ist so schlecht, daß ich ihn jeder That fähig halte. 5. Glauben Sie, daß ein Geiziger seines Lebens froh sein kann? 6. Ich will ja gern meiner That geständig sein, laß mich nur laufen! 7. Der Jäger war seiner Beute so gewiß, daß er die Haut des Bären vertrank, bevor er ihn geschossen hatte. 8 Laß mich jetzt gehen, ich bin deines Geschwätzes herzlich müde. 9. Gut, wenn sie meiner überdrüssig sind, werde ich gehen. 10 Niemals werde ich mich einer That schuldig machen, welche mich ihrer Freundschaft unwürdig machen würde. 11. Ich besitze ein Landgut, aber ungewohnt der Arbeit, und unkundig des Ackerbaues, bin ich desselben überdrüssig. 12. Einer ist des andern werth, aber auch oft Einer des Andern unwerth. 13. Ein König, der das Volk nicht liebt, ist des Thrones unwürdig. 14. Wenn du mich auch des Diebstahls verdächtig hältst, kann ich dieser That doch nicht geständig sein, weil ich sie nicht verübt habe 15. Wenn die Menschen immer des Todes eingedenk wären, würden sie oft nicht so böser Thaten schuldig werden. 16. Hilf deinem Nächsten und frage nicht, ob er deiner Hülfe würdig ist, wenn er deren bedürftig ist. 17. Ich will sie begleiten, ich bin des Weges ganz kundig; ich sehe es, Sie sind dessen unkundig. 18. Ich danke Ihnen, mein Herr! ich bin Ihres Dienstes nicht benöthigt; denn da ich des Gehens müde und des Fahrens überdrüssig bin, werde ich hier bleiben. 19. Was thut ein Mann in Amerika, der keines Handwerks kundig ist? 20. Er muß jede Arbeit thun, deren er fähig ist, und eingedenk des Sprichworts sein, wer nicht arbeitet, soll nicht essen.

1. He who is acquainted with a trade, in America, has a golden soil. 2. The covetous man is insensible to the misery of others. 3. The Italians, who rose in some provinces against Austrian oppression, were unmindful of their weakness. 4. I became tired of hearing such a long speech. 5. Everybody is sure of death, but unacquainted with the time thereof. 6. If thou wert so accustomed to country life as I am, thou wouldst not stay in town. 7. Never will I make myself guilty of a deed, which will make me unworthy of your friendship. 8. The man who has led a conscientious life, and followed the dictates of his conscience, has no fear of dying; but the wicked man, unmindful of his actions and conscious of his crimes is afraid of death and the future. 9. Many a one who stands accused of a crime before his judges is conscious of less offence than those who judge him.

LESSONS IN NATURAL HISTORY.—No. XII.

THE COMMON HEDGEHOG.

(*Order* CARNIVORA.)

In almost all parts of the country the hedgehog may be found. Concealed during the day in woods, copses, orchards, and dense hedge-rows, it amuses itself

"What time the timorous hare limps forth to feed,"

appearing all alertness, and alive to every sound. tripping along the narrow paths and among the long grass with a noiseless step.

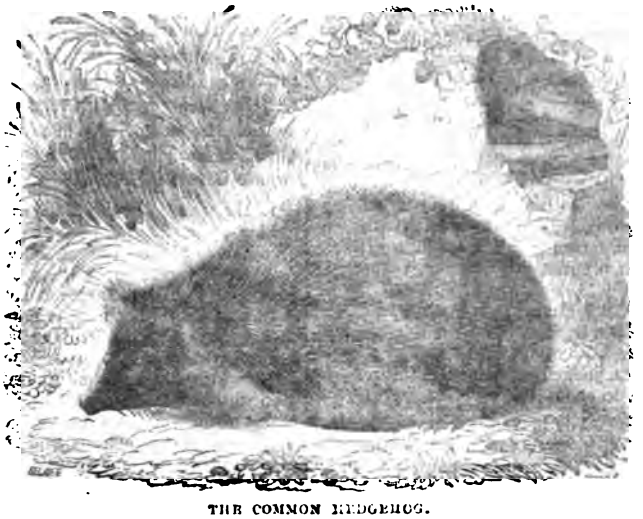
How remarkable is the defence with which this animal is provided! Endowed with a set of cutaneous muscles, their contraction rolls up the animal, while by means of a circular muscle round the margin of the dorsal covering, the thorn-clad skin of the back is drawn up like the mouth of a purse, so as to shut in the head and limbs, the whole being thus enveloped. Nor is this a long process; on the contrary, it is effected with wonderful celerity. When surprised, therefore by any danger, the hedgehog makes no effort to escape by flight, but rolling itself up in the form of a ball, trusts to its defence of prickles, and quietly waits the result. While in

this position the head, legs, and tail are completely protected; and the animal may be tossed about and even roughly handled without being forced to unfold itself; indeed, the more severely it is assailed the more firmly does it contract itself, and the more pertinacious is its defence. During this armed state most dogs stand off and bark, not daring to seize it; and if they once attempt to make it a prey, their mouths are so pricked with its bristles that it is with difficulty they can be prevailed upon to repeat the attack.

But, listen to a word on behalf of the hedgehog from the pen of one who often pleaded forcibly for inferior creatures, Mrs. Charlotte Smith:—

"Wherefore should man, or thoughtless boy,
Thy quiet, harmless life destroy,
Innoxious urchin? For thy food,
Is but the beetle and the fly,
And all thy harmless luxury
The swarming insects of the wood.
Should man, to whom his God has given
Reason, the brightest ray of heaven,
Delight to hurt, in senseless mirth,
Inferior animals? And dare
To use his power in waging war
Against his brethren of the earth?
Poor creature! to the woods resort,
Lest, lingering here, inhuman sport
Should render vain thy thorny case;
And whelming water, deep and cold,
Make thee thy spiny ball unfold,
And show thy simple negro face!"

"O but," says the thoughtless, as an excuse for his brutality, "hedgehogs drain the udders of cows." Their advocate replies, "Had you looked at the mouth of one of these creatures the sight would have been sufficient to refute the charge which ignorance has long been accustomed to advance. It is true that the hedgehog often creeps close to the cattle, as they slumber in the meadow, attracted by the warmth of the cow, or by the insects which swarm round it; and if the udders of the cows should drip, it may sip the milk; but to say it injures the cow is just as true as to declare that the cow preys on hedgehogs!"



THE COMMON HEDGEHOG.

There is another charge: "Hedgehogs rob orchards, and carry away the apples and other fruits sticking to their spines, in order that they may hoard them up for the winter." Now the fact is that they make *no* winter store; and if they do take some fruit, they often render man a service. The well-known naturalist, Mr. White, of Selborne, says, "They abound in my gardens and fields. The manner in which they eat the roots of the plantain in my grass-walk is very curious; with their upper mandible, which is much longer than their lower, they bore under the plant, and so eat off the roots upwards, leaving the tuft of leaves unnoticed. In this respect they are serviceable, as they destroy a very troublesome weed, but they deface the walks in some measure by digging round holes."

Some years ago, a full-grown hedgehog was put into a small yard, in which was a border of shrubs. In the course of a few days he formed, beneath a small holly-tree, a hole in the earth sufficiently large to receive his body. After a while, a small shed was built for him in the corner of the yard, and filled with straw, but the animal would not quit his former situation, until it was covered with a stone. He then took possession of the shed, and every [illegible] carried leaves from a distant part of the border, to stop [illegible]. His principal food was raw meat and mice. Of the [illegible]uld eat six at a time, but never more; and although [illegible]rown to him dead, he bit them all in the neck, before he began to eat any. He would also eat snails with their shells, but would leave anything for milk, which he would lap extremely slow. If the person who usually fed him neglected this duty, he would follow him along the yard; and if the door were open, he would go after him into the house. If meat were put near the mouth of his shed in the day-time, he would sometimes pull it in, and eat it. As the weather became colder, he carried more leaves into his shed; and sometimes he would not come out for two or three days successively. In this state he lived for about six months, at the end of which he died, some thought for want of food, but most probably, from the severity of the weather.

There is no doubt that the food of the hedgehog is much more various than was at one time supposed. It is quite certain that it preys upon the eggs of pheasants, partridges, and all kinds of domestic poultry, to a considerable extent; and in other ways it seems to gratify its carnivorous propensities; of a snake, it was seen, on one occasion, to make an easy prey. Dr. Buckland laid a hedgehog on the body of a snake, with that part of the ball where the head and tail meet downwards, and touching it. The snake proceeded to crawl; the hedgehog started, and opened slightly, and seeing what was under it, gave the snake a hard bite, and instantly rolled itself up again. It soon opened a second time, repeated the bite, and then closed as if for defence; it opened carefully a third time, and then inflicted a third bite, by which the back of the snake was broken. This done, the hedgehog stood by the snake's side, and passed the whole body of the snake successively through its jaws, cracking it, and breaking the bones at intervals of half an inch or more; by which operation the snake was rendered entirely motionless. The hedgehog then placed itself at the top of the snake's tail, and began to eat upwards, as a man would eat a radish, without intermission, but slowly, till half the snake was devoured, when the hedgehog ceased from mere repletion. During the following night, the anterior half of the snake was also entirely eaten up.

When taken young, the hedgehog may be completely tamed and rendered familiar, allowing itself to be handled, and associating, on the most amicable terms, with the dog or the cat. The landlord of the Angel Inn, at Felton, Northumberland, kept a hedgehog some years ago, which answered to the name of Tom. It was very docile, ran familiarly about the house, and would even do the work of a turnspit dog.

The hedgehog is spread over every part of Europe, except the cold countries, such as Lapland and Norway. On some parts of the continent its flesh is still eaten, as it used to be in England, when roasted, or baked in a pie; it was reckoned in season in the month of August.

LESSONS IN ENGLISH.—No. XXVI.

By JOHN R. BEARD, D.D.

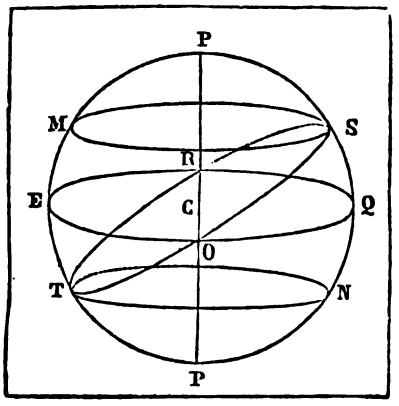
GREEK STEMS. (*Continued*).

LANGUAGES have their distinctive peculiarities which fit them for some special service in the great workshop of humanity. The numerous broad and open vowels of the Italian makes it specially suitable as the language of song. The strength and dignity of the Latin render it a good organ of civil government. The French, as being light and graceful, is unequalled as a medium of conversation. The swell and pomp of the Spanish both represent and symbolise the people by whom it is spoken. Two or three languages possess almost every variety of excellence. Of those, the lowest in the scale is the English, which is distinguished alike for power, ex-

the axis X X′ should be called *south*. Moreover, it might be agreed upon that every distance measured *upwards* from the axis X X′ should be called *north latitude*, and every distance measured *downwards* from the axis X X′ should be called *south latitude*; and in like manner, that every distance measured from the point A, *to the right* or *eastward*, should be called *east longitude*, and every distance measured from the point A *to the left* or *westward*, should be called *west longitude*. Now this supposition is that which has actually been agreed upon; so that in a map of the world upon Mercator's projection, as it is called, the straight line Y Y′ would represent the *first meridian* or that of *Greenwich*; and the straight line X X′ would represent the *equator*; also, the point A would represent the point of intersection of this *meridian* with the *equator*, which are in fact the two rectangular axes to which all points on the earth's surface are referred, in order that their true positions (*geographical* positions) may be determined. Accordingly, the point P, fig. 7, would be described as the position of a place in *north latitude* and *east longitude*; the point P′, that of a place in *north latitude* and *west longitude*; the point P″, that of a place in *south latitude* and *west longitude*; and the point P‴, that of a place in *south latitude* and *east longitude*.

If the straight lines X X′, and Y Y′, which we have supposed to represent the first *meridian* and the *equator*, were to become circumferences of circles of the same size, they would then more truly represent the actual rectangular axes which are employed on the surface of the globe. The aspect they would then assume will be understood by reference to fig. 3, in our last Lesson, p. 90, No. 33, here repeated, where the circle P M E T P N Q S may

Fig. 3 repeated.



represent the first meridian, and the circle E O Q R the equator, their point of intersection E being their origin as rectangular axes. We still call these rectangular axes, because the planes of the circles cut each other at right angles, and the spherical angles P E O, P E R on each side of the meridian are right angles, whether taken from the upper or north pole P, or from the lower or south pole P; so that we still have four right angles round the origin E; but these are now spherical right angles, that is, angles formed by the quadrants or fourth parts of the circumferences of these great circles of the sphere. In order to have a proper view of the rectangular axes on the sphere, we should require to be looking at the edge or *circumference* of the circle P E P Q, and not at its *plane* or surface as in the figure; then we should see the edge or *circumference* of the circle R E O Q cutting the former at right angles, and both exhibiting at a distance the same appearance as the lines X X′ and Y Y′ in fig. 7. In this view, the point E being the origin of the axes, all points on the surface of the sphere included between the semicircle E M P S Q and the semicircle E O Q, are said to be in *north latitude* and *east longitude*; the longitude being measured from E along the *eastern half* of the equator E O Q, and the latitude from the same part of the equator on a meridian passing through any of the points in question and the two poles P P. All points on the surface of the sphere included between the semicircle E M P S Q and the semicircle E R Q, are said to be in *north latitude* and *west longitude*; the longitude being measured from E along the *western half* of the equator E R Q, and the latitude from the same part of the equator on a meridian passing through any of the points in question and the two poles P P. All points on the surface of the sphere included between the semicircle E T P N Q and the semicircle E R Q, are said to be in *south latitude* and *west longitude*; the longitude being measured from E along the *western half* of the equator E R Q, and the latitude from the same part of the equator on a meridian passing through any of the points in question and the two poles P P. Lastly, all points on the surface of the sphere included between the semicircle E T P N Q and the semicircle E O Q, are said to be in *south latitude* and *east longitude*; the longitude being measured from E along the *eastern half* of the equator E O Q, and the latitude from the same part of the equator on a meridian passing through any of the points in question and the two poles P P.

The student who reads the preceding explanation for the first time may have a little difficulty in realising the appearance of the sphere from the diagram made on a flat surface, but he must endeavour by his natural ideas of perspective to obtain as clear a notion as he can. Of course the difficulty would be entirely removed by the actual inspection of a globe; but we cannot insert globes in the pages of the POPULAR EDUCATOR; still we shall try what we can do by means of the map of the world inserted in vol. I., No. 20, p. 305, although it must be remembered that the surface of no solid body as a whole can be truly represented on a plane surface such as the page referred to. With that map before you, then, you will see the two sides of the globe represented in what are called the *eastern and western hemispheres*. In order to see the whole of only one side or half of the globe, the eye must be supposed to be at an infinite distance, and still possessing the power of sight; accordingly, *two such sights* directly opposite to each other will enable you to see the whole of the globe. This is the reason that two circles are necessary to represent the globe, because only one-half can be seen at a time. If these two circles could be pasted along their edges or circumferences, back to back, so that their north and south poles coincided, and then inflated till they assumed the form of a globe, they would then form a pretty correct representation of the earth's surface. The equator, which you know is a circle equally distant from the two poles, is represented on the map of the world by a straight line drawn across the middle of both hemispheres, marked by the word *equator*, and with degrees from 0° to 180° east, and from 0° to 180° west, reckoned from the *first meridian*.

In the map referred to, these degrees are marked only at the distance of every 20 degrees, on account of its smallness; in larger maps they are marked at the distance of every 10 degrees; and in larger still, at less distances; the best being those where they are marked at the distance of every *single* degree; but these, of course, must be of enormous size. The first meridian, that of Greenwich, is known by its being marked with 0 on the map or the equator. On looking at the *eastern hemisphere*, you will see this 0 marked on the equator, in the *Gulf of Guinea*, south of the coast of Guinea in Africa; this is the origin of the rectangular co-ordinates, the *first meridian*, and the *equator*, and it is to this point that all measurements of *longitude* are to be referred. On running up the meridian, passing through this *zero* point, towards the *north pole*, you will find that it passes through London in the *British Isles*; this, you know, is not strictly the case, the *meridian* of St. Paul's Church, London, being about 6′ or geographical miles *west* of the *meridian of Greenwich*; but this is so small in ordinary maps, that it is scarcely perceptible, and certainly not markable; whence the meridians of London and Greenwich are, for common purposes, considered the same. The meridian of Greenwich has been chosen as the *first meridian*, in preference to that of London, because Greenwich is the site of the *Royal Observatory*. Accordingly, all meridians which cross the equator *to the right* of that of Greenwich, are said to be meridians of places in *east longitude*; and all meridians which cross the equator to the left of that of Greenwich, are said to be meridians of places in *west longitude*. For example: if you look at *Pekin, in China*, on this map, you will find that it lies *to the right* of the *first meridian* in the northern half of the *eastern hemisphere* between two meridians which cross the equator, the one being that which is, or should be, marked at the point of intersection 110°; and the other that which is, or should be, marked at the point of intersection 120°; this enables you to guess, by the vicinity of Pekin to the latter meridian, that its longitude is about 116° *east*; now the actual longitude is 116° 26′ E. Again, if you

look at Buenos Ayres, in South America, on the same map, you will find that it lies to the left of the *first meridian* in the southern half of the *western hemisphere*, between two meridians which cross the equator, the one being that which is, or should oe, marked at the point of intersection 50°, and the other that which is, or should be, marked at the point of intersection 60°; this enables you to guess, by the vicinity of Buenos Ayres to the latter meridian, that its longitude is about 58° *west;* now the actual longitude is 58° 25′ W.

On the first meridian, the degrees of latitude are not marked; but they are marked, in the map of the world, on the circle which surrounds each hemisphere. On this circle, the points of its intersection with the equator are marked 0, to show that *latitude* begins to be reckoned from these points. Each of the four quadrants (or, fourth parts) of these circles is marked with degrees from 0° to 90° reckoned from the equator to the poles. In the map referred to, these degrees are marked only at the distance of every 10 degrees, on account of its smallness; in larger maps, they are marked at less distances; and the best are those in which they are marked at the distance of every *single* degree; but these, of course, must be of very great size. In the same map, circles are made to pass through the corresponding points on the upper or northern quadrants of the outer or surrounding circle of each hemisphere, and of the upper or northern half of the middle straight line extending from pole to pole, at the distance of every 10 degrees; these upper quadrants, and this upper half, actually denoting the northern portions of meridians passing respectively through the points of the equator marked longitude 20° W., longitude 160° E., and longitude 70° E. These circles, which on the globe are parallel to the equator, are, from the nature of the projection employed in this map, not actually parallel to that line or to each other, being drawn from different centres; but they are still called *parallels of latitude*, and are used to enable us to determine the latitude of any place on the map. Similar parallels of latitude are drawn through the corresponding points on the lower or southern quadrants of the outer or surrounding circle of each hemisphere, in the same manner, and for the same purpose. For example: if you look at *Pekin, in China*, on this map, you will see that it lies between the equator and the *north* pole in the *eastern hemisphere*, and close to the *parallel of latitude* marked 40° at each side of the map; this enables you to guess that the *latitude* of Pekin is nearly 40° *north;* now the actual latitude is 39° 54′ N. Again, if you look at *Buenos Ayres, in South America*, on the same map, you will find that it lies between the equator and the *south* pole in the *western hemisphere*, and nearly in the middle between the *parallels of latitude* marked 30° and 40° at each side of the map; this enables you to guess that the latitude of Buenos Ayres is nearly 35° *south;* now the actual latitude is 34° 36′ S. Having thus shown how to find separately the latitude and longitude of any place on the surface of the globe by means of the circles and lines drawn in the map of the world, it is easy for the student to combine these, and thus to determine the actual position of any place on the surface of the globe. Thus, we have found that the city of Pekin, in China, is situated in lat. 39° 54′ N., and long. 116° 26′ E.; and that the city of Buenos Ayres is situated in lat. 34° 36′ S., and long. 58° 25′ W.

Exercises.

Find from the map of the world, the latitudes and longitudes—that is, the geographical positions—of the following places to the nearest degree:—Tehraun, or Teheran, in Persia. Delhi, in India. Canton, in China. Sydney, in Australia. Cape of Good Hope, Africa. Cape Horn, South America. Assumpcion, South America. Chuquisa, South America. Mexico, North America. Washington, North America. Bhering's Straits, North America. Tobolsk, in Russia.

ANSWERS TO CORRESPONDENTS.

We particularly request our correspondents to say all that they have to say *on one single sheet* of paper, and to give their *real names* (which will be kept *secret* if they *desire* it), and their *assumed names*, as well as their *places of residence*, on the *same sheet*, in order to prevent *numerous mistakes, omissions*, and *misunderstandings*; if this be done, then the *envelopes* may be thrown aside, and *the single sheet* will alone occupy our attention. Our address, as we have said before, is "*Editor of the Popular Educator, La Belle Sauvage-yard, Ludgate-hill, London,*" and we request this to be put at the top of the same sheet of paper.

We further request that the students of *Cassell's Euclid*, who are really and truly desirous of making progress in Geometry under our tuition, will send their *solutions of the exercises* in said edition, addressed to *Professor Wallace*, to the above address as soon as possible, in order that they may receive the approbation due to them, by their names being *honourably mentioned*, when the solutions are given in the *Lectures on Euclid*, according as the propositions to which they belong successively appear in the POPULAR EDUCATOR. Those who desire the *answers to the questions in Cassell's Arithmetic*, will expedite their publication by sending the solutions to such as they have already calculated as soon as possible. Their names will also be honourably mentioned in the POPULAR EDUCATOR.

A. H. E. will be able to judge for himself, by the extracts we have made from the L. U. Calendar, whether he can go up to the University of London for Matriculation. Thanks for his suggestions.—X. Y. Z. (Dudley) will find an answer to his inquiry in the same extracts.—NEWCASTLE: Cassell's History of England, price 3s. 6d.—E. D. (Pontypool): The rule for the *octagon* is not correct, on the supposition that it is *regular*.—J. V. C. (Glasgow): We would hardly advise any addition to, or cessation from, his studies. The dictionary he mentions (Young's) may do for a little. The maps should be pasted in their proper places according to *directions to be given to the binder*, when the volume is completed.—JAMES TAYLOR (Aberuthven): Mr. Lover, Glasgow, and Mr. Menzies of Edinburgh, will gladly furnish you with any work issued from our office.

MUSIC.—WILLIAM HAMILTON (Glasgow): We are obliged by his politeness in sending us a set of his new "Penny Series of Glees and Choruses," and a list of his publications. It is *a noble* collection of cheap music for the people.—S. A. E. (Ravenfield): Every member of your class can obtain a modulator for a penny by purchasing the number of the EDUCATOR in which it is printed. A large one for class purposes is published by Ward and Co., for one shilling and fourpence.—STOURBRIDGE and WHITLEY: Can any one answer the following questions for our correspondents? Will there be any difference in the sound of a pianoforte (flat, table-shaped) if the top has been split, but well fastened together again with iron bands, and glued? Give a rule to get the length of organ pipes having certain different diameters, but sounding the same note? A description of Barker's pneumatic valve? The relative length of pipes between the octaves would be in the same proportion as the string of the monochord.—T. S. C. (Chudleigh): When pianofortes and organs are tuned, in every key, *perfectly*, according to the proper divisions of the monochord, then there will be nothing of what tuners call "wolf." Such instruments would, at present, be very expensive because of the number of pipes or strings required. But might not some of the money now lavished on ornament be better spent in obtaining correct tune?—T. BAINES (Bury): We *do* intend to introduce all the clefs, as he expects.—JOHN STOCKING: What is the best deal for the belly of a violin? Does it make any difference whether the back is in one or two pieces? Can any friend answer him?—A PERSEVERING SINGER: Be content to listen while your voice is breaking.—A MUSICAL REFORMER: We shall be happy to see, and will promise to re-examine, the last edition of the "Sequential System."—T. HART should not ask us questions which he can answer for himself by careful perusal of our Lessons, neither should he "suppose" without a reason.—PETER SIMPLE'S questions we cannot answer.

ERRATUM.

No. 31, p. 71, col. 1, last line, before *four* insert *more than*.

LITERARY NOTICES.

THE ALTAR OF THE HOUSEHOLD; or, DOMESTIC WORSHIP. Part I. will be published on the 1st of January, 1853, price 1s. This work will contain a Series of Services for the Family, adapted for every morning and evening throughout the year, viz., portions of Scripture, Prayers and Thanksgivings, suitably adapted to each other, to which will be added short practical comments to explain the subjects read, or enforce the duties enjoined. This work will be edited by the Rev. Dr. Harris, Principal of New College, assisted by a band of eminent divines in London and the country.

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LESSONS IN DRAWING.—No. I.

INTRODUCTORY CHAPTER.

In order to assist our pupils in obtaining some elementary notions relating to *form*, to *colour*, and to *light and shade*, as well as to *natural perspective* in Drawing, we shall suppose, as a first lesson, that you take up some object, such as a *closed book*, and that you place it before you in various positions, in order to observe the effect which is produced upon the eye in each of these positions. Three things will particularly attract your attention, when you look at the book in any given position: *first*, its FORM; *then*, its COLOUR; and *next*, its CHIARO-SCURO, or LIGHT AND SHADE. When you have carefully considered and understood the appearance of the book in these particulars, you will be able to make a *Drawing* of it. If you have never been accustomed to use a pencil, or make a sketch of any object before, your first attempt may not please yourself, or, indeed, any one else; but a first attempt must be made; a second may be more successful; and a third, the most successful of all.

It is frequently asserted that the art of Drawing, like that of writing poetry, is a *natural gift;* and that unless you possess this, you never can excel. It may be true that, to rise to the highest eminence in any science or art, requires a peculiar bent of the mind; but to acquire a useful practical knowledge of the art of Drawing, it is by no means necessary that every one should be a genius. With regard to the sister arts—poetry and painting—it may be truly said, in regard to their elements, at leas, that every man is endowed with some ability for their acquisition and their application. Every one, for instance, is *poetical* when he speaks on a subject with which he is well acquainted, or in which he is deeply interested; and, in like manner, every one is *an artist, who is* ready to make a sketch or a *Drawing* of any object, which he wishes to explain to another, when he finds that language fails to convey his ideas. The art of Drawing, therefore, may be attained to a sufficient extent for practical purposes by every one who exerts the necessary attention and assiduity. The artisan, the tradesman, or the connoisseur, may, by the use of a few well-directed strokes of the pencil, convey an idea of his plans, operations, and views in relation to artistic productions, of which the most laboured and elegant composition, consisting of many hundred words, would fail to convey the slightest impression to the mind of the hearer or the reader.

But to return to our example already suggested. Let the pupil take up the book before mentioned, and hold it in a *horizontal position* on the palm of the right hand—that is, *flat*, as it would lie on a table; then raise it in this position to the height or level of the chin, with one end towards you, and at the distance of about twelve inches from the face; then, if the front or fore-edge of the book be turned to the right, it will present the appearance represented in fig. 1.

Fig. 1.

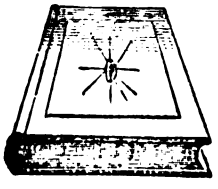
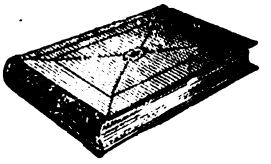


Fig. 2.

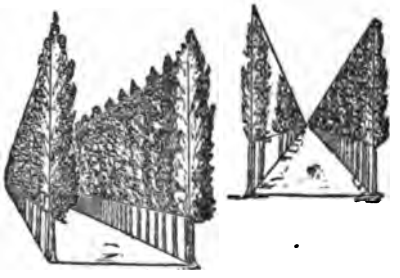
If the hand be held in the same position, but the farther end of the book be turned to the left, it will appear as represented in fig. 2. And, if the hand be held in the same position, but the farther end of the book be turned to the right, it will exhibit the appearance represented in fig. 3.

Fig. 3.



In these different positions, you see how remarkably the appearance changes, and still it is the same book. One thing, however, cannot escape your observation, and it is this: that the two ends of the book, especially in the view represented in fig. 1, appear to be of different lengths, although they be in reality of the same length, that end which is farthest from you appearing to be the smaller. Now this is according to a law of nature, the law of perspective, by which all bodies at great distances appear less than the same bodies at small distances, and that in proportion to the greatness of the distance. Every one must have noticed the regular appearance and gradation of the effects of this law, when looking down an avenue, where the trees at the farther end appear almost to approach each other, although you know that they are exactly at the same distance as those at the near end, see fig. 4; or, when looking alongside of a wall of uniform height, and of a considerable length, the top and the bottom of the wall seem to approach each other in the distance.

Fig. 4.

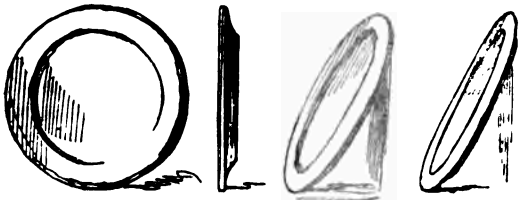


There are positions in which you may look at the book and not perceive any difference in the apparent lengths of the two ends, viz., when you look down at it from a point directly over the middle of the side, or when you look up at it from a point directly under the same; also, when you hold the side of the book facing you, and look at it from any convenient distance. Generally speaking, however, the appearance of the book, and of the dimensions of its different parts, will vary with its position; so that, as the position changes, the appearance changes. A complete knowledge of the laws which regulate these appearances, will enable you to give a true representation of them on paper or canvass; and these laws are known under the name of the principles of perspective. It is plain, from what we have said, that these principles are not arbitrary, and that they are not mere matters of choice or of human invention. They are discoverable in all the appearances of nature; and, indeed, until the principles of perspective were well understood, natural appearances were not well understood; and, consequently, the art of drawing was not well understood. It is true that there have been men who possessed great natural powers of observation,—men who could draw well before perspective was fully understood,—and among these there have been some

of the greatest men, such as Leonardo da Vinci; but it is equally true that the principles of drawing were not sufficiently well understood to admit of a popular explanation to any man of ordinary comprehension. This has at length been accomplished; and men in general may now be taught the art of drawing as easily as the arts of reading and writing.

In reference to FORM, then, the first of our three elements in Drawing, the appearances of objects are very variable; but we must endeavour to apprehend these appearances, and to represent them in every possible change of position. For example: suppose that you place any round or circular object before you—say a dinner-plate; if you look directly at the face or back of the plate, it will appear in the form of a circle, as in the first diagram in fig. 5. If you look at the plate sideways, that is,

Fig. 5.



with the edge towards you, it will present the appearance shown in the second diagram, fig. 5, similar to that of a straight piece of wood partly cut away at the two ends. The third and fourth diagrams exhibit two other positions in which the same object may be viewed, but neither of which present the appearance of a circle, although the object be really of that form. The lessons on perspective will enable you to acquire a knowledge of the laws which regulate the various appearances exhibited by curvilinear forms.

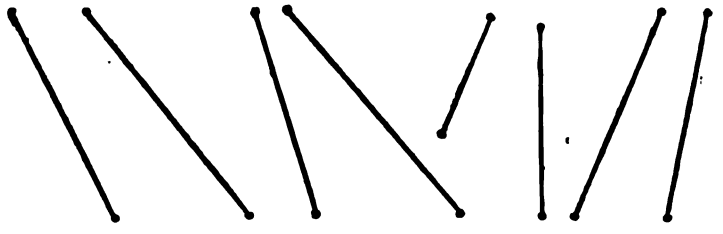
We now call your attention to the subject of *outline*. If you do not know what *outline* means, take the following as a definition: outline is a tracing which goes closely round any object or figure, touching it at all points of its course. You will obtain a clear idea of outline, by imagining a wire bent round the outside of any figure, so as to fit it close in every part, and to lie in a horizontal position when removed; that is, if you lay this bent wire upon a flat surface, you will have an outline of the figure in question.

If you think for a moment, you will perceive that whatever may be the form of an object, its outline will be composed either of straight lines, or of curved lines, or of some combination of straight and curved lines. It is not possible to imagine a line which shall not belong to one of these three kinds. It follows, therefore, that if you can form a straight line of any length, and give it any direction you please, and if you can combine with it other straight lines or curve lines at pleasure, you then possess the power of drawing the outline of any object whatever; that is, you are then able to *draw in outline*. Perseverance will give this desirable power to any one; and the only sure method of attaining it is by careful and constant practice. Tracing outlines against a glass window, or employing any such idle schemes, are mere delusions; these must be never thought of if you wish to learn to draw. Sketching at random is equally useless, and must also be avoided, as it will give you bad habits of hand, difficult to overcome if once confirmed. As a first lesson, then, in outline, try your hand at drawing a straight horizontal line, as *a b*, in fig. 6.

Fig. 6.

If you have had no previous exercise on this simplest of all simple figures, you will probably make a crooked line; perhaps you will make your line higher at one end than at the other, and not horizontal, or, perhaps, you may make a flat, irregular curve. Something will depend on the position of the right arm. In drawing a horizontal line keep your elbow rather close to your side at starting, and you will find it easier to do. In drawing a perpendicular line, you will find it better to give the elbow more play. When you look at a broken-down gate with the two posts only remaining, but both of the same height, a horizontal line is as clearly indicated by the tops of these posts as if a line were stretched across to show it, or a straight piece of timber laid from post to post. Make, then,

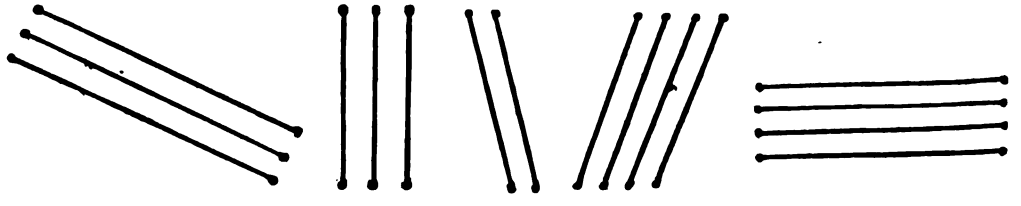
Fig. 7.



two points on your paper, as if you were marking out the places of the tops of the posts, thus:—

Now join these by a straight line, proceeding steadily from left to right. If you do not find this easy at first, practice it

Fig. 8.

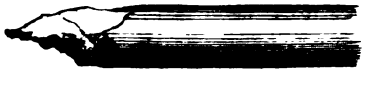


until you do; and you will then be master of a movement which lies at the foundation of drawing. It is held as a principle among geometers, that when two points are given, the straight line joining them is also given. Draw straight lines in every direction, first marking out their extreme points, and continue this exercise until you have fully mastered it (see fig. 7). Then try your hand at drawing three or more lines as in fig. 8, always beginning by marking the points; and learn to draw these lines in all directions. At first you will find it most easy to begin at the top, and draw towards the left hand; but you must practise this lesson until you can draw them in any direction, beginning either at the right or the left, at the top or at the bottom. Do not think this exercise too simple; you will find that in learning to draw lines in this way you will make greater advances towards command of hand than if you had spent thrice the time in copying lines or drawing them without system. Command of hand includes precision and accuracy, and excludes all looseness of habit in drawing.

The size of the page precludes the insertion of examples on so large a scale as could be desired; but you may make these lines as long as you please, say from six inches to a foot in length. You may even proceed to the drawing of straight lines longer and longer, until you are able to join points a yard asunder; the points in all cases showing you where to begin, where you are going to, and where you are to stop.

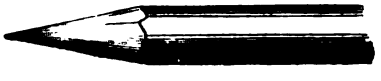
For these exercises it is not always necessary to use paper. A large slate will do equally well; or, what is better still, a black-board with a piece of chalk; you may even draw them against a smooth wall. If you use paper, almost any sort will do, as it would involve needless expense to use a high-priced article. The paper you employ for drawing should be fastened down upon a board—drawing pins are used for this purpose; these are generally made with flat brass heads about the size of a threepenny piece, and a short steel point for fixing in the wood; when these are not easily to be had, common tacks may be used; or, instead of either, each corner of the paper may be fastened to the board by a little sealing-wax. When you sit down to draw, place your feet right before you, and take care not to fall into any lounging, awkward, or cramped position. There are some excellent remarks on this head in the first Lesson in Penmanship, page 31, in this volume, which you will do well to read. Some of the antics there mentioned I will not suppose you to be guilty of, they are too silly; nevertheless, read the article. A desk is a very suitable apparatus for drawing on; but if you place your drawing board on a table, it is easy to give it a slope by putting something under it. If you use a black-lead pencil, do not cut it all on one side nor hack it as represented in fig. 9. but cut it with a sharp knife in

Fig. 9.



an even and proper manner, as represented in fig. 10, taking care

Fig. 10.



not to cut away so much of the wood as to leave the black-lead without support, for then it is very liable to break. Use no Indian rubber in these early exercises, but let your bad lines remain; they will serve afterwards to shew you what improvement you have made.

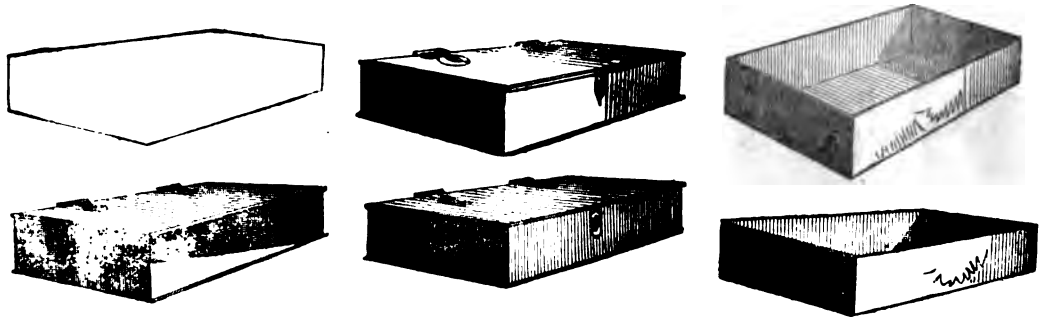
Hold your pencil generally as you hold a pen. The necessity of making your lines longer, and in greater variety than is usual in writing, will cause you to move your hand and arm more freely; but do not aim at mere quickness, this will be acquired in due time. When you can make good lines, you may make them as quickly as you please.

If you have a ruler or a pair of compasses in your possession, do not use them at first; put them away till you have acquired hand-practice.

Let us again return to the example of the book. Suppose it now to be lying on a table in a clear light, and that its colour is scarlet. Remove it to a dark part of the room; put a red-brown book on the table in the place whence you took the former; and you will then see that the scarlet book, in its dark place, approaches the appearance of the red-brown book in the light place. If it had been a blue book, it would have approached to a purple in colour or perhaps to a black or dark grey, according to the original shade of blue. If it had been of a yellow colour, it would then have looked in the dark place as if grey had been mixed with it. From these considerations, then, we infer that COLOUR is subject to modifications as well as FORM.

Lastly, as to CHIARO-SCURO, or LIGHT-AND-SHADE, attend to the following considerations. I need scarcely tell you that if you turn the back of the book away from the light, the lettering and gilding on the back, if there be any, will become obscure and illegible. The smaller quantity of light causes the different colours to appear *more of one tone*, that is, more alike in appearance. The obscurity has diminished the contrast which made them formerly so distinct. Next, open the book, and you will find that, according as you allow the light to fall upon it, either directly or from the left hand or the right, so you will have both pages of the book enlightened, or one light and the other dark. As appearances of this kind come under the observation of every one, it would seem too simple and obvious to require much discussion; but, from the consideration of a number of such simple examples, you may draw this general conclusion, that none of the true principles of art are arbitrary or conventional,

Fig. 11.



but are all capable of explanation by referring to natural appearances. To these they owe their origin, and the laws which regulate them are as constant as all the other laws of nature. The *rules* for practice in the art of drawing, as in any other art, are good only when they are founded on some natural facts, the cause of the natural phenomena. The rule, for instance, which recommends you to keep your elbow towards your side, in beginning to draw a horizontal line, arises from the construction of the bones of the arm at the elbow joint. Thus we see that art is not artificial in any disparaging sense of the word; it has its root in nature, and its smallest twigs and branches, when carefully examined, show whence they derive their origin and vitality.

We have now only entered upon our subject,—we have just opened a door and glanced within. If our pupils will patiently follow us,—stopping when bid, and doing what they are told,—they will ultimately be admitted into places in the temple of art, where they will receive both pleasure and profit. Let any ingenious artisan who reads this article, or any youth who is fond of chalking upon a wall, or of scrawling uncouth figures on his slate, only resolve to follow and carefully obey our instructions, and we shall soon have the gratification of knowing that his faculties are becoming enlarged, and, consequently, his enjoyments increased. The refined and cultivated classes have for a long time possessed an apparent monopoly of these enjoyments; but this arises from their being refined and cultivated by these means. The gate of knowledge is now thrown open; let us then urge all the students of the POPULAR EDUCATOR to enter by degrees, trusting that, before long, they will manifest such progress in all the arts and sciences, as will enable us to add their names to the daily increasing number of those who are qualified to receive that exalted pleasure which a refined

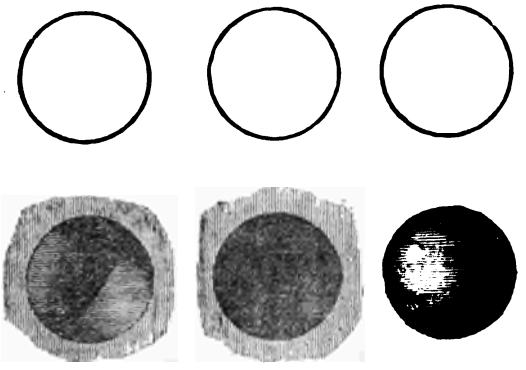
and cultivated taste always bestows on its happy possessors.

Our intended course of Drawing will include landscapes, figures, ornaments, instruction in water colours, in etching, &c., with explanations of practical methods of operation in the various branches.

The next lesson will include the consideration of so much geometry as it is absolutely necessary for a student of art to be acquainted with. In the meantime, the pupil may exercise his power of observation by noticing the changes in the appearance of any object that he may consider a fit object for the exercise of his drawing powers. A lucifer match-box will serve to compare with the following figures, see fig. 11, which show how the same outline may be variously filled up, to exemplify the different effects of LIGHT AND SHADE.

One of these figures is a mere outline; the others which, according to the shadows, exhibit the different appearances of a box open at the top, a box open at the side, a box open at the end, a closed box, and an open box, as seen from a higher point of sight. Fig. 12 shows how circles may be filled

Fig. 12.



up so as to represent hollows, or flat surfaces. These figures may be taken as a small illustration of the saying of a great Italian painter "Give me a correct outline, and you may fill it up as you please."

LESSONS IN ENGLISH.—No. XXVII.

By JOHN R. BEARD, D.D.

GREEK STEMS. (*Continued*).

THE learning of a new language is like the acquisition of a new sense. This is true, if only because a new language affords a new set of means for the expression of our ideas. The capacity of the human mind is greater than is the power of expression possessed by any vocabulary. That greater capacity finds a new channel, and a new outlet, in a new language. Besides, language is a medium for conveying ideas to a recipient, as well as an instrument for the expression of ideas already entertained. With words, then, you gain ideas. The increase of a man's vocabulary is the augmentation of his mental treasures. New knowledge must run into the old moulds. If it is true that no idea, no word; equally true is it that no word, no idea. You may, indeed, make a word contain more than it does contain. You may transmute brass into silver, and silver into gold; but out of nothing, comes nothing. There are, then, two ways by which I may impart knowledge; I may give a new idea by giving a new word, and I may increase the value of the word you have. Equally may I aid the development of your mind, and augment at once its knowledge and its power, by supplying you with a fresh term, or a fresh system of terms, as a means for the expression of your thoughts and feelings.

These remarks find verification in the study even of the remnants of Greek which form part of our English speech. If ours is a rich language, if ours is an expressive language, we owe a large debt of gratitude to the Greek. By the aid which it affords, we express thoughts which we could not otherwise have expressed; and we acquire ideas, and modifications of ideas, the sources of which are found only in its literature. In exemplication, it suffices to refer to the single domain of theology. The creed of Christendom wears the shape and the hue which it received from the Greek language, in which the Gospel was promulgated to the world, and by which it was planted in the mind of all the most civilised nations.

GREEK STEMS.

Greek words.	*Stems.*	*English words.*
epos, *a word*	*ep*	orthoe*py*, *epic*
erémos, *a desert*	*erem*	*eremite* (hermit)
ergon, *a work*	*erg* (*urg*)	energ*etic*
metallân, *to mine*,	*metall*	*metall*urgy
ethos, *a custom*	*eth*	*eth*ics
eu, *well*	*eu*	*eu*logy
	ev	*ev*angelist
aggelos, *a messenger*	*aggel**	*angel*
gaster, *the belly*	*gastr*	*gastr*ic
gennân, *to produce*	*gen*	*gen*esis
oxys, *sharp*	*oxy*	*oxy*gen
hydor, *water*	*hydro*	*hydro*gen
genos / Lat. genus } *kind*	*gen*	hetero*gen*eous
heteros, *another's*	*hetero*	*hetero*dox
glossa / glotta } *a tongue*	*gloss*	*gloss*ary
	glott	poly*glott*
polys, *many*	*poly*	*poly*gon
gonia, *an angle*	*gon*	*gon*iometry
hex / La'. sex } *six*	*hexa*	*hexa*gon
gramma, *a letter*	*gram*	*gram*mar
epi, *upon*	*epi*	*epi*gram
thalamos, *a bridechamber*	*thalam*	epi*thalam*ium
graphein, *to write*	*graph*	auto*graph*

The aid which the Greek language affords to the student in making exact verbal distinctions is illustrated in orthoepy, which is, by its derivation, seen to designate *right speaking*, as orthography is *right writing*; the first, therefore, refers to *pronunciation*, the second to *spelling*.

"The *epic* poem is a discourse invented by art to form the manners by such instructions as are disguised under the allegories of some one important action, which is related in verse after a probable, diverting, and surprising manner.—*Pope*.

The three great *epics* are Homer's "Iliad," Virgil's "Aeneid," and Milton's "Paradise Lost." Such is the perfection of these poems that they form a class by themselves.

"Three poets, in three distant ages born,
Greece, Italy, and England did adorn."

The formation of our *hermit*, from the Greek *eremites*, illustrates the change which words undergo in passing from one language to another.

Metallurgy, an incomprehensible term to the ordinary English student, discloses its meaning by its own act to those who know the import of its component parts. Metallurgy is, in general, the art of *working metals*, that is, the extraction of metal from the ore.

Ethics is the science of morals, that is, of right feeling and right doing. The word *ethics* resembles the word *morals* in origin. They both signify *customs*, and they intimate that with the ancient Greeks and Romans, what *is customary* was what *is right*. At the bottom of such a notion there must have been a low standard of morality. Thus does a knowledge of language open to our eyes the character of nations. The termination of ethi*cs*, like physi*cs*, mathemati*cs*, &c., denotes a science. *Ethics* is the science of *morals*.

Evangelist is, according to the derivation, *the bearer of good news*. The Greek word for *gospel*, namely, euangelion, means *good news*. (Luke ii. 10.)

"The *gastric* juice, or the liquor which digests the food in the stomach of animals, is of all menstrua the most active, the most universal."—*Paley*, "Natural Theology."

Oxygen is

"A principle existing in the air, of which it forms the respirable part, and which is also necessary to combustion. *Oxygen*, by combining with bodies, makes them acid, whence its name, signifying *generator of acids*."—*Todd's Johnson*.

Hydrogen is *water-producer*. *Hydor* (*hydro*) is found also in *hydro*cephalous (kephalé, Gr. *the head*), having water in the head (the brain); and in *hydro*phobia (phobia, Gr. *fear*), *water-madness*. *Hydro*psy, *water-sickness*, is shortened into our *dropsy*.

* In Greek, when two *g's* come together, the first sounds like *n*.

"Soft, swollen, and pale, here lay the *hydropsy*,
Unwieldly man, with belly monstrous round."
Thomson, "Castle of Indolence."

Hydrography is properly the opposite of *geography*; for, as the latter, considered in its component parts, is a *description of the land*, so the former is a *description of the water*. By usage these significations are modified, so that *geography*, signifying a description of the surface of the earth, comprises *hydrography*, which describes, by maps, charts, &c., the surface of the water, and especially the sea coast, with its rocks, islands, shoals, and shallows.

"Christopher Columbus, the first great discoverer of America, was a man that earned his living by making and selling *hydrographical* maps."—*Chambers*.

By derivation, grammar is the science of letters. This is not an incorrect definition, for the science of letters, considered in all its relations, is the science of language, of which letters are the elementary portions. "Letters" is often used, however, for systematic knowledge, or the results of a high and varied education. So we speak of "a man of letters." In this sense the term is used in the question, "How knoweth this man *letters*, having never learned?" (John vii. 15.) The hostile questioners took Jesus to be *ignorant* (Acts iv. 13)—that is, as in the original, *idiotes*, idiot, untaught—such as Peter and John were accounted.

"I made it both in forme and matter to emulate the kind of poeme which was called *epithalamium*, and by the ancients used to be sung when the bride was led into her chamber."—*Ben Jonson*, "Masques."

GREEK STEMS.

Greek words.	*Stems.*	*English words.*
hagios, *holy*	*hagio*	*hagio*graphy.
hecaton, *hundred*	*hecato*	*hecato*mb
bous, *an ox*	*b*	hecatomb
helios, *the sun*	*helion*	ap*helion*
peri, *near*	*peri*	*peri*helion
apo, *from*	*ap*	*ap*ology
hemera, *a day*	*hemer*	ep*hemer*al
hep'a, *seven*	*hept*	*hept*agon
hieros, *holy*	*hiero*	*hiero*glyphics
glyphein, *to engrave*	*glyph*	*glyph*ography
hippos, *a horse*	*hippo*	*hippo*potamus
potamos, *a river*	*potam*	*mesopotamia*
hodos, *a way*	*od*	ex*od*us
ek, ex, *out of*	*ex*	*ex*orcism
homos, *the same*	*homo*	*homo*logous
hygros, *wet*	*hygro*	*hygro*meter
ichthys, *a fish*	*ichthy*	*ichthy*ology
isos, *equal*	*iso*	*iso*thermal
kakos, *bad*	*caco*	*caco*phony
phoné, *a sound*	*phono*	*phono*graphy
kalos, *beautiful*	*cali*	*cali*graphy
kalypto, *I cover*	*calyp*	apo*calyp*se
kosmos, *the world*	*kosm*	micro*cosm*
kyklos, *a circle*	*cycl*	*cycl*e
laos, *the people*	*lai*	*lai*ty
monos, *alone*	*mono*	*mono*syllable
syn, *with*	*syn* / *syl*	*syn*thesis / *syl*logism
lambanein, *to take*	*lab*	syl*lab*le
thesis, *a placing*	*thesis* / *thet*	*thesis* / syn*thet*ic
morphé, *shape*	*morph*	meta*morph*ŏsis
meta, *change* / *after*	*meta* / *met*	*meta*thĕsis / *met*hod
mythos, *a speech* / *a fable*	*myth*	*myth*ology
nekros, *dead*	*necro*	*necro*mancy
manteia, *divination*	*mancy*	geo*mancy*

A hecatomb is the slaughter of a hundred oxen in sacrifice. It is sometimes used metaphorically; e. g.,

"And here, sir, she offers by me to the altar of your glory, whole *hecatombs* of most happy desires, praying all things may prove prosperous unto you."—*Drummond*.

Isothermal lines, are lines of equal heat in different parts of the globe. *Iso* is also found in *isosceles* (skelos, *a leg*), applied to a triangle which has its two sides of the same length.

Aphelion is that point of the orbit of a planet in which it is remotest from the sun; *perihelion* is that point in which it is nearest to the sun.

"There are certain flies that are called *ephemera*, that live but a day."—*Bacon*.

An *ephemeris* is properly a journal (jour, Fr. *day*), an account of daily transactions. *Ephemérides* (the plural of ephemeris) denotes a set of astronomical tables, showing the present state of the heavens for every day at noon.

"Comparing the *homologous*, or *correspondent* members on both sides, we find that as the first member of the expression," &c.—*Bishop Berkeley*, "Analyst."

Apocalypse, by its very derivation, signifies *uncovering*; in Latin, it is *unveiling*, that is, *revelation*.

In *apocrypha*, we have another theological term, which is interpreted to mean *a hidden* writing, from apo, *from*, and kryptein (*kryph*), *to hide*. But why should not the apo here have the same meaning as in apocalypse, and so reverse the import of kryptein (Eng. *crypt*), *to hide*, and thus signify the disclosed, discovered, or *detected* writing? Any way, *apocryphal* is equivalent to *spurious*, and opposed to *canonical* or authentic.

"Now, beside the Scriptures, the bookes which they called *ecclesiasticall* were thought not unworthy sometimes to bee brought into publicke audience; and with that name they intituled the bookes which we term *apocryphall*."—*Hooker*, "Ecclesiastical Polity."

CONVERSATIONS ON ENGLISH GRAMMAR.—No. III.

"The substance of our two conversations are pretty clear to me now."—"I am glad you have carefully studied them, but you have just committed a grammatical error."—"You do not say so? I fear I shall never get right."—"Yes, you will get right by perseverance. The error into which you have fallen is a very common one; I have heard it even from the lips of persons who do not think themselves ignorant of grammar."—"Wherein does it lie?"—"You have used a plural verb where you should have used a singular one."—"But 'conversations' is in the plural."—"It is; that word, however, is not the subject to the verb of the sentence; it comes immediately before the verb, and so has led you to put the verb into the plural, by a kind of latent attraction, against the influence of which I must put you on your guard."—"What, then, is the subject?"—"'Substance' is the subject, or, what in common grammars is called, the nominative case, and the sentence should have stood thus: 'The substance of our two conversations *is* pretty clear to me now.' 'Substance,' I repeat, is the subject. *What* is clear? You do not mean that 'the conversations' are clear."—"No, for there are some things in them that I do not quite comprehend; but they are clear on the whole."—"Yes, your language expressed your meaning correctly, though your grammar is at fault. This I have often observed in persons of defective education. Right in their logic, and having a good command of words, they are unable to put them together correctly, and so lose a large part of the advantage they ought to derive from their efforts at self-culture. Observe, now, 'conversations' is dependent on the preposition of; in the ordinary phraseology, it is governed by that preposition; and being governed by it is in what is called the objective case, it cannot be the nominative, or the subject to the ensuing verb. In fact, the word 'conversations' is a part of the compound subject of the sentence, as you may see exhibited thus:—

COMPOUND SUBJECT.	PREDICATE.	
	Verb.	*Attribute.*
The substance of our conversations	is	clear to me now.

Take another instance: 'The majority of us are stone masons.' Is that correct?"—"No."—"I beg your pardon, it is quite correct."—"How so?"—"Because the word 'majority' is what is called a noun of multitude—a noun, that is, which being singular in form, is plural in signification. In a majority, you know, there must be more than one. Now nouns of this kind, as they imply more than one, are constructed according to their sense, and not according to their form. Consequently, 'majority' requires its verb to be in the plural."—"Then it would be right to say 'the fleet have sailed,' for a fleet consists of many ships."—"No, it would be wrong; 'the fleet *has* sailed' is correct English. The true rule in this matter is this: nouns of multitude require their verb to be in the plural when the mind dwells on the individual objects which they comprise, but when those objects are presented or contemplated as a whole, than the verb must be in the singular. In the phrase, 'the majority of us,' the idea of plurality is made prominent, you of necessity think of several persons, therefore, your verb must be in the plural; but in the phrase, 'the fleet has sailed,' you conceive of the component parts as forming a whole, several elements coalesce into one, unity is the predominant feeling, and consequently you must employ a singular verb. I give you another instance: 'The imprisonment of us is wrong.' What say you to that?"—"It is correct."—"Yes, it is correct. Now do you not see that the words 'of us' hold in this sentence precisely the same relation or position that is held in the first sentence by the words 'of our conversations?' Look at this arrangement:—

Compound Subject.	Predicate.	
	Verb.	*Attribute.*
The imprisonment of us	is	wrong.

'Us,' you see, is not the nominative case (or, as I prefer putting it, is not the subject), for *we*, you know, is the nominative, and *us* is in the objective case. You would not say *us are*."—"O, no, that would be ridiculous."—"And yet I heard a man, the other day, say *us is*; nay, I am not sure that you yourself—speaking of the potatoes we had to-day for dinner—did not say, 'they is good;' what think you?"—"It is not impossible; these things are very perplexing."—"Yes, at first, they are troublesome, but study and practice will remove all difficulties; they have done so in my own case, why not in yours?"—"Well, I am not going to yield."—"Certainly not; Bonaparte is reported to have said that the French had not such a word as 'impossible' in their language; however this may be, you, as an Englishman, will not, I am sure, easily admit the idea into your mind, or the thing itself into your conduct. 'Impossible?' No, nothing that is good and honest is impossible; what man has done, man may do. Now I must put you to rights in regard to this verb *is* and *are*; it is a word against which many, very many, persons sin grievously. Study this form:—

The Verb *to be*.

	Present Tense.	Past Tense.
	Person.	
Singular.	1 I am. i.	I was.
	2 Thou art. ii.	Thou wast.
	3 He is. iii.	He was.
Plural.	1 We are. i.	We were.
	2 You are. ii.	You were.
	3 They are. iii.	They were.

This, surely, is not very complicated, yet it contains all you need know in order to speak and write correctly, so far as this point is concerned. Take care, then, not to separate the pronouns from the proper forms of the verb. Take care not to mix together verbs and pronouns that should be kept apart. Do not take the first person I, and put it before the third person *is*. In other terms, 1 and i. must go together; 1 and iii. must not be combined. You must say *we were* (1 and i.), and not *they was* (iii. and 1). Before I conclude, let me impress it on your mind that you will never speak grammatically, or, at any rate, never be sure that you speak grammatically, unless you take the trouble to make yourself familiar with the terms and the laws of grammar. Many, finding the study somewhat difficult, after a little while, give it up in a sort of confident spirit, thinking such drudgery beneath them, and fancying they can do all that is necessary by a sort of nondescript grammatical feeling. This is silly. Accurate knowledge is not obtained by genius, or inspiration, or any other fancied short cut to science. If you would know, you must condescend to learn, and all true learning demands, as it well rewards, diligent and constant labour."—"Well, I do not know that I am in that danger; I never thought myself a 'genius;' and as for 'inspiration,' that belongs to a subject too sacred for me to venture on—a subject on which I had rather worship than speculate, much less be over confident."—"Those are wise words; the man who is without reverence will be a small man to the end of his days."

LESSONS IN GERMAN.—No. XXVI.

Section XLIX.

ADJECTIVES REQUIRING THE DATIVE.

Adjectives, in German, that require the *dative*, usually answer to our adjectives followed by the preposition "*to*." Ex.: Es ist mir angenehm; it is agreeable *to* me. Er ist seinem Vater ähnlich; he is similar *to* his father. Er ist seinem Herren ergeben; he is devoted *to* his master. Es ist ihm ein lästiges Geschäft; it is a disagreeable business *to* him. § 131.

Exercise 53.

Ab'geneigt, disinclined; Abhold, averse; Aehnlich', similar; An'gehörig, belonging to; An'gelegen, important; An'hängig, adherent, attached to; An'ständig, becoming; An'stellung, *f.* situation; Behülf'lich, serviceable; Bemerk'bar, observable; Durchaus', throughout, entirely; Erge'ben, devoted; Erhitz'en, to heat, inflame; Erin'nerlich, coming to mind; Er'sterer, former; Ewig, eternally; Feind, hostile; Gefährlich, dangerous; Gefäl'lig, obliging; Gehor'sam, obedient; Genehm', agreeable; Geneigt', inclined; Gewo'gen, favourable; Gleich'gesinnt, like-minded; Gleich'gültig, indifferent; Grundsatz, *m.* principle, axiom; Günstig, favourable; Hin'derlich, hindering; Letz'terer, latter; Lob, *n.* praise; Neigung, *f.* inclination; Obrigkeit, *f.* authority; Pfad, *m.* path; Rauchen, to smoke; Schädlich, injurious; Schmei'chelhaft, flattering; Spiel, *n.* play; Theuerung, *f.* dearth; Ueberle'gen, superior; Un'ähnlich, dissimilar; Ungleich, unlike; Un'günstig, unfavourable; Unlieb, disagreeable; Unterneh'men, to undertake; Un'terschied, *m.* distinction; Un'terthänig, submissive; Untreu, untrue; Unvergeßlich, not to be forgotten; Verbun'den, obliged; Versprо'chen, promised; Wanderer, *m.* traveller (on foot); Wanze, *f.* bug; Wohl'gefällig, well-pleasing.

Jeder recht'liche Mann ist dem Guten geneigt' und dem Bösen ab'geneigt.	Every upright man is inclined to good, and disinclined to evil.
Mir ist nichts mehr an'gelegen, als meinen Freunden behülf'lich zu sein, wo ich kann.	There is nothing more important than to be serviceable to my friends, where I can.
Der Hund ist seinem Herrn gehor'sam und dankbar; warum will der Mensch ihm nicht gleich sein?	The dog is obedient to his master, and thankful; why will man not resemble him?
Dem Schiffer sind jene Klippen die gefähr'lichsten, welche ihm nicht bemerk'bar sind.	To the sailor, those rocks (cliffs) are the most dangerous which are not perceptible to him.
Sei deinen Freunden erge'ben und deinen Feinden gefäl'lig.	Be devoted to thy friends, and obliging to thy enemies.
Was dem Einen nützlich ist, ist oft dem Andern schädlich.	What is useful to one, is often injurious to another.
Ich bin Ihnen für Ihre Güte sehr verbunden.	I am very much obliged to you for your kindness.
Manche Menschen sind den stillen Wässern gleich, an'genehm dem Auge, aber untreu dem'jenigen, der sich ihnen an'vertraut.	Many men are like the quiet waters, agreeable to the eye, but unfaithful to him who entrusts himself to them.

1. Angenehm wäre es mir, wenn ich einmal einen Mann fände, der mir anhängig wäre. 2. Wenn Sie mir auch verwandt sind, so ist mir doch Ihr Betragen durchaus nich anständig, und ich würde denken, es wäre Ihnen selbst bemerkbar, daß Leute, denen Ihr Betragen bekannt ist, Ihnen nicht gewogen sind. 3. Meinem Vater ist die letzte Theuerung noch sehr erinnerlich. 4. Gefährlich ist dem Wanderer jener Pfad. 5. Sei gefällig deinem Nächsten, gehorsam deiner Obrigkeit, dann wird dir diese geneigt und jener gewogen sein. 6. Ist Ihnen das versprochene Geld gewiß? 7. Das der Fürst nicht gleichgesinnt mit dem Volke, und das Volk dem Fürsten gleichgültig ist, macht dem Erstern das Regieren schwer, und ist dem Letztern hinderlich an seinem Glücke. 8. Die Sterne sind mir günstig, leicht wird mir mein Unternehmen sein. 9. Wenn die Wanzen dem Menschen auch nicht schädlich sind, so sind sie ihm doch lästig. 10. Mir ist es sehr lieb, daß ich dir in dieser Sache nützlich bin. 11. Meinem Freunde war Ihr Lob sehr schmeichelhaft. 13. Gut zu werden, ist dem Lasterhaften schwer, denn er bleibt gewöhnlich seinen Neigungen treu. 14. Mancher Schwache ist dem Starken an Geist überlegen. 15. Welch ein Unterschied liegt darin: ein Mensch ist dem andern ungleich, und ein Mensch ist dem andern unähnlich? 16. Wie steht das Spiel? 17. Mir sehr ungünstig. 18. So unlieb es mir ist, muß ich dir erklären, daß mir dein Geschwätz unleidlich ist. 19. Wer möchte wohl den Grundsatz glauben: „wer seinem König nicht unterthänig, ist untreu seinem Vaterlande." 20. Es ist mir ewig unvergeßlich, wie sehr ich dir verbunden bin. 21. Nicht jeder, der mir verwandt ist, ist mir auch wohlgefällig.

1. Who can be hostile to a child? 2. Is it agreeable to you to take a walk? 3. This is injurious to your business. 4. Everybody has been favourable to him. 5. A benevolent action is well-pleasing to God. 6. You are very similar to your father in your habits, for he was disinclined to smoking and averse to drinking. 7. What belongs to me, let it be also

important to me. 8. To every thinking man it is observable, that it is not easy for a prince to make the people devoted to him. 9. With pleasure will I be serviceable to you, in obtaining a situation. 10. Be obliging to thy parents, obedient to their authority, then will they be inclined to thee, and favourable to thy prosperity.

Section L.

VERBS REQUIRING THE DATIVE.

Many verbs compounded with the particles, ab, an, auf, bei, ent, er, nach, ver, vor, zu, and wider; as, also, danken, to thank; drohen, to threaten; folgen, to follow; gehorchen, to obey; schmeicheln, to flatter, &c, (§ 129. 4.) govern the *dative*. Ex.: Er entsagte dem Glück und der Hoffnung; he resigned (the) happiness and (the) hope. Den besten Menschen kleben Fehler an; faults cleave to the best of men. Der Feldherr gehorchte dem Befehle des Kaisers; the commander-in-chief hearkened to the command of the emperor. Nur ein Sclave schmeichelt dem Herrn,—kein Freier dem Freien; only a slave flatters the master—no freeman, a freeman.

Exercise 54.

Ab'sagen, to renounce;
Acht, *f.* outlawry, ban;
An'gehören, to belong;
An'hangen, to adhere;
Auf'fordern, to summon;
Bay'ern, *n.* Bavaria;
Beeh'ren, to honour;
Bei'kommen, to get at;
Bei'stehen, to assist;
Bei'stimmen, to assent;
Bei'wohnen, to be present at;
Besuch, *m.* visit;
Braten, *m.* roast-meat;
Drohen, to threaten;
Ehre, *f.* honour;
Entsa'gen, to resign;
Erlie'gen, to succumb;
Erwei'sen, to render;
Fliehen, to flee;
Fluchen, to execrate;
Fügen, to submit, conform;
Gebrechen, to want, need;
Gebüh'ren, to be due;
Gefallen, to please, to like;
Gelten, to be of value;
Genü'gen, to suffice;
Gleichen, to be like;
Herzog, *m.* duke;
Her'zoghut, *m.* ducal coronet;
Hoffnung, *f.* hope;
Kaiser, *m.* emperor;
Klingeln, to ring (the bell);
Kriegszug, *m.* warlike expedition;
Krone, *f.* crown;
Läuten, to toll, ring;
Leuchten, to light:
Löwe, *m.* lion;
Magd, *f.* servant-girl;
Mißlin'gen, to fail;
Nachdem, after that;
Ort, *m.* place, region;
Rath, *m.* council;
Schmecken, to taste, relish;
Schmeicheln, to flatter;
Schweben, to wave;
Trotzen, to dare, defy;
Trübe, gloomy;
Ue'belwollen, to wish ill;
Ue'berziehen, to invade;
Un'umschränkt, paramount;
Umgeben, beset;
Ursache, *f.* cause;
Verlangen, *n.* demand;
Vernunft, *f.* reason;
Vorhaben, *n.* purpose;
Wegkommen, to get away;
Widerstreben, to struggle against;
Wunsch, *m.* wish;
Zugehören, to belong to;
Zürnen, to be angry at one;
Zuvorkommen, to anticipate.

Der'jenige, welcher einer bösen Gesell'schaft nicht ab'sagen kann, kann keiner guten an'gehören.
He who cannot renounce an evil company, can belong to no good one.

Ihr Freund begeg'nete mir gestern, aber es fiel mir nicht bei, wie sein Name ist.
Your friend met me yesterday, but it did not occur to me, what (how) his name is.

Fürsten entsa'gen nicht so leicht dem Throne
Princes do not resign the throne so easily.

Was nützt es dem Menschen, dem Schick'sale zu widerstre'ben?—stets muß er der Macht dessel'ben unterlie'gen.
What avails it for man to struggle against (the) his des iny?—he must always succumb to its power.

Traue nicht jedem Menschen und am allerwe'nigsten den'jenigen, die dir schmeicheln.
Trust not every one; and least of all, those who flatter thee.

Die Ermah'nung eines Freundes gilt mir viel, und ich folge ihr gern.
The admonition of a friend is of much value to me, and I follow it gladly.

1. Wenn in alten Zeiten ein Mächtiger dem andern feind war, so sagte er demselben ab. 2. Aus allen Orten, die ihm angehörten, sammelte dieser mächtige Herr die Männer, die ihm anhingen. 3. Nachdem sie seinem Vorhaben beigestimmt hatten, verpflichteten sie sich, ihm beizustehen, und dem Kriege beizuwohnen. 4. Solch ein (Sect. 41. VI.) mächtiger Herr war Heinrich der Löwe, Herzog von Bayern, welchem große Länder zugehörten und Tausende von Kriegern gehorchten. 5. Doch die Krone eines Kaisers schwebte ihm immer vor Augen. 6. Der Herzogshut genügte ihm nicht 7. Er traute seiner eigenen Kraft und trotzte dem Kaiser. 8. Der Kaiser forderte ihn auf, sich seinen Befehlen zu fügen, und drohte ihm mit der Acht. 9. Doch dem Herzoge, der einem Löwen glich, galt weder Vernunft, noch guter Rath. 10. Ihm gefiel nur seine eigene Meinung, und er dachte der Kraft die ihm gebrach. 11. Er widerstrebte dem Verlangen, dem Kaiser eine Ehre zu erweisen, die demselben gebührte. 12. Der Kaiser, der dem Herzoge schon seit langer Zeit übel wollte und ihm, wegen seines Stolzes, zürnte, kam ihm zuvor, und überzog ihn mit Krieg. 13. Der Kriegszug mißlang dem Kaiser nicht. 14. Der Herzog konnte der feindlichen Macht nicht widerstehen und erlag dem Kaiser in der Schlacht. 15. Er mußte nach England fliehen, und nur seine Familie und einige Freunde folgten ihm. 16. Hier entsagte er jeder Hoffnung und fluchte dem Stolze, als der Ursache seines Elends. 17. Ihrem Wunsche entsprechend, werde ich Ihnen beim Suchen des Pferdes helfen, das Ihnen weggekommen ist. 18. Ich läutete meinem Bedienten und klingelte meiner Magd, aber es half mir nichts, keiner kam. 19. Dieser Braten schmeckt mir nicht.

1. I flatter myself, that you will honour me with a visit 2. He would certainly harm me, if he could get at me. 3. The star of hope lights man even in the gloomiest night. 4. I shall assist my friend, for the assistance which he has rendered me. 5. The teacher has told me, he was contented with his scholars; they were diligent and anticipated all his wishes. 6. I know no one who flatters the passions of others as he does. 7. It were to be wished, that everybody might assist the poor. 8. Do not flatter your children too much! 9. Napoleon collected around him the best of his generals. 10. After he had made known to them his purpose, they volunteered to assist him. 11. He trusted to his own power, invaded Europe with hostile troops, and defied every danger. 12. His own opinion was always paramount, and he thought not of the difficulties which beset him.

THE NEW PLANETS.

In addition to the account of the new planets recently discovered, which was inserted in our Lessons in Geography, No. XIII., page 61 of vol. II., we are now enabled to give the following notices of the latest discoveries in this department of astronomical science. For these notices we are indebted to the kindness of the Secretary of the Royal Astronomical Society of London. The planet *Psyche* was discovered by M. de Gasparis, on March 1st, 1852; *Thetis*, by M. Luther, on April 17th, 1852; *Melpomene*, by Mr. Hind, on June 24th, 1852; and *Massilia*, by M. de Gasparis, on September 19th, 1852. Thus, it appears, that the planet last mentioned is not the same as *Fortuna*, discovered by Mr. Hind, on August 22nd, 1852. The present year has, therefore, up to the present date, been so prolific in astronomical discovery, that no less than *five* new planets have been added to our system—that is, the solar system,—and a number of comets, the history of which we must positively postpone till a future opportunity. The elements of these planets have not yet been properly ascertained; but, as soon as they are so, we shall have pleasure in placing them before our readers. The number of planets now revolving in the space between Mars and Jupiter is no less than TWENTY! Is it, then, really the fact, that our supposed *Pluto* has been broken up into *twenty* pieces, and that these pieces have become planets revolving in their fragmentary shapes, and at different distances within certain limits? We shall be glad when the Royal Astronomical Society can solve this question; but we deem it quite as difficult as the problem of the three bodies.

LESSONS IN PENMANSHIP.—No. VI.

The Lesson for this week contains the following copies:—Text: *Quillimane, Rockingham, Sunderland, Trebizonde.* Half-text: *Quarrels most commonly break friendships; Reputation is valuable to every person; Studiously improve both time and money; Truth needs not the aid of ornament.* Court-hand: *Quarrelsome persons are commonly dangerous companions; Repentance most commonly comes when guilt appears; Self-estimation is commonly punished with contempt; Temptations most commonly enter unguarded hearts.*

Quillmane. v

Quarrels most commonly break friendships.

Quarrelsome persons are commonly dangerous companions.

Rockingham

Reputation is valuable to every person

Repentance most commonly comes when guilt appears.

Sunderland

Studiously improve both time and money.

Self-estimation is commonly punished with contempt.

Trebizonde. v

Truth needs not the aid of ornament.

Temptations most commonly enter unguarded hearts.

LESSONS IN LATIN.—No. XXXV.

By John R. Beard, D.D.

DEVIATIONS IN THE THIRD CONJUGATION.

Vocabulary.

Adsciscĕre, *to take to one's self*; assuescere (with dat.), *to grow used to*; consuescere, *to be accustomed*; approbare, *to approve*; levare (with abl.), *to relieve, free*; privare (with abl. of the thing), *to deprive of, rob*; deponere, *to lay down*; sacra, orum, n. *sacred rites, worship of the gods*; auctor, ōris, *originator, adviser*; me auctore, *at my suggestion, by myauthority*; spiritus, ūs, m. *breathing; breath*; religio, ōnis, f. *religion, sense of moral obligation*; suavitas, ātis, f. *sweetness*; conficio 3, *I wear out, perish*; luxuries, ei, f. *luxury, self-indulgence*; alienigĕna, æ, *a foreigner, one born in another country, outlandish*; assiduus, a, um, *constant*; dilucĭdus, a, um, *shining, clear*; quotidiānus, a, um, *daily*; Ceres, Cerĕris, f. *Ceres, the goddess of the harvest*; futilis, e, *futile, useless*; paŭlulum, adv. *for a little while*; tempestas, ātis, f. *the weather*.

Exercises.—Latin-English.

Multi homines, labori assiduo et quotidiano assueti, quum temestatis causâ prodire prohibentur, ludis delectantur; Demosthenes summâ voce versus multos uno spiritu pronuntiare consuevit; Numam Pompilium, regem alienigĕnam, patribus auctoribus, sibi ipse populus adscīvit; Cereris sacra populus Romanus a Graecis adscita maximâ religione coluit; ubi animus paululum e negotiis requieverit, ad te advolabo, in cujus amore et suavitate spero me conquieturum, omnesque curas doloresque depositurum esse; si amici mei mores pernovĕris, spero te ejus innocentiam agnoturum eique ignoturum esse; bestiae, fame dominante, plerumque ad eum locum, ubi pastae aliquando sunt, revertuntur; cave ne incognita pro cognitis habeas, iisque temere assentiare! quid est tam futile quam quicquam approbare non cognitum? Populus Romanus eo magnitudinis (= ad eam magnitudinem) crevit, ut viribus suis conficeretur; quid est tam jucundum cognĭtu atque auditu, quam sapientibus gravibusque verbis ornata oratio? quo brevior, eo dilucidior et cognĭtu facilior narratio est; Cato, quoad vixit, virtutum laude crevit; omnium rerum naturâ cognitâ, levamur superstitione.

English-Latin.

As long as I live (I shall live) I shall accustom myself to worship God; nothing is so futile as to take the unknown for the known; fed oxen return to the place where they are accustomed to be fed; England has grown to a very great mass, and it will grow to a greater magnitude; how pleasant to be relieved from fear; inquire about the future; pardon thy son's sins; I know not that I can pardon that man's reproaches; in the beauty and sweetness of my little daughter my mind rests and will rest; at my suggestion thy brother has laid down his office; by constant labour thou wilt grow accustomed to despise luxury; he approves what thou hast said; dost thou think he will approve of my deeds? my mind has rested a little, now I will return to my labours.

Deviations in the Third Conjugation.

4. *Perfect in ŭi; Supine in ūtum.*

These verbs in the perfect and supine really follow the fourth conjugation, and so form a kind of hybrid conjugation, a compound of the third and the fourth.

i. Cupio, cupĕre, cupīvi, cupītum, *to desire*.
ii. Pĕto, petĕre, petīvi, petītum, *to strive after, aim at*; ab aliquo, *to ask from, entreat*.
iii. Quaero, quaerere, quaesīvi, quaesītum, *to seek*. The compounds are in quīro, quisīvi, quisītum; as, exquīro, *to search out*.
iv. Rudo, rudĕre, rudivi and rudi, rudītum, *to roar*.
v. Tero, terĕre, trivi, tritum (E. R. *trite*), *to rub*.
vi. Arcesso, arcessĕre, arcessīvi, arcessītum, *to send for*.
vii. Capesso, capessĕre, capessīvi, capessītum, *to take in hand*.
viii. Facesso, facessĕre, facessīvi, facessītum, *to make, take yourself off*; negotium facessere, *to give trouble*.
ix. Incesso, incessĕre, incessīvi (no supine), *to fall upon*.
x. Lacesso, lascessĕre, lacessīvi, lacessītum, *to challenge*.

Vocabulary.

Atterĕre, *to rub at, or on*; conterĕre, *to rub together*; repetĕre, *to seek back, repeat, borrow*; educo, xi, ctum 3, *to lead forth*; suscipio, ĕre, cepi, ceptum, *to undertake, begin*; adipiscor, adipisci, adeptus sum, dep. *to obtain*; fastidio 4 (with acc.), *to disdain*; aratrum, i, n. *a plough*; lepor, ōris, m. *joke, wit*; par, paris, n. *a pair*; Punicus, a, um, *Carthaginian*; propĕre, *hastily*; religioné, *religiously*.

Exercises.—Latin-English.

Saepe homines, res quas vehementer cupiverunt, adepti fastidiunt; audistine ut leones rudiverint? bellum ita suscipiatur ut nihil aliud nisi pax quaesita videatur; quum omnem antiquitatem memoriâ repetīveris, tria vix amicorum paria invenies, qui alter pro altero vitam deponere parati erant; cave ne judices de re priusquam eam accurate exquisīveris; Erechthei filiae cupide mortem expetiverunt pro vitâ civium; omnis Romanorum philosophia repetīta est a Graecis; Socrates totam vitam atque aetatem contrīvit in emendandis aliorum moribus; praecepta virtutis, quamvis contrīta sint et communia, tamen a paucis observantur; constat bello Punico secundo Hannibălem Italiae opes attrivisse; importunus iste homo multa mihi facessīvit negotia; non dubito quin novâ lege civibus negotium facessītum sit; nisi milites propĕre ex urbe facessivissent fugamque capessivissent, cives eos armis incessivissent; vix hostes milites nostros ad pugnam lacessīvĕrant, quum arma capessiverunt eosque incessiverunt; legimus Romanos saepe consŭles suos ab aratro arcessivisse; multa sacra, ab exteris nationibus adscīta atque arcessīta, Romani religiosissime coluerunt.

English-Latin.

Who does not know that Hannibal once wore down the resources of the Romans? never do good men desire bad things; I shall never disdain what I shall obtain; dost thou think that, having obtained money, thou wilt not disdain it? neither despise nor disdain any one; call thy generals from the plough; do not give trouble to that good man; bad pupils give trouble to the best teachers; in war, we seek for peace; peace is sought for by us in war; my children eagerly desired death for my life; it is certain that our citizens will fall on the enemy.

Perfect in ī; Supine in tum.

a. The stem ends in *b* or *p*.

i. Capio, capĕre, capi, captum, *to take*. Compounds in cipĕre, cipio, cepi, ceptum; as, percipio, *to take up wholly*.
ii. Rumpo (rupo), rumpĕre, rupi, ruptum, *to break*. Scabo, scabere, scabi (E. R. *scab*), *to scratch*, wants the supine.

b. The stem ends in *c*, *g*, *qu*.

iii. Ago, agere, egi, actum, *to lead, drive, do, handle*, &c.; so, circumagere, *to drive round*; peragere, *to drive through*. The other compounds have īgo, ĕgere, egi, actum; as, abīgo, *to drive away*; exigo (used of time), *to spend*; subigo, *to subdue*; cogĕre, *to bring together, compel* (cum and agere), has coēgi, coactum.
iv. Facio, facĕre, feci, factum, *to make, do*. Fio is used as the passive of facio. *A* in facio, passes into *i* in efficio (ef and facio), &c. In the imperative, facio makes fac; but perficio (*to complete*), has perfice; the other compounds retain fac; calefăce (from calefacĕre, *to warm*), however, occurs.
v. Ico, icĕre, ici (not very good), ictum, *to strike*, used of a treaty. Of the present, we find only icit; the other forms are supplied by ferire, *to strike*.
vi. Jacio, jacĕre, jeci, jactum, *to cast, throw*. Compounds, jĭcio, jēci, jectum, jĭcĕre; as, rejicio, *I throw back*.
vii. Lego, legĕre, legi, lectum, *to read*; so allĭgo, *I choose for myself*; perlĕgo, *I read through*; prelĕgo, *I read before*; relĕgo, *I read again*; sublego, *I read under*; the following, however, have, in the present, lĭgo; as, colligo, *I collect* (collĭgere, collēgi, collectum); delĭgo and elĭgo, *I choose out*; recollĭgo, *I collect again*; seligo, *I select*; but, dilĭgo, *I love or esteem*; intelligo, *I understand*; and negligo, *I neglect*; have, in the perfect, exi; as, dilĭgo, diligĕre, dilexi, dilectum.
viii. Frango, frangĕre, fregi, fractum, *to break*. Compounds, fringo, fringere, fregi, fractum; as, perfringo, *I break through*.
ix. Linquo, linquĕre, liqui, lictum, *to leave*.
x. Vinco, vincĕre, vici, victum, *to conquer*.

c. The stem ends in *m*.

xi. Emo, emĕre, emi, emptum, *to buy*. Compounds in ĭmo, imĕre; as exĭmo, exēmi, exemptum, eximĕre, *to buy off*; but in coemo, *to buy at once*, the *e* remains.

d. The stem ends in *u* or *v*.

xii. Acuo, acuĕre, acui, acutum, *to sharpen*. The compounds are without the supine.
xiii. Arguo, arguĕre, argui, argutum (part. fut. active arguturus), *to convict*. Instead of argutum and argutus, convictum and convictus are used. Argutus, in good Latin, occurs only as an adjective.
xiv. Exuo, exuĕre, exui, exutum, *to go out, put off*.
xv. Induo, induĕre, indui, indutum, *to go in, put on*.
xvi. Imbuo, imbuĕre, imbui, imbutum, *to dip into, fill with*.
xvii. Luo, luĕre, lui (no supine, the part. luiturus), *to wash*.

xviii. Minuo, minuĕre, minui, minutum, *to lessen.*
xix. Nuo, nuĕre, nui, *to wink, nod*; found only in the compounds; no supine, yet abnuiturus.
xx. Ruo, ruĕre, rui, rutum, *to rush, fall* (ruiturus).
xxi. Spuo, spuere, spui, sputum, *to spit.*
xxii. Statuo, statuĕre, statui, statutum, *to make fast, appoint.* Compounds, stituo, &c.; as, destituo, *to abandon.*
xxiii. Suo, suĕre, sui, sutum, *to sew.*
xxiv. Tribuo, tribuĕre, tribui, tribūtum, *to impart, to assign.*
xxv. Solvo, solvĕre, solvi, solutum, *to loosen.*
xxvi. Volvo, volvĕre, volvi, volutum, *to roll*; congruere, *to agree*; metuĕre, *to fear*; pluere, *to rain*; sternuere, *to sneeze*; want the supine. The ensuing two have *the perfect in i*, and *the supine in itum.* Fugio, fugĕre, fugi, fugitum, *to fly*; lambo, lambĕre, lambi, lambĭtum, *to lick.*

VOCABULARY.

Afficĕre, *to make, to affect*; delinquere, *to do wrong*; disjicere, *to cast asunder, split*; transigere, *to bring over*; excerpere, *to take out*; foedus, foedĕris, n. *a treaty*; existimatio, ōnis, *esteem*; benefactum, n. i. *a character, a good deed, benefit*; dominatio, ōnis, f. *lordship, tyranny*; potestas, atis, f. *power*; furiosus, a, um, *mad*; modo, *only now, but now*; affecti simus, *let us be*; the subjunctive of the first person plural here, as often is used as the imperative.

EXERCISES.—LATIN-ENGLISH.

Eodem modo erga amicos affecti simus, quo erga nosmet ipsos; acti labores jucundi sunt; sola virtus in suâ potestate est; omnia praeter eam subjecta sunt fortunae dominationi; unus dies, bene et ex praeceptis philosophiae actus, peccanti immortalitati anteponendus est; conscientia bene actae vitae multorumque benefactorum recordatio jucundissima est; Appetītus rationi sunt subjecti lege naturae; victus est Xerxes magis consilio Themistŏclis, quam armis Graeciae; quid hominem octoginta anni juvant, per inertiam exacti? quos vicĕris, amicos tibi esse cave ne credas; profecto beati erīmus, quum, corporibus relictis, cupiditatum erimus expertes; quid est tam furiosum, quam verborum vel optimorum atque ornatissimorum sonĭtus, inanis, nullâ subjectâ sententiâ? pecuniam si cuipiam fortuna ademit, tamen dum existimatio est integra, facile consolatur honestas egestatem; milites, captis armis, impetum fecerunt in hostes; hi autem propere fugam ceperunt; hostes, foedere quod modo icĕrant, rupto, subito in castra nostra irruperunt; si quid philosŏphus in ratione vitae deliquerit, eo turpior est, quod artem vitae profĭtetur; Plinius nullum librum legit quem non excerperet; Cives ab hostibus subacti, omni libertatis recuperandae spe ademptâ, miseram transegerunt vitam; milites hostium aciem perfregerunt et disjecerunt; foedera icta ab hostibus fracta sunt.

ENGLISH-LATIN.

Your troops will break the treaty they have formed; will the enemy break through our line; never can the enemy scatter our forces; wicked men pass their life in misery; dost thou think that wicked men pass their life in misery? the king has taken away all hope of regaining peace; make extracts from (excepere) that book (acc.); our soldiers, taking up their arms (abl. abs.), will make an attack upon the enemy; I wish to be affected in the same way towards the old as towards the young; religion alone is in its own power; whatever it pleases (placet sibi) it can do, God being its helper.

LESSONS IN GEOLOGY.—No. XXI.

By THOMAS W. JENKYN, D.D., F.G.S., &c.

CHAPTER II.

ON THE ACTION OF WATER ON THE EARTH'S CRUST.

SECTION V.

ON THE EXCAVATING POWER OF RUNNING WATER UPON SURFACE SOILS.

You now understand that water acts upon rocks chemically and mechanically. It acts *chemically* by dissolving some of the elementary substances which the rocks contain, and by this action it renders the entire mass porous and loose, though at first it was hard and compact. It acts *mechanically* by insinuating itself between the particles that have been chemically loosened, and then forcing them asunder. When rocks have undergone these influences, they are easily worn away by any current of water, or river, that may flow over them.

In country districts, indeed in any field, you must have observed that when a rill of water runs over any soft rock, such as marl or chalk, or if a torrent be, in its course, impelled against the side of some soft bed or strata, such water has the power to cut into and to wear away the surface of those rocks. You must also have observed that this power of scooping into soft and loose soils is generally in proportion to the volume of water, and to the velocity of its movement, or the rapidity of the current. You can again easily imagine, if, indeed, you have not actually observed, that this scooping or excavating power of a current of water is greatly increased if the stream becomes charged with sand, gravel, or pebbles; for, in that case, the friction at the bottom of the bed, or on the sides of the rock, must necessarily be much greater than when the river is clear and pure.

Through the accession of gravel and pebbles, a new mechanical power is obtained by the stream. This new power acts, together with the velocity and weight of the current, by the attrition and the rubbing of all the rolling pebbles and fragments, and sometimes by the masses of ice which are borne along by the river, and which, by hurrying and dashing onwards and downwards, have much the action of a file in cutting into a substance.

Such a current, charged with hard ingredients, whether stones, branches of trees, or masses of ice, when it is propelled and hurried against the sides of a cliff, will hollow and excavate it by mechanical force, and will continue to sap and undermine it, until the upper portion, having lost its support, falls headlong into the stream. This undermining action of water will be illustrated in a separate lesson.

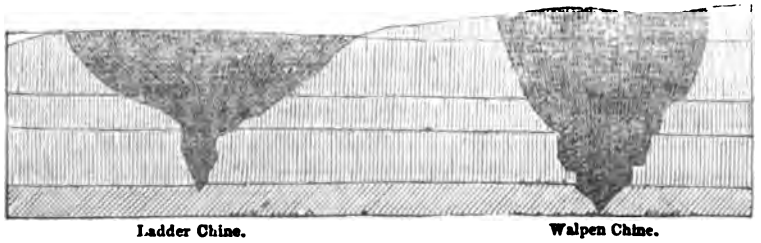
The excavating action of rivers becomes more easy by the circumstance that the surface and the sides of a rock may become predisposed for disintegration by being kept wet and dry alternately. This is particularly the case with rocks in mountainous regions. Here, the rocks, on account of their high elevation, are the more exposed to the influences of the atmosphere, such as frost and moisture, cold and heat, by which they are chemically predisposed to crumble. Your last lesson also has taught you that the chemical power of water, when it holds carbonic acid in solution, is very great; especially when such water comes to act on the calcareous and alkaline elements of rocks. Thus, both powers of water, the chemical and the mechanical, promote the excavation of surface rocks, the hardest as well as the softest.

When water runs with great rapidity, even in the smallest stream or rivulet, you find that it scoops out for itself a deep channel or bed in rocks that are soft and easily destructible. This action is strikingly exemplified in volcanic districts. Here light and porous lava, and beds of volcanic sands and ashes, oppose but a slight resistance to the torrents of rain which fall on them, or to the rushing streams that descend from the sides of the mountain. As an instance, I may mention, that, in 1824, an eruption of Mount Vesuvius was followed by very heavy rains. The mountain stream which flows from Atrio del Cavallo, swollen by these rains, became so great and rapid that, in three days, it cut a chasm twenty-five feet deep through a large bed of these volcanic materials.

Your own country supplies you with some of the clearest and most striking instances of this excavating power of water. In the Isle of Wight, at what is called the back of the island, the cliffs are marked by irregularities denominated Chines: such as Shanklin Chine, Black Gang Chine, &c. These chines are cuttings or excavations effected in the surface soil, chiefly by the action of running water, and partly by the force of winds. Perhaps the best specimen of a chine is that of Shanklin, though its sides are now much hidden by the growth of trees. The best spot, to study the formation and progression, or rather retrocession, of these chines is the neighbourhood of Black Gang and Atherfield. The strata upon this part of the coast rise uniformly at an angle of about 2° with the horizon. The upper strata consist of beds of sand and clay, unsupported by any solid rocks. Chines are fissures or chasms produced in these beds by the action of running water, so that when a spring rivulet, or rain current, has once cut a channel for itself, it soon scoops a fissure down to the shore. This action is well developed in Walpen Chine and Whale Chine. In Black Gang Chine, the process of cutting and fissuring into the soils has been interrupted by a firm and compact group of ferruginous beds, which crosses the streamlet and has given origin to the cascade so well known to all visitors to the Isle of Wight. As you walk westward towards Atherfield, you find that this excavating process has been checked by precisely the same ferruginous sand in other chines. In the fissure or chasm

called the Ladder Chine, the lower part of excavation is reduced to a very narrow fissure, and is finally closed, before it reaches the level of the shore, by the firmness and compactness of a bed including nodules in great numbers, above which the sand has been swept out in the form of half a basin. The subjoined diagram, fig. 45, illustrates these modifications in the structure of chines.

Fig. 45.



Ladder Chine. Walpen Chine.

The formation of Chines, Isle of Wight.

One of the most remarkable facts in the formation of chines is, that where the surface is acted upon by a constant streamlet, or perennial spring current, the rivulet cuts its channel backwards, so that the length of the fissure or chasm is increased by retrogression or recession. The rivulet, by trickling over the precipice, wears away the soil perpendicularly, and thus scoops a fissure backwards towards its spring-head. About half a mile or so to the west of Atherfield, there is a long winding chasm, which, a cottager told me, was in his boyhood not a hundred yards in length, but is now above a mile.

I assume that you are now become interested in the agency of water, and in the changes which it effects on the surface of the earth. The examples which I have instanced of this agency, in the fissures and chines scooped out by the rivulets of the Isle of Wight, are clear and decisive. They are nevertheless on a very small, almost, indeed, on a diminutive scale. To have adequate conceptions of the force and extent of this agency, you must learn and know its operations and effects on immense and boundless plains of loose and sandy soil. The be district for becoming acquainted with the phenomena of this kind of aqueous agency is found in the Southern Steppes of Russia.

To an Englishman who has never left the shores of our own little island, it is difficult to describe what is meant by a steppe. The word is supposed to be of Tartar origin, and is used to designate an immense level plain or waste destitute of trees. You are aware that all the surface of the earth that is not covered by water may be divided into mountain tracts, tablelands or high flats, and low levels or extensive plains, whose mean elevation above the sea is not many hundred feet, even towards the interior of large continents. These lower levels of the earth, when they are large and extensive, are spoken of sometimes as plains and sometimes as river-valleys. When these extensive plains put on something of the character of a desert, they are called in Europe, steppes. Regions of the same peculiar character are called in North America, prairies and savannahs; and in South America, llanos and silvas.

These steppes are found towards the eastern extremity of Europe, commencing at the River Dnieper, and extending along the shores of the Black Sea. They include all the country north and east of the Caspian Sea and Independent Tartary. They also pass between the Ural and Altai mountains, and may be said to occupy all the low lands of Siberia. To the east of the Dnieper, many hundreds of miles may be traversed without any variation in the one everlasting flat: a dead level of thin, but, for the time, luxuriant pasture, bounded only by the horizon, fatigues the eye, day after day, by the same unbroken monotony.

When the traveller begins his journey eastward, or north-eastward, from the Dnieper, a widely-extended, and apparently interminable plain stretches before him, the steppes receding as he goes until their outline vanishes on all sides in the far horizon. It is the dead level of a treeless desert. No hill, no cliff rises, as an island does in the boundless ocean, to break the uniformity of this endless plain. Even the geologist relieves his exhaustion only by speculating on the fact that, at one time, all before him and around him was the bottom of a great Mediterranean sea. It is something like the ocean in filling the mind with the feeling of infinity, but with this difference, that the aspect of the clear mirror of the ocean, with its light, curling, sporting, and gently foaming waves, cheers the heart like that of a friend; but the steppe lies stretched before us dead and rigid. While the herbage is green, horses and cattle without number give some little animation to the scene; but winter comes in October, and then they become a trackless field of spotless snow. In summer the scorching sun is as severe in its consequences on these steppes as is the winter cold. In June the surface is parched, no shower falls, nor does a drop of dew refresh the thirsty and fissured earth. In some seasons the drought is excessive, and the air is filled with impalpable powder. At such times the springs become dry, and cattle perish by thousands.

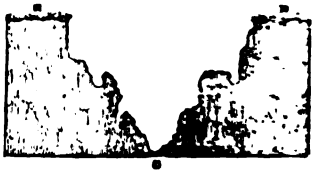
I have detained you thus long on the description of a steppe that you might form some good idea of the scene on which rain and streams have to exert their excavating agency. In your estimate of the dimensions of a steppe, you must not limit your conception to some large flat in England, like Salisbury Plain, or the Fens of Cambridgeshire. You must, on the contrary, imagine a district that is double the size of Great Britain, and all of it one dead flat, as it appears to the eye of the traveller.

When steppes are described as interminable plains, it is not meant that, in reality, and literally, they are without any undulations and declivities. In a surface of several millions of square miles there will necessarily be many indentations and depressions, with corresponding gentle elevations.

I have described to you the ground of these steppes in summer and winter. When the more temperate sun and gentler gales of spring succeed, then the accumulated snow of the winter begins to melt, and rains descend in torrents, and their combined waters sweep over the soft soil for millions of square acres, and fissure the surface in all directions. With every return of spring, rain torrents scoop out new channels or chasms and form fresh river-gullies in the unbroken ground, to the depth of from 100 to 150 feet deep, and about half a mile long.

This is particularly the case when heavy rains are brought to bear on a given spot at the edge of a pretty steep declivity. In such a vast extent of plain there are many such declivities, and even ravine cliffs, formed something like those of the chines

Fig. 46.



A transverse section of a rain-gully in the Southern Steppes of Russia.

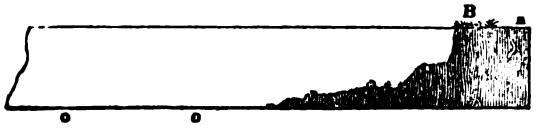
in the Isle of Wight. In natural slopes of great length, and inclining at a very small angle, these fissures or gullies are very rarely formed by the rain torrents. But where the declivity is steep, and having on its surface a little depression formed by nature, towards which the rain rivulets will tend, or where a trench or ditch has been digged by human hands, or where even a furrow has been drawn deeper than usual along the incline by the plough, or where a public road has been a little worn into ruts on an acclivity however gentle, there the water rushes with great violence, robs the surface of any grass covering which it may have had, and then, in its descent, it cuts and cuts into the ground, already soft by the percolating waters, and forms a deep fissure or narrow chasm.

In this manner a small cutting or rent is made in the surface of the declivity, and then rills collect themselves into rivulets, rivulets into brooks, and brooks into rivers, and, unitedly, bear the soil before them in their headlong course. Through the perpetual deepening of the channel at the top of the declivity, the fissure is caried back and is lengthened inland, while on both sides of the fissure the sandy soil is either undermined or worn down, and then removed by the force of the current. The whole formation and structure of these rain gullies make it obvious that they are the results of the receding activity of moving water.

As the torrent plunges downwards, the fissure or chasm is deepened many fathoms perpendicularly, but towards the bottom the sides become less vertical and more inclined towards the bed of the river. If you fancy yourself at the brink of one of these gullies or chines, and looking across to the other side, the excavation will have the appearance represented in fig. 46.

It is generally found that the inclination of the bottoms of these fissures is never greater than the corresponding declivity of the surface of the ground. It is only at their mouths, as represented by o in our last figure, that their depths are greatest. From this mouth of the fissure, the bed of the gully is ever gradually rising inland towards the head of the declivity, where the water begins to scoop the surface; near the mouth the angle of the rise is very small, but, afterwards, the farther you go inland, the angle is constantly and rapidly increasing. This inclination is much governed by the declivity of the surface, and by the character of the rocks or beds in which the gullies are formed. If you suppose yourself standing at the head of one of these gullies, and look along the bed of it towards the mouth of the ravine, say at B in the next diagram, fig. 47, or, if you like, looking from the outlet or mouth towards the head, the appearance would be as is here represented.

Fig. 47.



Longitudinal section of a rain-fissure in the Southern Steppes of Russia.

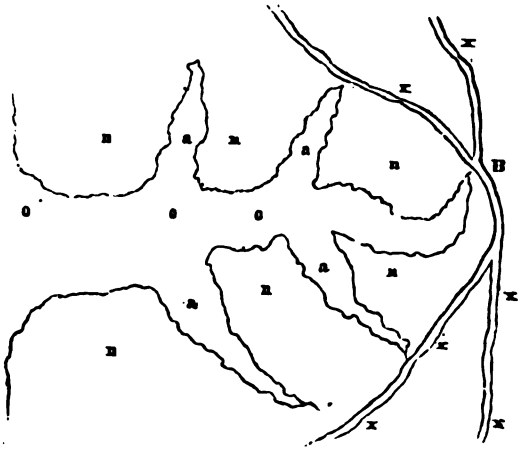
At the sides of these large gullies and chasms, which may be called longitudinal valleys, there are again many smaller fissures or chines, which open into them, and which may be called transverse chasms. These, at first do not themselves form deep fissures, because they do not run over any declivity. But when the principal fissure, or channel widens itself by the action of torrents, and works into them, and imparts to them the character of a steep cliff, then these side currents also begin at that point to cut for themselves a receding fissure.

By these processes there are found, at the sides of each of these excavated chasms, in some places innumerable little fissures, and, at others, very large and complicated ramifications of branch gullies. By means of these ramifications and fissurings, the wildest laceration of the surface is produced and extended, promontories projecting far, like so many maritime head-lands, are formed, and innumerable ridges and tongues of land are made, which have on both sides of them deep precipices. A man looking down upon the surface from a balloon above the district, would behold the longitudinal chasm and the side or transverse fissures extended and joined as they are represented in fig. 48.

In this figure, B is the point to which the stream has cut back the fissure, x x the public road around the chasm, a a the rain-gullies, o the bed of the chief chasm, n n the high surface of the steppe. I mentioned that these chasms are never excavated in a flat district, or on a surface having but a very insignificant inclination. Still where they have once been formed at the edge of any declivity, we have seen that it is one of their laws to cut their course backward into flat levels. Consequently ancient rain-gullies are frequently found in flat regions very remote from any declivities. These are called in Russia ruitwinas, and prove very injurious and obstructive to trade and commerce.

In winter the frost adorns the bottom and the sides of these chasms with large needles of ice and crystal columns. In many instances a bridge of ice is formed across the whole

Fig. 48.



Horizontal section of rain-gullies in the Southern Steppes of Russia.

chasm, a deceitful covering of snow lays over this brittle bridge, which, under the sledge of the traveller that has lost his road, breaks in pieces, and buries in the depths below both traveller and cattle.

LESSONS IN FRENCH.—No. XXXVI.

By Professor Louis Fasquelle, LL.D.

Section LXXX.

THE DEMONSTRATIVE PRONOUN, CE (§ 108).

1. The pronoun *ce* answers to the English pronoun *it*, used before the verb *to be*, in such sentences as, *it is I, it is thou*, &c. The latter pronouns (*I, thou*, &c.) are rendered by moi, toi, lui, elle, nous, vous, eux, m., elles, f. The verb remains in the singular, except when the pronoun following it is in the third person plural; in which case it may be put in the plural or in the singular [§ 116 (2)]. If the pronoun is followed by *qui*, the verb is better in the plural, and, if followed by *que*, in the singular:—

C'est moi, c'est lui, c'est elle.	*It is I, it is he, it is she.*
Ce sont elles qui parlent.	*It is they who speak.*
C'est elles que nous cherchons.	*It is they whom we seek.*

2. If the relative pronoun *qui* and another verb follow *être*, this second verb must agree in number and person with the pronoun preceding the relative:—

C'est vous qui avez fait cela.	*It is you who have done that.*
C'est nous qui avons déchiré cette soie.	*It is we who have torn that silk.*

3. Ce also renders the English pronoun *it*, used absolutely, but not unipersonally before the verb *to be* [§ 108 (5)]:—

Ce fut en Allemagne qu'il trouva son ami.	*It was in Germany that he found his friend.*

4. Celui qui, celle qui, ceux qui, m., celles qui, f., are equivalent to the English pronouns, *he who, she who, they who* —celui que, celle que, ceux que, celles que, render *he whom*, &c.

Celui ou celle qui chante.	*He or she who sings.*

Résumé of Examples.

Est-ce vous qui nous avez averti de cela?	*Is it you who have warned us of this?*
C'est nous qui vous en avons averti.	*It is we who have warned you of it.*
Est-ce vous, mesdames, que nous avons rencontrées?	*Is it you, ladies, whom we have met?*
Ce n'est pas nous, c'est eux que vous avez vus.	*It is not we; it is they whom you have seen.*
Ce n'est pas vous, ce sont eux qui ont fait cela.	*It is not you; it is they who have done that.*

C'est en Angleterre que je vous ai vu.	*It is in England that I have seen you.*
Connaissez-vous ces deux Portugais ?	*Do you know those two Portuguese ?*
Je connais celui qui parle à M. L.	*I know him who speaks to Mr. L.*

Exercise 159.

Appel-er, 1. *to call.*
A-toute-force, *by all means.*
Avert-ir, 2. *to warn.*
Blessure, *f. wound.*
Combl-er, 1. *to overwhelm.*
Connaissance, *f. acquaintance.*
Expliqu-er, 1. *to explain;* No., *number.*
Guerre, *f. war.*
De-jour en-jour, *from day to day.*
De temps en temps, *from time to time.*
Phrase, *f. sentence.*
Prélud-er, 1. *to prelude.*

1. Est-ce vous, Madame, qui avez appelé votre domestique ? 2. Ce n'est pas moi qui l'ai appelé. 3. Est-ce vous mon ami qui voulez à toute force aller en Espagne ? 4. Ce n'est pas moi, c'est mon cousin. 5. N'est-ce pas lui qui a averti ce matelot de son danger ? 6. Ce n'est pas lui, c'est moi qui l'en ai averti. 7. Est-ce nous que vous attendez de jour en jour ? 8. Ce n'est pas vous, c'est eux que j'attends. 9. Est-ce vous, Madame, qui nous avez comblées de bienfaits ? 10. Ce n'est pas moi, Madame. 11. N'est-ce pas en Italie que vous avez fait connaissance avec lui ? 12. Ce n'est pas en Italie ; c'est en Russie. 13. Est-ce vous, Mesdames, ou vos cousines que nous avons vues au bal ? 14. C'est nous, ce n'est pas nos cousines que vous avez vues. 15. Ne connaissez-vous pas ces deux messieurs ? 16. Je connais celui qui parle à Madame L. 17. Est-ce vous qui avez reçu une blessure à la guerre ? 18. Ce n'est pas moi, c'est mon voisin. 19. N'est-ce pas vous qui nous avez expliqué cette phrase ? 20. Est-ce vous, Monsieur, qui demeurez au No. 18 ? 21. Ce n'est pas moi qui y demeure. 22. Entendez-vous ces musiciens ? 23. J'entends celui qui chante. 24. Je n'entends pas bien celui qui joue. 25. Nous entendons ceux qui préludent.

Exercise 160.

1. Is it you, my friend, who have warned me of my danger ? 2. It is not I who have warned you of it. 3. Is it they whom you expect from day to day ? 4. It is not they whom we expect. 5. Is it you who have done this ? 6. It is not we ; it is you who have done it. 7. Was it in England that you bought this hat ? 8. It was not in England ; it was in Germany. 9. Was it not in Russia that you became acquainted with him ? 10. It was not in Russia ; it was in Italy. 11. Was it you who were calling us ? 12. It was not we ; it was he. 13. Are you not acquainted with the two Poles who are reading ? 14. I know the one who is near you. 15. Is that (*est-ce là*) the lady whom you expected ? 16. It is not (she). 17. Is it you, gentlemen, who have loaded my brother with kindness ? 18. It is not (we), Sir ; we have not the pleasure of knowing him. 19. Is it you who have been wounded in the (*au*) arm ? 20. It is not (I). 21. Do you not hear those two ladies ? 22. I do not hear the one who sings. 23. I hear the one who plays. 24. Was it you who came to our house this morning ? 25. It was not I ; I was in London then (*alors*). 26. Was it you, Sir, who did us that favour ? 27. It was not (I) ; it was my sister. 28. Was it your son who wished by all means to go to London ? 29. It was not he ; he is now in Germany. 30. Is it you who wrote that letter ? 31. We have written no letter. 32. Who lives at (*au*) No. 20 ? 33. I live there (*c'est moi*). 34. Is it we whom you have seen ? 35. It was not you whom I saw.

Section LXXXI.

1. The pronoun *ce* (and not the pronouns *il*, *elle*, &c.), must be used for *he*, *she*, *they*, coming before the verb *to be*, when that verb is followed by a noun, or an adjective used substantively, *preceded* by *the*, *a*, or *an*, by *some* or *any* understood, or by a *possessive* or *demonstrative adjective*. When the word used in apposition with *ce* is plural, and in the third person, the verb is put in the plural, although *ce* remains unchanged [§ 103 (2) (3)] :—

C'est un Polonais.	*He is a Pole.*
Ce sont des Anglais.	*They are Englishmen.*
C'est cette dame qui m'a parlé de vous.	*It is that lady who spoke to me of you.*

2. Ce is used as the nominative of the verb être, in sentences like the following, and the conjunction que is used idiomatically after it. The verb in this case is not put in the plural :—

Qu'est-ce-que ces enfants ?	*What are those children ?*
Qu'est-ce-que l'Italie ?	*What is Italy ?*
Qu'est-ce-que le jardinage ?	*What is gardening ?*

3. Que is used idiomatically in a number of sentences. In the following it gives greater force to the expression :—

Ce sont de bons livres que les vôtres.	*Yours are indeed good books.*
Je dis que oui ; je crois que non.	*I say yes ; I believe not.*

Résumé of Examples.

Qui sont ces messieurs qui parlent à M. L ?	*Who are the gentlemen who speak to Mr. L. ?*
Ce sont mes cousins, qui viennent d'arriver.	*They are my cousins, who are just arrived.*
De quel pays sont ces marchands ?	*Of what country are those merchants ?*
Ce sont des Polonais ; ils viennent d'arriver.	*They are Poles ; they are just arrived.*
Ils ne sont pas Polonais ; ils sont Russes.	*They are not Poles ; they are Russians.*
Ce ne sont pas des Polonais ; ce sont des Russes.	*They are not Poles ; they are Russians.*
Qu'est-ce que la Touraine ?	*What is Touraine ?*
C'est le jardin de la France.	*It is the garden of France.*
Votre fenêtre ne donne-t-elle pas sur la rue ?	*Does not your window look on the street ?*
Non, c'est sur la cour qu'elle donne.	*No, it looks on the yard.*
Je crois que oui ; je crois que non.	*I believe so ; I believe not.*

Exercise 161.

Bris-er, 1. *to break.*
Charron, m. *wheelwright.*
Confitures, *f. p. preserves.*
Donn-er, 1. *to give, look.*
Ecossais, e, *Scotch.*
Etranger, e, *foreign.*
Fenêtre, *f. window.*
Lyon, *Lyons.*
Mouchoir, m. *handkerchief.*
Roue, *f. wheel.*
Soieries, *f. p. silk stuffs.*
Sucre, m. *sugar.*
Suisse, *Swiss.*
Surprend-re, 4. ir. *to catch, surprise.*
Vol-er, 1. *to steal.*

1. Connaissez-vous ces étrangers ? 2. Oui, Monsieur, ce sont les frères de notre voisin. 3. Ne sont-il pas Ecossais ? 4. Non, Monsieur, ils sont Suisses. 5. Ne sont-ce point des Ecossais qui vous ont fait présent de cette casquette ? 6. Non, Monsieur, ce sont des Suisses. 7. N'est-ce pas votre domestique qui vous a volé du vin ? 8. Ce n'est pas lui, c'est son frère. 9. N'est-ce pas lui qui a pris vos confitures ? 10. Ce n'est pas lui ; ce sont ses enfants. 11. Ne sont-ce pas là les enfants que vous avez surpris à voler votre sucre ? 12. Ce sont leurs frères. 13. Ne sont-ils pas cousins ? 14. Ils ne sont pas cousins ; ils sont frères. 15. Qu'est-ce-que ces soieries ? 16. Ce sont des merchandises qu'on vient de nous envoyer. 17. N'est-ce pas une belle ville que Lyon ? 18. C'est une grande et belle ville. 19. N'est-ce pas là le mouchoir que vous avez perdu ? 20. Je crois que oui. 21. N'est-ce pas sur le jardin que donnent vos fenêtres ? 22. Oui, Monsieur, c'est sur le jardin qu'elles donnent. 23. N'est-ce pas notre charron qui a fait cette roue ? 24. Ce n'est pas lui qui l'a faite. 25. Ce sont nos amis qui l'ont brisée, et c'est le menuisier qui l'a faite.

Exercise 162.

1. Is that lady your friend's sister ? 2. No, Sir, she is a stranger. 3. Who are the two gentlemen who are speaking to your sister ? 4. They are Swiss gentlemen. 5. Are those the gentlemen whom you have invited ? 6. It is they (*eux*). 7. Do you not know that man ? 8. I know him very well ; he is the man who has stolen my wine. 9. What is Italy ? 10. It is the garden of Europe. 11. Is not that the letter which you intended to carry to the post-office ? 12. No, Sir, it is another. 13. Is the city of Havre fine ? 14. Yes, Sir, Havre is truly a large and beautiful city. 15. Is not that the man whom you have caught stealing your fruit ? 16. It is not, it is another. 17. Is not this the cup that you have bought ? 18. Yes, Sir, I believe so. 19. Do not the windows of your room look on the street ? 20. No, Madam, they look on the garden. 21. Do not the windows of your dining-room look on the yard (*cour*) ? 22. No, Sir, they look on the lake (*lac*). 23. Is it that little child who has taken your preserves ? 24. It is his brother and sister. 25. What are those engravings ? 26. They are engravings which I bought in Germany. 27. Are those gentlemen Scotch ? 28. They are not Scotch ; they are Italian. 29. Are those ladies Scotch ? 30. No ; they are the Italian

ladies who came yesterday. 31. What is Marseilles? 32. It is one of the finest cities in (*de*) France. 33. Is it not your tailor who made that coat? 34. It is not he; it is an English tailor who made it. 35. It is your friend who broke my watch.

Section LXXXII.

1. In French, as in other languages, when a verb has two subjects in the singular, it is generally put in the plural [§ 114 (2)]:—

L'oncle et la tant sont arrivés.	*The uncle and aunt are arrived.*

2. When a verb has two or more subjects of different persons, it is put in the plural, and assumes the termination of the first person rather than that of the second or third, and the termination of the second in preference to that of the third:—

Vous et moi irons demain à la chasse.	*You and I will go hunting to-morrow.*
Vous et lui irez demain à l'école.	*You and he will go to school to-morrow.*
Sa mère et moi nous avons écrit cette lettre.	*His mother and I have written that letter.*

3. The above examples will show, that, when a verb has several subjects, all of them pronouns, or partly pronouns and partly nouns, the words moi, toi, lui, eux, are used instead of je, tu, il, ils. A pronoun recapitulating the others, may, as in the last example, be placed immediately before the verb [§ 33 (10) (11)].

4. For further rules on this subject, see § 114 and 115, and also the next section.

5. Gêner corresponds in signification to the English *to trouble, to incommode, to disturb, to be in the way*, and *to hurt (in speaking of shoes and garments)*. Se gêner means *to constrain*, or *trouble one's self*:—

Est-ce-que je vous gêne?	*Am I in your way?*

Résumé of Examples.

Où irez-vous, votre frère et vous?	*Where will you go, your brother and you?*
Lui et moi irons en Angleterre.	*He and I will go to England.*
Vous, elle et lui, vous achèterez du blé.	*You, she, and he will buy wheat.*
Eux et moi, nous sommes fait mal à la tête.	*They and I have hurt our heads.*
Vous et lui, vous devriez vous prêter aux circonstances (se prêter).	*You and he should adapt yourselves to circumstances.*
Lui et moi, vous gênerons sans doute.	*He and I will without doubt incommode you.*
Ma cousine et moi, nous craignons de vous gêner.	*My cousin and I fear to be in your way.*
Je ne me gêne jamais chez mes amis.	*I am never under constraint with my friends*
Ne vous gênez pas; mettez vous à votre aise.	*Be under no constraint; place yourself comfortably.*
Nous n'aimons pas à gêner les autres.	*We do not like to incommode others.*
Nous n'aimons pas à nous gêner.	*We do not like to incommode ourselves.*

Exercise 163.

A perte, *at a loss.*	Nullement, *by no means.*	Prodigue, *prodigal, lavish.*
A profit, *with a profit.*	Pardon, *excuse me.*	
Bras, *arm.*	Persist-er, 1. *to persist.*	Société, f. *company, society.*
Dérang-er 1. *to disturb.*	Place, f *room.*	
Econome, *economical.*		Tous deux, *both.*

1. Si nous restions plus longtemps ici, nous craindrions de vous gêner. 2. Vous ne nous gênez nullement; votre societé nous est très agréable. 3. N'avez-vous pas été trop prodigues, vous et votre frère? 4. Lui et moi au contraire, nous avons été très économes. 5. N'avez-vous pas tort de gêner ce monsieur? 6. Nous n'avons nullement envie de la gêner. 7. Est-ce-que mon bras vous gêne, Monsieur? 8. Non, Monsieur; nous avons assez de place, vous ne me gênez pas. 9. Ne devriez-vous pas vous prêter aux circonstances? 10. Nous faisons, elle et moi, notre possible pour nous y prêter. 11. Ce jeune homme persiste-t-il dans sa résolution? 12. Nous y persistons, lui et moi. 13. Persistez-vous tous deux à rester ici? 14. Nous y persistons tous deux. 15. Cet homme est-il gêné dans ses affaires (*uncomfortably situated, badly off*)? 16. Il était gêné dans ses affaires il y a un an. 17. Ne vous gênez pas, Monsieur. 18. Je ne me gêne jamais, Monsieur. 19. Est-ce-que mon frère vous dérange? 20. Non, Monsieur, il ne me dérange pas. 21. Je ne voudrais pas vous déranger. 22. Pardon, si je vous dérange. 23. Vous et votre associé avez vendu vos marchandises à perte. 24. Vous et moi nous vendons toujours à profit. 25. Votre père, votre frère et moi nous avons acheté des marchandises.

Exercise 164.

1. Do we incommode you, my brother and I? 2. No, Sir; you do not incommode us; we are very glad to see you. 3. Are you not afraid to disturb your friend? 4. We are afraid to disturb him; he has much to do. 5. Is my foot in your way, Sir? 6. No, Sir; your foot is not in my way. 7. Will you and your brother go to Germany this year? 8. We intend to go there, he and I. 9. He, you, and I, should write our lessons. 10. Should you not, you and your friends, adapt yourselves to circumstances? 11. We should do so, if it were possible. 12. Do I not disturb you, Sir? 13. You do not disturb me by any means. 14. Does not my little boy disturb you? 15. He does not disturb me. 16. He disturbs nobody. 17. Does not your partner sell his goods at a loss? 18. He never sells at a loss. 19. He and I always sell at a profit. 20. Do you persist in your resolution? 21. Your friend and I persist in our resolution. 22. I never feel under constraint at your house. 23. Be under no constraint (make yourself at home). 24. Are you not wrong to incommode them? 25. I do not intend to incommode them. 26. We do not like to incommode ourselves (to put ourselves out of the way). 27. My little boy and I will, perhaps, be in your way. 28. No, Sir; we are very glad of your company. 29. Do I disturb you? 30. No, Sir; you do not disturb us. 31. Do I disturb your father? 32. No, Sir; you disturb no one. 33. Excuse me, Sir, if I disturb you. 34. Have you not been very lavish? 35. No, Sir; I assure you that your son and I have been very economical.

SKELETONS OF LEAVES AND FRUITS.

Leaves when carefully dissected are very beautiful objects, and they greatly contribute to the study of Botany. The first person who seems to have thought of thus exposing to view their exquisite structure was M. Leverin, a professor of anatomy at Naples. In 1645, he published a work, in which he gave a figure, with a description, of a leaf of *Ficus Opuntia*, one of the plants belonging to the Indian fig tribe, reduced to a skeleton. With the reserve then so usual among even men of science, and now so happily unknown, he gave no description of the process through which the leaf had passed, but he confided it, as a special secret, to a person named Bartholicé. The leaf, if examined at all, could not fail to be regarded as curious and beautiful; but the way of preparing it appears to have excited no particular attention.

Seventy years after Leverin's publication, the Dutch anatomist, Rysch, tried a plan he had adopted successfully with animals—covering leaves and fruit with insects, that they might eat off the soft and pulpy parts, and leave those which were hard. As, however, this method proved to be imperfect, he tried to remove what he wished by hand, after the leaf had suffered decomposition; and so beautiful were the results that they excited great astonishment, and a desire to become acquainted with the means by which they might be secured. But here the love of secrecy also prevailed; and it seems that it was only when Rysch felt it could no longer be preserved, that he published the mode he had adopted, in 1727.

Others have given great attention to preparing skeleton leaves, and the process may be said now to have attained perfection; as those which may be seen in the British Museum, and in other collections of botanical specimens, are all that can be wished.

The process admits of a very simple explanation. Choose the leaves of trees or plants which are somewhat substantial and tough, and have woody fibres, such as those of the apple, oak, laurel, apricot, box, poplar, ivy, holly, magnolia, &c., and avoid such leaves as have none of the woody fibre, as the vine, lime, &c. The swollen calyces of the yellow-rattles, found in corn-fields in the north of England, form very beautiful vege-

table skeletons; and so do, also, the calyces of the henbane, of all the campanula or bell-flower tribe, of the winter cherry, &c.

Put the leaves into an earthern or glass vessel, pour a large quantity of rain water over them, and expose them, uncovered, to the action of the air, and the heat of the sun. As the water evaporates and the leaves become dry, more water must be added, and in this they must continue for six weeks or more. When they have been for some time in a putrescent state, the two membranes of the leaf will begin to separate, and the green part to become fluid, a proof that the operation of clearing may now be performed.

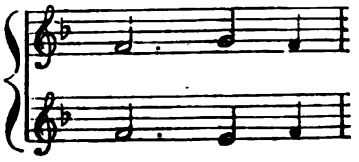
To do this the leaf is to be put on a flat earthern plate, and being gently squeezed with the finger, the membranes will begin to open, and the green substance to come out at the edges, requiring the membranes to be taken off very carefully, and great caution to be used in separating them near the middle ribs. When once there is an opening towards this separation, the whole membrane always follows easily. The leaves now require to be washed clean and bleached, which last process is very simple. Place them, first damped, in a close box, along with a little brimstone burning in a pan or ladle, and in an hour they will be very white. It should be remembered that there will be no success if the water is often changed, and that the more leaves done at the same time the better.

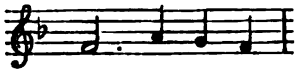
Fruits are divested of their pulp in a different way. Take, for example, a fine large pear which is not tough, but soft; let it be neatly pared without squeezing it, and without injuring either the crown or the stalk, put it in a pot of rain water, cover it, set it over the fire, and boil it gently till it is perfectly soft. Then take it out, lay it in a dish filled with cold water, and holding it with one hand by the stalk, rub off as much pulp as you can with the finger and thumb, beginning at the stalk, and rubbing regularly towards the crown. The fibres are most tender towards the extremities, and therefore in these directions require greater care. Any pulp now sticking to the core may be removed by the point of a fine penknife. In order to see how the operation advances, the water should frequently be thrown away, that clear water may be substituted. When the pulp is removed, the remainder should be placed in spirits of wine. The fibres that will thus be presented to the eye exhibit a very remarkable and beautiful structure. The same process may be pursued with the bark of trees, with a similarly interesting result.

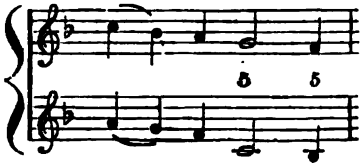
ANSWERS TO CORRESPONDENTS.

AUTOMATHES (Morriston): See vol. I. p. 288, col. 2, line 49.—PHILOSOPHICAL (Bamber-bridge): We question the fact.—A LABOURER (St. Osyth): We have no space to continue the argument.—WOULD-BE GRAINER: We do not know.—F. D. (Dover): See vol. I. p. 271, col. 1.—G. S——TT (W——n): The old names.—J. K. S. (Belfast): Right.—J. W. GARLICK (Halifax): Kuhner's Elementary Greek Grammar.—C. HILL (Kensington): Right.—A. CAMPBELL (Cathcart): The first question has been already proposed.—S. EVANS (Merthyr Tydfil): We wish he had given us the name of the worthy chancellor, and the printed work where the extract is to be found.—IZAK (Leicester): Very good, but not quite equal to the proposer's solution.—W. H. MANNING (Lewisham): His kind communication is under consideration.—T. HOLLINSHED (Somer's-town): Right.—J. E. A. R. (Salford): The letters explain the notes in music.—LIONI (Cork): Very well; but he should have had L'Educateur Populaire instead of the English words. Johnson says that *Salmagundi* is a corruption of the Latin *Salgama*, preserves or pickles. The French have it *Salmigondis*.—J. H. W. (Melbourne): Verbs ending in *izo* in Greek, are *frequentatives*, like Latin verbs ending in *ito*. Thanks for his opinion on Phrenotypics.—W. C. (Chelsea): See vol. I., p. 288, col. 2, line 49.—I. O. U.: Interest Tables are frequently wanted; we would recommend application to a banker or broker.—R. REED (Doncaster): Fowne's Rudimentary Chemistry.

A BUILDER'S CLERK (Ipswich): We cannot answer his queries because we have not decided on all the points. He will find by consulting the *Times* advertisements that catalogues of second-hand books are forwarded gratis by many London booksellers.—J. C. EWAN (Bootle) should study the two branches he likes best *most carefully*, and read all the others for relaxation.—DISCIPULUS (Glasgow): Wrong.—W. E. (Bristol): We have not seen the book he mentions.—PUPIL TEACHER (Scremerston): Right in the solutions. *Disintegration* is the opposition of *integration*; the latter means *a making whole, a restoring all parts*; the former, therefore, means *a destroying of the wholeness, a reduction to parts*.—F. E. FLETCHER (Cheltenham): Such queries as his must in future be referred to the editor of the "Pathway."—ATHOS (Newcastle): The answer to the snail query is 16 days. Perhaps the glowworm was an *ignis fatuus*.—A FACTORY LAD (Wardle): His inquiry about the Normal-school will be answered. His derivation of *mill* shows ingenuity, but it is a Saxon word; see Johnson's Dictionary.—M. W. N. (Manchester): At the extinction of the Roman Empire, which, according to Gibbon, took place at the death of Theodosius, "Arcadius and Honorius were saluted Emperors of the East and West;" the *eastern* empire, comprising the *Prefectura Orientis et Illyrici*, was allotted to Arcadius, and the *western* empire, comprising the *Prefectura Galliarum et Italiæ*, to Honorius. *The East* included Asia, Egypt, Lybia, Thrace, Mœsia, Macedonia, Greece, and Crete. *The West* included Italy, countries south of the Danube, the islands of Sicily, Sardinia, and Corsica, Spain and the Balearic Isles, France, Switzerland, Germany, and Britain.

MUSIC.—CONTRAPUATIST'S note has been laid before the composer of the harmony he criticises, who has kindly sent the following reply:—"Both the passages are correct, and agreeable to the ear. In both of them, the dissonances are 'passing notes.' Reducing the first passage (the first complete bar of 'Happy Mind') to its elementary form, it consists of two chords, the tonic F, and the dominant C, which last is represented by its third E.

But, to form an agreeable melody, two notes are introduced—the G, and the A. The A is an *appogiatura* or note of taste, above the G, and



the G is a note which a singer would naturally introduce as a connecting link between the F and the A, so as to give roundness and smoothness to the melody. Neither of these notes in connexion with the under part gives the smallest offence to the ear. In the second passage, the F in the under-part, which forms a dissonance with G in the upper, is a note of *suspension*, introduced to avoid the bad effect which would otherwise be produced by the consecutive fifths pointed out by our correspondent. The passage in its elementary form would be

The fifths here would be glaring, but the introduction of the F,—an accented note, which suspends the C,—removes the bad effect which they would otherwise produce. The other case of supposed error is not copied in our correspondent's note. Many of the finest effects of part-writing are produced by notes which do not belong to the fundamental chords—*suspensions, anticipations*, and *passing notes*. But they must be cautiously and discreetly used; otherwise (as in much of the modern German music), they may be harsh and unpleasing. As to consecutive fifths, there are innumerable exceptions to the rule whereby they are prohibited—exceptions pointed out in every good treatise on harmony."

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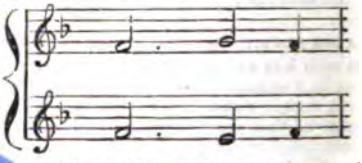
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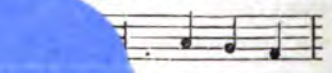
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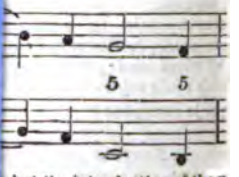

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LESSONS IN GEOLOGY.—No. XXII.

By Thomas W. Jenkyn, D.D., F.G.S., &c.

CHAPTER II.

ON THE ACTION OF WATER ON THE EARTH'S CRUST.

SECTION VI.

ON THE AGENCY OF WATER IN ABRADING HARD ROCKS.

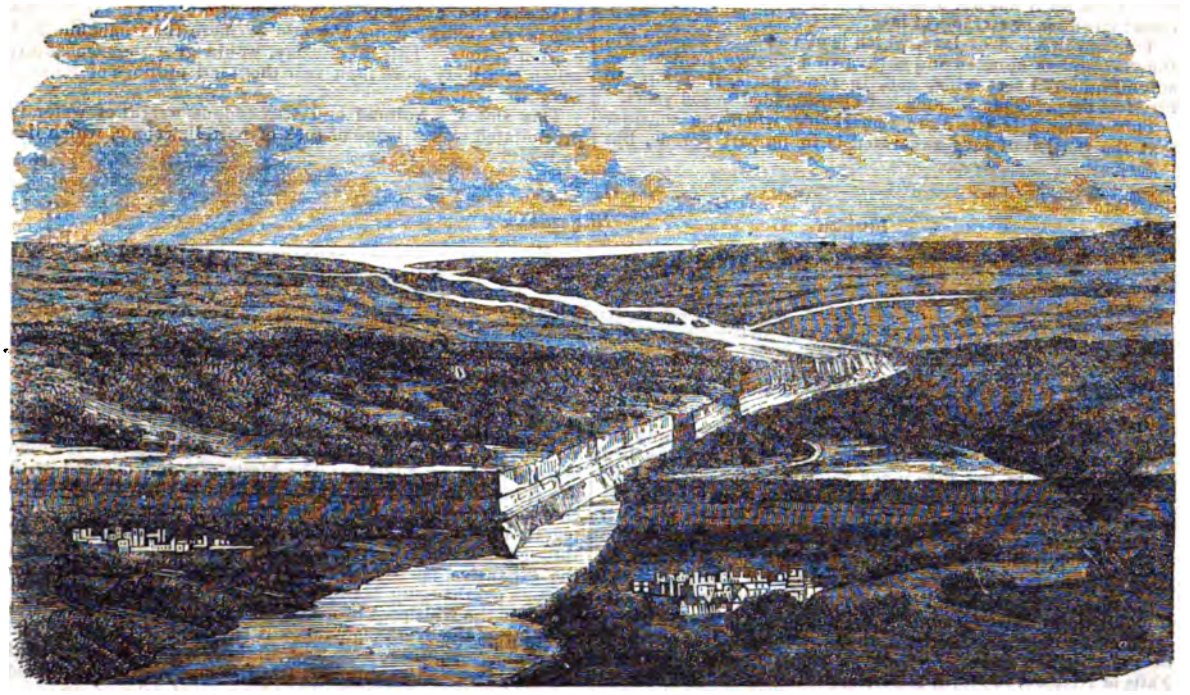
The last lesson taught you the mechanical agency of running water in excavating soft and loose soils. You have now to turn your attention to the combination of its mechanical and chemical action in eroding and abrading hard rocks; that is, in gradually and imperceptibly wearing away the surface of hard rocks, and forming, for its current, a bed or gorge which it has excavated by its own power.

In an earlier lesson it was shown that water, by its chemical agency, has the power to decompose and disintegrate some of the hardest rocks. Your own observation must have informed you that there is a constant tendency in all substances to be decomposed or disintegrated, to be removed by currents, to be carried away to a lower level, and finally to be deposited in some river, pool, lake, or the sea.

A running stream necessarily combines in its action the two powers of water. By infiltration into the mass of a rock, it tends to separate the particles of which it is composed. In this process, it acts chemically on the cementing matter that made the rock hard, and, by dissolving it, sets its particles at liberty. Its mechanical power then dislodges these particles, and forces them away from the surface on which it acts. When these particles have been removed from the surface, the rock presents to the running water a fresh surface, which, in its turn, becomes abraded by a repetition of chemical infiltration and mechanical disturbance. As the process goes on, the bed of the stream becomes deeper and deeper in the underlying rock.

The gradual abrasion of deep beds—such as may be called chasms or gorges—in some of the hardest and most compact rocks, by the incessant action of running water charged chemically with gases, and mechanically with gravel and pebbles, is one of the most interesting phenomena in geology. The business of this lesson is to furnish you with a few specimens of this abrading agency.

Fig. 49.



An Ideal Bird's-eye View of the Country about the Falls of Niagara.

In the volcanic districts of Auvergne, in Central France, there are many examples of valleys, across which streams of lava have, at some ancient period, flowed, and, on cooling, have formed a high embankment or dam, which has completely stopped the course of the river at the bottom. These lava embankments furnish the most clear instances of the abrading power of running water. The rivers that have been stopped, collected their waters, and then have cut out and cut downwards for themselves fresh passages, which now appear as large chasms in the lava, some of them from twenty to seventy feet in depth, and frequently of great breadth.

The materials on the surface of the sides of these valleys,

show that such new chasms or fresh beds of the river have not been affected, as is sometimes the case, by the current of an ancient sea, or by the denuding wave of some debacle or deluge. The geological proof of this fact is that, a little higher up in the valley, and at no great height above the present level of the river, there are, at the present day, many heaps or cones of scoriæ, or cinders, out of which these melted lavas flowed. You can now reason out this geological argument for yourself. If this district had, at any time since the settlement of these banks of lava across the valley, been either submerged under the sea, or had been subjected to the sweeping action of a deluge, it is evident that all those light cones and loose heaps of cinders would have been carried away. Hence, it is obvious that the present channel of the river excavated in the embankment has been effected by the abrading power of the river itself.

The neighbourhood of Etna furnishes another example of this abrading power of water. At the base of Etna, westward, a current of lava has descended from near the summit of the volcano to the distance of some six miles, and has crossed the valley of the Simeto, the largest river in Sicily. It has flowed from one side of the valley to the other, and when it reached the opposite side, it accumulated there as a rocky mass. This lava flowed across the valley about the year 1600. It has every appearance of being one of the most modern eruptions from Etna, for it has not been covered or crossed by any subsequent ejections or streams of lava.

Through this bed of lava, which is of considerable breadth, the Simeto has abraded and excavated a passage from fifty to several hundred feet wide, and, in some parts, from forty to fifty feet deep. This channel has been abraded in 250 years.

This abrasion is the more remarkable, when you consider that the portion of lava excavated is in no part porous, but consists of a compact mass of hard blue rock, approaching the consistency of basalt. The declivity in this part of the bed of the Simeto does not give much velocity to the stream, but, in consequence of some part of the lava being more easily worn away than another, there are two waterfalls in this gorge, each of them about six feet in height. In this neighbourhood, the chasm is about forty feet deep, and only fifty feet wide. In approaching the waterfalls, therefore, in the channel of the river, the visitor to the two cataracts is entirely shut out from all view of the surrounding country.

The most clear, and, perhaps, the most magnificent example of the abrading power of rivers, is found in the celebrated Falls of Niagara, in North America.

This river is one of the most stupendous in the world; though its significance and glory in the river systems of the earth is much lost by its having different names in different parts of its course. From Montreal to the sea, it is called the St. Lawrence; but from Lake Erie to Lake Ontario, it is called the Niagara. It also bears many other names.

The first springs of this noble river are found amid the sources of the majestic Mississippi; but, under the name of Niagara, it flows from Lake Erie to Lake Ontario, a distance of about thirty-two miles, in a course almost due south and north. After leaving Lake Ontario, it meets the tide four hundred miles from its mouth, where it is ninety miles wide, and finishes a course of three thousand miles in length.

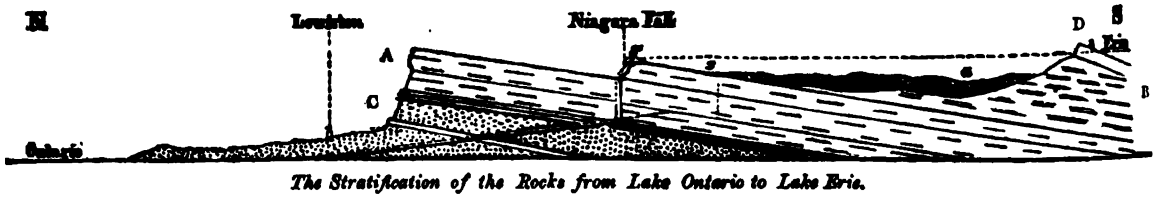
Lake Erie, from which the river flows, is three hundred and thirty feet, or more than a hundred yards higher than Lake Ontario, into which it empties its enormous mass of waters. When the river starts from Lake Erie, it appears, for some distance, as a continuation of the lake, is about three quarters of a mile wide, and from twenty-five to thirty feet deep. Its water is beautiful sea-green, and its current is full six miles an hour. For a few miles from the lake it is almost on a level with its banks, which are so low on each side that, if the waters were to rise eight or ten feet, many miles in Canada on one side, and in the state of New York on the other, would be under water. In its course for about fifteen miles it varies in breadth, being sometimes one, sometimes two, three, and nearly four miles wide. Here it enters what are called the "Rapids," and falls about fifty feet for every mile.

At the end of the rapids, and at the very edge of the fall, an island divides the river into two sheets of water, and, consequently, into two stupendous cataracts. One is called the Horse-shoe Fall, and is on the Canadian side of the river, and the other is called the American Fall. The stream of the Horse-shoe Fall is six hundred yards, or eighteen hundred feet wide, and falls one hundred and fifty-eight feet perpendicularly. The American Fall is two hundred yards wide, and one hundred and sixty-four feet perpendicularly.

To form any good conception of the abrading power of this river, you must detain your mind upon the enormous volume of its water, and upon the force of its accelerated velocity in the rapids. The river immediately below Navy Island is nearly four miles wide, but just above the falls it is about three miles, and at the falls it is, in a moment, contracted into three quarters of a mile. It has been mathematically calculated that the weight of its volume of water, running at the rate of six miles an hour, would be more than one hundred million of tons. This, in one day, would give the mechanical action of a body more than two thousand millions of tons in weight.

This amazing volume and tremendous weight of water is precipitated over a ledge of rock of hard limestone, which lies in strata almost horizontal, but dipping towards Lake Erie. Below this stratum of limestone is a thick bed of shale, which is perpetually crumbling. The blasts of wind charged with the spray that is constantly rising from the abyss under the cataract, strike against this bed of shales, and incessantly disintegrate it. As this bed of soft shale crumbles away, chiefly through the action of the gusts of spray, and partly through the expansive agency of frosts, the calcareous rocks above form an overhanging mass, which projects some forty or fifty feet over the whirlpool below. In proportion as these shales wear away, the overhanging rock is left without support. The consequence is, that, from time to time, immense masses fall headlong into the profound abyss below, with a sound the most terrific. Such a fall took place on the American side, in 1818, and on the Canadian, in 1828; and on both occasions the whole surrounding district was shaken as if by an earthquake.

Fig. 50.



The Stratification of the Rocks from Lake Ontario to Lake Erie.

The engraving in page 165, and fig. 49, is designed to give an ideal bird's-eye view of the district of Niagara. In this diagram, the chasm, or the river-bed, from the falls to the cliffs at Queenstown, is represented as being almost a straight line. This is not really and physically the case. The chasm is represented straight, for the sake of giving a more distinct view of the stratification of the limestone and shales from Queenstown up to the falls. For the same purpose, the proportions of the heights also are designedly exaggerated.

A glance at the above diagram will show you that the abrading power of this river has scooped out for itself a bed or gorge seven miles in length, and about half a mile in breadth. The depth of the river itself is more than a hundred yards, or fifty fathoms. How deep the cataract has scooped into the bottom of the pool below it it is impossible to calculate; but logs of

timber and other substances, after descending from the precipice, continue a long time under water before they emerge again.

There can scarcely be a doubt that at one time the falls of the river were at the cliffs of Queenstown, and that, by the abrading action of the water, they have gradually receded to their present position. In 1829, Mr. Bakewell was at these falls. Here he found an old man who was one of the first settlers in this part of the country, and had lived in its immediate neighbourhood forty years. He informed Mr. Bakewell that during that period the Horse-shoe Fall had receded about fifty yards. This progressive recession is due partly to the abrading action of such a weight of moving water upon the limestone itself, but principally in consequence of the crumbling and removal of the underlying shales which supported that rock.

Every intelligent observer may convince himself that the small length of chasm which has been abraded and excavated during the last sixty years has precisely the same character as the entire gorge for the seven miles down to Queenstown, and, consequently, that the river has been able to scoop out the whole gorge in the same gradual and progressive manner. The only article requisite in the calculation to account for the entire operation is sufficient length of time; and this, you are aware, geology has almost at command.

As the chasm below the present falls has been lengthened fifty yards in forty years, and as this distance of gorge resembles, in depth and breadth, its average dimensions all the way down to Queenstown, it is natural to inquire how long this process of recession may have continued, and at what time the abrading action commenced. At the rate of fifty yards in forty years, it would require ten thousand years for the falls to have reached their present situation.

If we suppose that the Niagara commenced its falls at the cliffs which overhang Queenstown, as seen in our diagram, the river must then have been at a much higher level than its present course. The present falls are formed in an immense mass of limestone, which is the base of all the country for miles upon miles, and which lies in strata almost horizontal, but having a gentle dip to the south. Upon this stratum of limestone lay originally a bed of diluvial detritus, consisting of sands, clays, and gravels, about two hundred feet in thickness. This noble river, therefore, had, in its early action, first to wear away a channel in this enormous bed of superficial soil; and it was, after flowing some ages over the bare surface of the rock, when it had reached that surface, that it began gradually to scoop that away also.

Though there can be no historical proof that the river ever fell over the heights at Queenstown, there are, happily, some geological evidences that this was once the case. These evidences consist in distinct traces of an ancient river-bed which have been discovered on the high table-land between Queenstown and the falls. In this old channel are found detritus which are precisely the same as those of the Niagara above the present falls; also fresh water muscle shells of the same species as those which now inhabit the Lake Erie, from which the river issues. This evidence is corroborated by the height of the several islands which are found in the river between the falls and Lake Erie. There are also decisive proofs on the borders of Lake Erie that, at a former age, its waters stood at an elevation several feet higher than their present level. It is, therefore, highly probable, if not, indeed, evident, that the present lower bed or gorge of the river has been abraded and worn away, chiefly, if not entirely, by the force of the stream itself.

The bird's-eye view which the last diagram gives of the course of Niagara from Lake Erie, shows that the excavated chasm continues, for its whole length, to have perpendicular banks or cliffs of the average depth of 200 feet. The table land, as seen above Queenstown, and exposed at the falls, extends all the way to Lake Erie, covered for the most part with a fresh-water deposit of gravel and clays. Below this sedimentary deposit are the rock of hard limestone and the underlying shale beds already alluded to.

The stratifications of these rocks are represented in the illustration marked fig. 50, where the elevation of the rocks and the inclination of the beds are exaggerated for the sake of bringing out the peculiarities of the country. A B is the limestone rock which prevails as the base of the whole country, and which forms high cliffs at A by Lewiston, on the American side of the river, and by Queenstown, on the Canadian, as shown in fig. 49. C are the underlying shales which are seen both at Queenstown and at the falls B. *a x* is supposed to be the clays and gravels at the bottom of the river as far as *x*, the rapids.

If the present condition of the river continues, it is likely that the Falls of Niagara will retreat until they reach the shores of Lake Erie, and discharge all the water of that inland sea. A reference to our last diagram will show that this discharge will not be so sudden as to produce a violent deluge over the length of country below. The waters of the lake will be lowered gradually in proportion to the depth, to which the water will, at D, scoop a channel in the inclined bed of the limestone rock B, which forms the bottom of Lake Erie. When the falls once reach beyond D, the retreat of every succeeding yard will occasion a greater amount of water to pass over them. Such an addition must add greatly both to the velocity and to the abrading power of the falls, which will, in consequence, recede more rapidly, and effect a chasm more inward towards the centre of the lake, until, eventually, the water forced over the falls would become smaller, because the superficies of the lake would be of less dimensions. If the falls recede at the rate of fifty yards in forty years, they will take thirty thousand years to reach the shore of Lake Erie.

It is supposed, however, that the entire area of Lake Erie will be converted into dry land long before the falls recede to its immediate shore, as the lake is very shallow. Its bottom is fast filling up with sediment deposited by the streams that run into it, and its average depth is only about twenty or thirty feet.

LESSONS IN LATIN.—No. XXXVI.

By JOHN R. BEARD, D.D.

DEVIATIONS IN THE THIRD CONJUGATION.

VOCABULARY.

Destituĕre, *to abandon*; instituĕre, *to instruct, teach*; effugĕre, *to fly from*; exacuĕre, *to sharpen*; involvĕre, *to roll into, involve, cover*; redarguĕre, *to convict, disprove*; respuĕre, *to reject*; gloriari, *to boast*; tunĭca, ae, f. *an undercoat, waistcoat*; soccus, i, m. *sock, shoe*; obsequium, n. *obedience, slavery, obsequiousness*; pallium, i, n. *a little cloak*; discrimen, Inis, n. *danger, discrimination, crisis*; ingenue, *well, nobly, like a gentleman*; reformido, *I fear*.

EXERCISES.—LATIN-ENGLISH.

Quis honestâ in familiâ institutus et educatus ingenue, non ipsâ turpitudine, etiamsi eum laesura non sit, offenditur? Carthago diruta est, quum stetisset annos sexcentos sexaginta septem; pacis nomine bellum involutum reformĭdo; Philosophi involutam multarum rerum naturam evolverunt; placebit ne tibi unquam (id) quod omnium mentes aspernatae sunt et respuerunt? Milites in ipso discrimĭne periculi cives inermes destituerunt; quum animus, cognitis perceptisque virtutibus, a corporis obsequio indulgentiâque discesserit, voluptatemque oppresserit, omnemque mortis dolorisque timorem effugĕrit, cultumque Dei et puram religionem susceperit, et exacuerit ingenii aciem ad bona diligenda et rejicienda contraria, tum vita nobis erit beatissima; credisne, improborum prosperitates redarguisse Dei bonitatem? Dejanira Herculi sanguine Centauri tinctam tunicam induit; Hippias sophista gloriatus est, se non solum omnes artes, quibus liberales doctrinae atque ingenuae continerentur, scire, sed annulum quem haberet, pallium quo vestitus, soccos quibus indutus esset, se suâ manu confecisse.

ENGLISH-LATIN.

A Greek philosopher made with his own hand the ring he had, the cloak with which he was clad, and the shoes with which he was shod; the same Greek philosopher boasted that he knew all liberal arts and letters; it is certain that no mind ever embraced all the sciences; I will give you a cloak dyed in the blood of a bull; your evil does not disprove the goodness of God; the husbands will not abandon their wives in the crisis of danger; let thy mind depart from slavery to (of) the body; I will not be oppressed by the pleasures of the senses; dost thou think thou wilt fly from the fear of death? few men have fled from all fear of death; do not fear pain; death will not injure the good.

VOCABULARY.

Deficĕre, *to fail, faint*; praeficĕre, *to put over*; diminuĕre, *to lessen*; dilugĕre, *to wash away*; dissolvĕre, *to break up, dissolve*; persolvĕre, *to pay*; eruĕre, *to bring out*; obruĕre, *to overwhelm*; designare 1, *to point*

out, indicate; extenuare, *to make thin, to diminish, extenuate*; mereor, meréri, meritus sum, dep. *to earn, deserve*; molestia, ae, f. *a hardship, trouble*; stipendium, i, n. *service, pay*; usus, ûs, m. *use, practice.*

EXERCISES.—LATIN-ENGLISH.

Homines metalla terrâ obrûta eruerunt; milites in expugnatae urbis cives ita saevierunt ut omnem humanitatem exuisse viderentur; Divina lex non scripta est, sed nata; quâ non institui sed imbui sumus; nemo est tam immanis cujus mentem non imbuerit deorum opinio; pueri animum tenerum virtutis praeceptis imbuimus; cogitatio omnes res humanas fragiles et caducas esse, omnes meas molestias extenuavit et diluit; quae observata sunt in usu et tractatione dicendi, haec ab hominibus doctis verbis designata et partibus distributa sunt; divitiae quae ab exteris nationibus Romam confluxerunt, morum disciplinam severitatemque dissolverunt; stipendiis quae dux militibus promiserat, non persolutis, seditio concitata est.

ENGLISH-LATIN.

I will pay the payments which I have promised to the soldiers; dost thou think that the king will pay the payments which he has promised to the soldiers? a messenger has said that the general would not pay the payments which he had promised to his soldiers; who will pay these very great payments to the sailors? the Queen of Great Britain, because she has promised them; have the sailors earned these payments? the sailors, in battle, seemed to have put off all fear; the minds of children are by nature imbued with the love of (their) parents; children must be taught and instructed by their parents; my mother swoons; the king has set my brother over the city; wash away thy tears; I am unable to wash away my grief; has your father washed away his troubles? no, but he has lessened them with the aid of God (*Deo adjuvante*); he pointed out the soldiers for death; I will distribute (arrange) in parts the things which I have observed by practice in writing.

Aesopii Fabulae.

CAPRA ET LUPUS.

Lupus capram in altâ rupe stantem conspicatus, "Cur non," inquit, "relinquis nuda illa et sterilia loca, et huc descendis in herbidos campos, qui tibi laetum pabulum offerunt?" Cui respondit capra: "mihi non est in animo, dulcia tutis praeponere."

VENTER ET MEMBRA.

Membra quondam dicebant ventri; "Nosne te semper ministerio nostro alimus, dum ipse summo otio frueris? non faciémus. Dum igitur ventri cibum subducunt, corpus debilitatur, et membra sero invidiae suae poenituit.

CANIS ET BOVES.

Canis jacebat in praesepi bovesque latrando a pabulo arcebat. Cui unus boum, "Quanta ista," inquit, "invidia est, quod non patéris ut eo cibo vescamur, quem tu ipse capere nec velis nec possis!"—Haec fabulo invidiae indólem declarat.

VOCABULARY.

Capra, ae, f. *a she-goat*; herbidus, a, um (herba), *grassy*; subduco 3, *I withdraw*; poenitet, *it repents*; penitet me culpae, *I repent of my faults*; literally, *it repents me of my fault*; praesepe, is, n. *an inclosure*; latro 1, *I bark*; vescor, vesci 3, dep. *I feed on, eat* (with abl.); indóles, is, f. *character.*

DEVIATIONS IN THE THIRD CONJUGATION.

a. The stem ends in *d* or *t*.

b. *Perfect in i; Supine in sum.*

i. Cando, found in compounds, as, accendo, accendĕre, accendi, accensum, *to kindle, to inflame.*
ii. Cūdo, cudere, cudi, cusum, *to forge.*
iii. Edo, ĕdere, ēdi, esum, *to eat.*
iv. Fendo, found in compounds, as, defendo, defendere, defendi, defensum, *to defend, protect.*
v. Fŏdio, fodere, fōdi, fossum, *to dig.*
vi. Fundo, fūdere, fūdi, fūsum, *to pour out.*
vii. Mando, mandere, mandi, mansum, *to chew.*
viii. Pando, pandere, pandi, pansum, and passum, *to spread out, to open.*
ix. Prehendo, prehendere, prehendi, prehensum, *to lay hold of.*
x. Scando, scandere, scandi, scansum, *to climb, mount.* Compounds are in scendo, scendi, scensum; as, ascendo, *to get up to.*
xi. Sīdo, sīdere, sēdi (no supine), *to sit down, to sink.* Compounds are in sido, sidere, sedi, sessum; as, considō, *to set one's self down.*
xii. Strīdo, stridere strīdi (no supine), *to crack, hiss.*
xiii. Verto, vertere, verti, versum, *to turn*
xiv. Fido, fidere, fisus sum, *to trust;* so confidere, *to confide;* diffidere, *to distrust.*

b. The stem ends in *l* or *r*.

xv. Vello, vellere, velli, vulsum, *to pluck.* Convello has in the perfect convelli; but avello, and evello, have avelli, evelli, and (seldom) avulsi, evulsi.
xvi. Psallo, psallere, psalli (no supine), *to play on the lyre.*
xvii. Sallo, sallere (no perfect), salsum, *to salt.*
xviii. Verro, verrere, verri, versum, *to sweep, clean.*
xix. Viso, visere, visi (visum, from video), *to visit.* In these verbs, the vowel of the stem, when short, becomes long in the perfect. Two verbs form apparent exceptions: Fi(n)do, findere, fĭdi, fissum, *to split* (so the compounds); sci(n)do, scindere, scĭdi, scissum, *to separate* (so the compounds). But these two verbs originally had the reduplication. It is the same with the compound percello, percellere, percŭli, perculsum, *to strike through.*

VOCABULARY.

Comprehendere, *to take in, comprehend*; confodere, *to pierce*; effodere, *to dig out*; diffundere, *to spread abroad*; effundere, *to pour out, to throw off* (*horseback*, compare the slang term *to spill*); offundere, *to pour against, spread*; exedere, *to eat away, gnaw*; incendere, *to set on fire*; procudere, *to forge, coin*; lacerare, *to tear, mangle*; digerere, *to divide, digest*; inscribere (with dat.), *to inscribe, engrave*; liquefacere, *to make into a liquid*; proficere, *to benefit*; pervĕhi, *to be carried through or to*; colonia, ae, f. *a colony*; velum, i, n. *a sail*; furor, ōris, m. *rage*; vetustas, ā is, f. *old age*; conspectus, ûs, m. *a view*; antiquitus, *anciently*; velis passis (ablative absolute), *in full sail*; aegritudo (aeger) inis, f. *sickness, grief*; epigramma, ătis, *an epigram, something written on a tomb*; nuntius, i, m. *a messenger.*

EXERCISES.—LATIN-ENGLISH.

Constat Tyriorum colonias paene toto orbe terrarum diffusas fuisse; in morte portum nobis paratum esse et perfugium patemas (subjunctive for imperative); quo utinam velis passis pervehi liceat! Hannibal patriam defensum ex Italia revocatus est; nihil proficiunt praecepta, quamdiu menti error offusus est; beate vivendi cupiditate incensi omnes sumus; ingens nummorum numerus hoc anno procusus est; aegritudo animum meum laceravit, exĭdit planeque confecit! epigrammătis, monumento inscripti, litterae vetustate exesae erant; milites urbem, ab hostibus oppugnatam, acerrime defenderunt; antiquitus magna auri argentique vis in Hispaniâ est effosa; milites furore capti, ducem confoderunt; equus repente corruit consulemque lapsum super caput effudit; cibos mansos ac prope liquefactos dēmittimus quo (=ut eo) facilius digerantur; quo magis virtutis vim animo et cogitatione comprehenderimus, eo magis eam admirabĭmur; proditōres urbis deprehensi in conspectu omnium civium necati sunt; videne omnium ora atque oculos in te conversos? multi facultatem dicendi ad hominum perniciem converterunt.

ENGLISH-LATIN.

Wilt thou turn thy skill in (of) speaking to the destruction of thy country; I will turn my skill in speaking to the benefit of all; he has turned his skill in speaking to the salvation and preservation of his country; the traitor being taken will be put to death before the eyes of the citizens; take care thy horse do not fall and throw thee on thy head; will the soldiers run their general through? this book is eaten by age; the queen will coin a large amount of money; the messenger lacerated my mind; my mind was torn by the view of my husband's death; the old and the young will be inflamed with the love of life; thou canst not see truth so long as thy mind is covered with error; he was carried into Italy; they will be carried to those coasts; the general bravely defended the city; the city will be well defended by the citizens; the colonies of England will soon lay spread in all parts of the world.

VOCABULARY.

Convellere, *to pull down*; desīdĕre, *to sink*; diffindere, *to split*; discindĕre, *to tear asunder*; rescindere, *to break off, rescind*; transgredior, transgredi, transgressus sum, *to pass over, or beyond*; mora, ae, f. *delay*; nodus, i, m. *a knot*; scrupulus, i, m. *a little stone, a doubt*; caligo, caliginis, f. *darkness*; motus, ûs, m. *movement*; motus terrae, *an earthquake*; quocunque, *whithersoever*; scilicet, *namely, because*; Pompēii, *the town Pompeii in Italy*; resurgo, resurgere, resurrexi 3, *to rise from the dead*; opitŭlor, ari, atus sum 1, *to assist* (with dat.).

EXERCISES.—LATIN-ENGLISH.

Quocunque te vel oculis, vel animo converteris, divinae bonitatis plena esse omnia intelliges; Alexander rex Macedŏnum, Gordii nodum esse diffidit, scilicet diffisus eum a se solutum iri; quum Hannibal Alpes transgrederetur, multa ingentis magnitudinis saxa

diffissa sunt; quis tibi vestem discidit? quid? discissane est? est discissa; Pompēii terrae motu deciderunt; quis vescit apud Romanos eloquentiam ad summum honorem adscendisse? Caesar militum virtuti confisus, sine morā hostilem exercitum adortus est; litterae tuae omnem scrupulum mihi ex animo evellerunt; est boni regis officium, quum rempublicam labefactam convulsamque videt, opitulari patriae.

ENGLISH-LATIN.

A few men have denied that all things are full of the goodness of God; they turn their eyes to the evils of the world; on the evils of the world their eyes are fastened (fixed); it is the duty of a good teacher to interpret all things to his pupils; I have a doubt about (of) declaring what I saw; the testimony of that witness has taken away all scruple from my mind; eloquence ascended to the greatest height among the Romans; thy garment will be torn; already it is torn; is my garment torn? no, but it will be torn; whithersoever you turn your eyes you see all things beautiful; did Alexander cut the Gordian knot? why did Alexander cut the Gordian knot? because he distrusted that he could solve it; when the Lord rose from the dead the rocks were split.

LESSONS IN GERMAN.—No. XXVII.

SECTION LI.

VERBS REQUIRING AN ACCUSATIVE OF A PERSON, AND A GENITIVE OF A THING.

Verbs signifying to accuse, to acquit, and some others (§ 126. § 127.) govern the *accusative* of a *person*, and the *genitive* of a *thing*. Ex.: Er klagt seinen Diener des Diebstahls an; he accuses his servant of theft. Der Feind bemächtigte sich der Festung; the enemy took possession of (mastered) the fortress. Sie beraubten mich meines Geldes und meiner Ehre; they robbed me of my money and of my honour. Die Richter sprachen ihn des Mordes los und entledigten ihn somit einer großen Furcht; the judges declared him (spoke him free) innocent of the murder, and, therefore, released him from (a) great fear. Der Landmann rühme sich des Pflugs; the husbandman may pride himself of the plough. Wohl dem, der sich des Dürftigen annimmt, Ps. 41. 2., blessed is he that considereth the poor (needy), Ps. 41. 2.

EXERCISE 55.

An'schuldigen, to accuse of;
An'wesend, present;
An'geblicklich, instantaneously;
Bad, *n.* bath;
Befleißen, to be studious of;
Bege'ben, to resign, divest one's self of;
Belehren, to teach, instruct;
Bemächtigen, to overpower;
Berauben, to rob, deprive of;
Bereits', already;
Beschuldigen, to accuse of;
Bet'teln, to beg;
Bezüch'tigen, to charge with;
Bitten, to beseech;
Entblößt', destitute;
Entheben, to free from;
Entle'digen, to release;
Entschla'gen, to cast away;
Entsetzen, to displace;
Erbar'men, to commiserate;
Fessel, *f.* fetter;
Flehen, to supplicate;
Frei'sprechung, *f.* liberation;
Freuen, to rejoice;
Freundschaft, *f.* friendship;
Gedanke, *m.* thought;
Gedenken, to think of;
Geschweige, much less, to say nothing of;
Geschweigen, to pass by in silence;
Gnade, *f.* grace, favour;
Handlung, *f.* action;
Jedoch, nevertheless;
Kerker, *m.* dungeon;
Kloster, cloister, convent;
Krone, *f* crown;
Lachen, to laugh;
Landstraße, *f.* highway;
Leer, empty;
Pflegen, to cherish;
Raub, *m.* robbery;
Räuber, *m.* robber;
Rühmen, to boast, pride one's self in;
Schämen, to be ashamed of;
Sorge, *f.* solicitude, care;
Spotten, to scoff at, deride;
Ueberführen, to convict;
Unschuldig, innocent;
Viehhändler, *m.* dealer in cattle, drover;
Vielmehr, much more, rather;
Voll, full;
Vorig, former, last;
Würdigen, to vouchsafe.

Des Hoch'verraths an'geklagt, entging er dem Kerker nur durch die Flucht. — Accused of high treason, he escaped the dungeon only by flight.
Belehre mich eines Bessern, wenn du kannst. — Teach me (convince me of) a better, if you can.
Sie bemächtigten sich des Räubers, der den Kaufmann seines Geldes beraubt hatte. — They possessed themselves of the robber, who had robbed the merchant of his money.
Er besann sich eines Bessern, um nicht einer Unwahrheit bezüchtigt zu werden. — He bethought himself of a better (course) in order not to be accused of an untruth.
Mein Sohn hat mich alles Geldes entblößt. — My son has stripped me of all (my) money.
Entlebet mich dieser traurigen Pflicht! — Relieve me of (from) this sad duty.
Der Gerechte erbarmt sich seines Viehes. — The righteous (man) is merciful to his beast.
Erinnere dich der vielen Wohlthaten, die ich dir erwies. — Remember the many good deeds (favours) that I have shown you.
Gedenke deines Freundes selbst in weiter Ferne! — Remember thy friend, even in remote distance.
Wenn ich seines Betragens auch geschweigen wollte, muß ich seine Reden tadeln. — Even if I would be silent concerning his behaviour, I must blame his talk.
Drohe wie du willst, ich lache deiner. — Threaten as thou wilt, I will laugh at thee.
Nach geschehener Arbeit kann man der Ruhe pflegen — After completed (taken place) toil, we can cherish (the) repose.
Viele rühmen sich solcher Thaten, die sie niemals vollbracht haben. — Many boast themselves of such deeds as they have never accomplished.
Ueberhebe mich der Nothwendigkeit, dich zu strafen. — Exempt me from the necessity of punishing thee.
Ehe ich mich eines Schlages versehen hatte, lag ich schon zu Boden gestreckt. — Before I was aware of a blow I lay stretched upon the earth.
Er war so stolz, daß er mich keines Blickes würdigte. — He was so proud that he deigned me not a (no) glance.

1. Sie erinnern (§ 86. 1. 2.) sich wohl noch des jungen Mannes, der im vorigen Jahre des Raubes angeklagt war. 2. Er war beschuldigt, einen reichen Viehhändler auf der Landstraße seines Geldes beraubt zu haben. 3. Man konnte jedoch denselben dieses Verbrechens nicht überführen. 4. Er hatte sich bereits aller Hoffnung einer Freisprechung begeben und sich des Gedankens entschlagen, als unschuldig erklärt zu werden. 5. Der Richter jedoch enthob ihn aller Sorge. 6. Nachdem er den Angeklagten aufgefordert hatte, nur gutes Muths zu sein und sich alles Kummers zu entschlagen, erklärte er: Ich bin der vollen Meinung, daß man diesen jungen Mann nicht des Raubes bezüchtigen kann. 7. Denn nicht Jeder, der sich des Bettelns schämt und aller Mittel entblößt ist, wird ein Räuber. 8. Ich will seines guten Betragens geschweigen, denn er hat sich immer eines ordentlichen Lebens befliffen. 9. Ich erinnere euch aber der Thaten im letzten Kriege, deren er sich mit Recht rühmen kann. 10. Freuet euch seiner Freisprechung und würdiget ihn eurer Freundschaft. 11. Spottet seiner nicht, weil er im Kerker war, sondern erbarmt euch vielmehr seiner und gedenket seiner Leiden. 12. Jeder, der seiner lacht, schäme sich seines eigenen Betragens. 13. Alle Anwesenden freuten sich dieser Rede, und man entledigte augenblicklich den Angeklagten seiner Fesseln. 14. Belehre uns deiner Wege, o Herr! und beraube uns nicht deiner Gnade! 15. Ich bin Willens (§ 128), im nächsten Sommer ein Bad zu besuchen. 16. Ich kann durchaus nicht der Ansicht sein, daß junge Leute zu sehr ihrer Gewohnheiten pflegen sollen. 17. Wer sich des Lebens freut, soll auch des Sterbens sich erinnern. 18. Als General Tilly sich der Stadt Magdeburg bemächtiget hatte, lachte er der Flehenden, welche baten, sich ihrer zu erbarmen.

1. In former times the people knew not how to read, much less to write. 2. I am willing to visit next summer the bath of Homburg and Laubach. 3. When Louis Philip, King of the French, abdicated his throne, he divested himself at the same time of the government. 4. Few kings have little reason to boast of their reigning. 5. The Emperor Charles V. gave up his crown and went into a convent. 6. It becomes a man better to be studious of his actions, than to boast of his abilities. 7. I will relieve myself of all business, and enjoy a quiet life. 8. He rejoiced at the liberation of the innocent and vouchsafed to them the greatest friendship. 9. The enemy stormed the town, and laughed at the supplicants, who beseeched them to have commiseration.

Section LII.

VERBS REQUIRING THE DATIVE OR ACCUSATIVE.

Some verbs govern the dative or accusative, according to their signification:—Ich rief dem Knaben, aber er hörte mich nicht, I called to the boy, but he did not hear me. Ich rief den Knaben in das Zimmer, I called the boy into the room. Er bekommt das Geld, he gets the money. Dieſe Speiſe bekommt mir nicht, this food does not agree with me.

Exercise 56.

Ab'ſchwören, to abjure, forswear;
Ab'ſehen, to behold, look at, perceive;
Auf'geben, to give up, (with dat.) to impose a task;
Beſie'gen, to vanquish;
Eid, *m.* oath;
Falſch, false;
Koſten, to taste, cost;
Läugnen, to deny;
Leid, *n.* affliction, pain;
Muthig, courageous;
Nach'ahmen,* to imitate;
Naſe, *f.* nose;
Paſſi'ren, to pass;
Pilot', *m.* pilot;
Sachſe, *m.* Saxon;
Schaden, *m.* loss, hurt;
Schlech'tigkeit, *f.* badness, vileness;
Selten, seldom;
Sogleich', immediately;
Stärke, *f.* strength;
Steuern, to steer, (with dat.) to check;
Ue'belſtand, *m.* misfortune, inconvenience;
Um'kehren, to turn about;
Un'artig, ill-behaved, rude, naughty;
Unſterb'lichkeit, *f.* immortality;
Vernünf'tig, discreet, judicious;
Verſich'ern, to assure to make sure;
Voll'ſtändig, completely;
Wie'derſehen, to see again.

Der General ſchwor ſeinem Glauben ab, und wurde Muſelmann. — The general abjured his faith and became (turned) Mussulman.
Ehe der Richter mich um etwas fragte, mußte ich einen Eid abſchwören. — Before the judge asked me concerning anything, I was obliged to take an oath.
Ich werde kommen, um Ihr neues Gemäl'de an'zuſehen. — I will come in order to look at your new painting.
Sieht man mir an, daß ich krank war? — Does one see by my appearance, that I was sick?
Er iſt ein verlor'ner Sohn; ich gebe ihn auf. — He is a lost son; I give him up.
Was Sie mir auf'gegeben haben, habe ich gethan'. — What you enjoined on me I have done.
Guten Menſchen mußt du nach'zuahmen ſuchen. — Good men thou must seek to imitate.
Er ahmt dem Franzo'ſen nach, und trägt einen Schnurrbart. — He imitates the Frenchman, and wears mustaches.
Als der König dieſe Stadt paſſir'te, wurde ſie beleuch'tet. — As the king passed this city, it was illuminated.
Viele Stra'ßen der Stadt ſind ſehr ſchmutz'ig; dieſem Un'fuge ſollte die Polizei' ſteuern. — Many streets of the city are very filthy; this nuisance the police should put a stop to.
Er ſteu'erte das Schiff glücklich durch die Felſen'riffe. — He steered the ship fortunately through the reefs of rocks.

1. Die alten Sachſen ſchworen ihren Göttern ab, nachdem ſie Karl der Große vollſtändig beſiegt hatte. 2. Indem er dieſe That durch einen falſchen Eid abſchwor, läugnete er die Unſterblichkeit der Seele. 3. Die Schlechtigkeit ſieht man ihm an den Augen an, ſobald man ihn anſieht. 4. Ich habe die Hoffnung, meine Angehörigen wiederzuſehen, nicht aufgegeben. 5. Ich hatte meinem Bedienten aufgegeben, mir zu rufen, ſobald Sie kämen. 6. Da ich mich rufen hörte, kehrte ich ſogleich um. 7. Wenn ich dir nachahmen wollte, würde ich bald kein Geld mehr haben. 8. Es iſt ihm ſchon oft begegnet, daß er ſeine Brille ſuchte und ſie auf der Naſe trug. 9. Der König paſſirt heute noch dieſe Stadt. 10. Steure dein Schiff durch die zürnenden Wellen, muthiger Pilot! 11. Ein vernünftiger Vater ſteuert früh dem unartigen Betragen ſeiner Kinder. 12. Selten habe ich Geld, aber immer Schulden,—wenn ich nur dieſem Uebelſtande zu ſteuern wüßte. 13. Was hülfe es dem Menſchen, ſo er die ganze Welt gewänne und nähme doch Schaden an ſeiner Seele? 14. Seine Stärke half dieſe Leiden tragen. 15. Die Köchin koſtete die Speiſen. 16. Es koſtete mir Freiheit und Vaterland. 17. Es koſtete ihm ſeinen erſten Sohn. 18. Er verſicherte mir die Wahrheit dieſer Sache. 19. Man hat ſich bei Dieſer verſichert. 20. Gute Sitten muß man nachzuahmen ſuchen. (See note.)

1. Teach your children to imitate good behaviour. 2. He imitates his father in all his habits. 3. Judicious parents check the rude behaviour of their children in time. 4. Steer courageously the ship through the rolling sea. 5. It often happened that he looked for his book and found it in his pocket. 6. The ships which go to Australia must pass the equator. 7. You should seek to imitate the examples of your brother. 8. I behold his innocence in his manners. 9. To deny the immortality of the soul is as much as to forswear God. 10. The police made sure of the thief. 11. Imitate always the good, but never the bad.

* Nachahmen is commonly employed with the *dative* of a *person*, and *accusative* of a *thing*.

LESSONS IN ENGLISH.—No. XXVIII.

By John R. Beard, D. D.

GREEK STEMS. (*Continued*).

Unhappily there prevails a certain disesteem of verbal studies. Words and facts are put into broad contrast, if not into contradiction, and, with much self-satisfaction, men, especially young men, declare that for their part they prefer realities to sounds. The contrast is a creation of the imagination. In making it the basis of your conduct, you stand on a sound not a reality. Words are the signs of things. Words are the tickets which by one sound or two sounds make known the qualities of things. Words are the church bells which announce facts to the whole parish. As no bell, no service; so no word, no idea. And if you have an idea, you cannot be sure of retaining that idea, still less can you be sure of turning that idea to any good account, until you have found form and pressure for that idea in a suitable word. It is its clothing which makes an idea recognisable. It is its clothing which makes an idea presentable. Bearing a certain mark and likeness in a word, you can look at your thought; you can turn it over and over; you can subject it to microscopic inspection; you can ring it to ascertain if it is "good;" you can weigh it to learn if it has been clipped or "sweated;" you can compare it with similar or different tokens; you can even toss it into the crucible and reduce it to its elements. Yes, words are the signs and the representatives of realities. If you would have knowledge of realities, you must not neglect the knowledge of their tokens and equivalents.

Laity denotes the people as contradistinguished from the *clergy*. In ancient times the laity were ignorant, the clergy learned. Hence arose a broad contrast, exhibiting the people as wicked as well as untaught, and the clergy (*clerks*) no less holy than instructed. These usages are found in the substance of our language, and still linger amongst us in both thought and feeling.

"He entended (intended) to set forth Luther's heresy, teaching that presthed (priesthood) is no sacrament, but the office of a lay-man or a lay-woman appointed by the people to preache."—*Sir T. More.*

"No wonder though the people grew profane,
When churchmen's lives gave *laymen* leave to fall."
Dryden.

Synthesis is properly the *putting together*, as *analysis* (ana, up; and luein, *to undo, to loosen*) is *the undoing*. A watchmaker performs an act of *analysis* when he takes a watch to pieces, and an act of *synthesis* when he puts the parts together again.

"*Synthesis* consists in assuming the causes discovered and established as principles, and by them explaining the phenomena proceeding from them, and proving the explanations."—*Newton*, "Optics."

"*Analysis* consists in making experiments and observations, and in drawing general conclusions from them by induction."—*Newton*, "Optics."

Analysis is the way of discovery, *synthesis* is the way of teaching or communication. By *synthesis* men put together and exhibit what they have ascertained by *analysis*.

Metamorphosis denotes a change of form.

"Thus men (my lord) be *metamorphosed*
From seemly shape to byrds and ougly beasts." *Gascoigne.*

Metempsychosis (meta, *change*; en, *in*; and psychē, *the soul*) has for its Latin equivalent *transmigration* (trans, *over*; migro, *I change my place*).

"The sages of old live again in us, and in opinions there is a *metempsychosis*. We are our re-animated ancestors, and antedate their resurrection."—*Glanvill.*

Metathesis is a change of position or a transposition. Thus what we write *bird* was formerly *bryd*, the *i* and the *r* changing places.

Mythology is the science of fable, and is applied to the religion of the Greeks, the Romans, the Hindoos, &c., in opposition to the pure religion of the Gospel. German philosophy has introduced amongst us the new term *myth*, as denoting a *legend*, or a *version of facts*, shaped and coloured by opinion, fancy, prejudice, by the workings of the intellect, the workings of the imagination, or the workings of the heart. In origin, *myth*, *fable*, and *legend* are one, for the words severally denote a *word*, something spoken, something narrated. But as *old stories* soon lose their primitive form, and acquire new shapes and hues, so *words* pass into *legends*, and *legends* are corrupted into *fables*.

Necromancy is the fancied art of learning and disclosing facts by communication with the dead. The witch of Endor dealt *necromantically* with Samuel at the request of Saul. (1 Sam. xxviii, 7; compare Deut. xviii. 9.)

GREEK STEMS.

Greek words.	*Stems.*	*English words.*
neos, *young* / *new*	*neo*	neology
phytos, *begotten* / *created*	*phyt*	neophyte
nomos, *an allotment*	*nom*	astronomy
aster, *a star*	*astro*	astronomical
nosos, *disease*	*noso*	nosology
oikein, *to dwell*	*ochi*	parochial
para, *beside* / i. e., *by the side*	*para*	parallel
allélōn, *of one another*	*allel*	parallel
oligos, *few*	*olig*	oligarchy
optesthai, *to see*	*opt*	optics
ornis, *a bird*	*ornith*	ornithology
pais, *a boy*	*ped*	pedagogue
pathos, *feeling*	*path*	apathy, antipathy
a (negative), *not*	*a*	apetalous
anti, *in opposition to*	*anti*	antichrist
christos, *anointed*	*Christ*	Christian
penté, *five*	*pent*	pentagon
petros, *a stone*	*petri*	petrifaction
phoné, *sound*	*phony*	euphony
phthogos, *a sound*	*phthong*	diphthong
dis, *twice*	*di*	didymus
polemos, *war*	*polem*	polemical
polis, *a city*	*polis*	metropolis
meter, *a mother*	*metro*	metropolitan
pseudein, *to deceive*	*pseudo*	pseudo-apostle
apostellein, *to send out*	*apostel*	apostolic
pyr, *fire*	*pyro*	pyrometer
sarks, *flesh*	*sarco*	sarcophagus
sitos, *food*	*sit*	parasitical
scopein, *to see*	*scop*	telescopic
telos, *the end*	*tels*	telescope
strephein, *to turn*	*stroph*	strophé
technė, *art*	*techn*	technical
thaptein, *to bury*	*taph*	epitaph
theos, *God*	*the* / *th*	atheist / enthusiast
topos, *a place*	*topo*	topography
zoon, *an animal*	*zoo, zo*	zoology

Neology, or *new doctrine*, conveys with it the same tacit blame as *new light*, on the ground that what is *old* is more likely to be true than what is *new*, and that what is *new* may be *fanciful*.

"They endeavour, by a sort of *neology* of their own, to confound all ideas of right and wrong."—*Boothby*, "On Burke."

Neos supplies also the first syllable to *neophyte*, one *newly born*, or *created anew* by grace, *a convert*.

"In effects of grace, St. Paul makes a difference between those he calls *neophytes*—that is, newly grafted into Christianity—and those that are brought up in the faith."—*Bacon*.

In 1 Tim. iii. 6, the Greek word neophytes is rendered *novice*.

Astronomy, from the Greek words in the preceding list, means the *allotment* or *distribution* of the stars into classes, and not the *laws* of the stars, which is a modern idea.

In the word *parochial*, the original form of the Greek root is seen better than in *parish*; which, however, is of the same derivation. *Parish*, from paroikia, *a division*, a district formed of persons living together, takes its English form from the French *paroisse*. Blackstone defines a parish as "a circuit of ground committed to the charge of one person, or vicar, or other minister having care of souls therein."

Parallel speaks of things that are, or run, *by the side* one of another. Two lines are called *parallel* when they are drawn equally distant from each other in all their extent.

"Yet shall this graceful line forget to please,
If border'd close by sidelong *parallels*,
Nor duly mixt with those opposing curves
That give the charm of contrast." *Mason.*

In the relation of such lines, the idea of equality is obviously involved; whence, *to parallel* is *to equal*.

"Tell me, gentle boy,
Is she not *parallelless*? Is not her breath
Sweet as Arabian winds when fruits are ripe?"
Beaumont and Fletcher.

But parallel lines are *opposite* to each other; hence para, from signifying *side by side*, came to signify *opposite, contrary to*. Thus a *para*dox is something opposed to common opinion; and a *paral*ogism is an unsound argument.

"In their love of God men never can be too affectionate; it is as true, though it may seem a *paradox*, that in their hatred of sin, men may sometimes be too passionate."—*Sprat*.

"If a *syllogism* agree with the rules given for the construction of it, it is called a true argument; if it disagree with these rules, it is a *paralogism* or false argument."—*Watts*.

The idea of equality may lead to the idea of general excellence or even of superiority; accordingly, the word *paragon*, which we derive through the Italian, signifies something supremely excellent, a model.

"An angel! or if not,
An earthly *paragon*." *Shakspear.*

Division, too, is implied in equality, and so *paragraph* in a book signifies a division. A paragraph is a portion of writing consisting of one or more, generally several, sentences.

"I call that by bookes and chapters which the Greeke book divideth by chapters and *paragraphes*."—*Ascham*.

These illustrations of the applications of the Greek preposition *para* may serve to assist the student in forming a correct acquaintance with the nature and power of language. Let him endeavour for himself to ascertain the acceptation of other forms of para, as *paradigm*, *paraphrase*, &c., and let him not confound with such forms the words *paradise* and *parade*. Of these, the former is of Persian origin, and signifies an *inclosure, a park, a garden*; and the latter is of Latin origin (from paratum, signifying *prepared*), and comes to us through the French, denoting *preparedness*; hence, proof of preparedness; and hence again, *show* and *display*, such as soldiers on *parade* present.

EXERCISES IN COMPOSITION.

Words with their Prepositions to be formed into sentences.

	F. R.
Arrive at,	ripa, *a river-side*
Ask of a person, / ,, for or after a person, / ,, for a thing,	ascian, *to petition*
Aspire to,	spiro, *I breathe*
Assent to,	sentio, *I feel*
Assimilate to,	similis, *like*
Associate with,	socius, *a companion*
Assure of,	assurer, *to assure.*
Atone for,	at one, *to at-one*
Attached to,	attacher, *to bind*
Attain to,	atteindre, *to reach*
Attend to,	tendre, *to stretch*
Averse to, from,	verto, *I turn*

LESSONS IN PENMANSHIP.—No. VII.

THE following are the copies for this lesson:—Text: *Valparaiso, Xenocrates, Yacunampas, Zwellendam.* Half text: *Value your reputation; Wisdom seek; Xenophon recommended literature; Youth requires very considerable cultivation; Zealously pursue all learning and virtue.* Court-hand: *Vanity is contemptible; Weigh reasons always; Xenophon loved and recommended literature; Youth is commonly wanting in thought and experience; Zeal, well grounded on knowledge, enlivens devotion.*

This is the last lesson we intend to give in Penmanship, as it takes up so much room. LESSONS IN PHONETIC SHORT-HAND will now take its place.

Valparaiso

Value your reputation Wisdom seek

Vanity is contemptible. Weigh reasons always.

Xenocrates

Xenophon recommended literature

Xenophon loved and recommended literature.

Yacumampas

Youth requires very considerable cultivation.

Youth is commonly wanting in thought and caution.

Zwellendam

Zealously pursue all learning and virtue.

Zeal, well grounded on knowledge, enlivens devotion.

LESSONS IN MUSIC.—No. XIV.

By JOHN CURWEN.

IT is very important that our pupils should realise to themselves the object at which they are aiming in this course of lessons. We all work better when we have a distinct aim. Let each one, therefore, set before him a certain stage of musical attainment which *he intends to reach*, and then let him work steadily on to that object. We suppose that the smallest attainment which our pupils can desire is this,—that they shall be able, as the result of these lessons, *to sing at first sight any simple tune not seen before*, at least in a humble manner. This may be done by many who have followed us faithfully to the present stage, in connection with the solfa syllables, and we hope soon to give so simple and direct an introduction to the old notation, that they will find *that* almost as easy to them as the solfa notation is now. In order to stimulate this personal effort and self-teaching, an association has been formed, called "the Tonic Solfa Association," the certificate of admission to which is a card bearing testimony that its owner has passed through a certain examination in vocal music. This certificate is an object distinctly set before all the classes taught on the plan, on which our own is framed, and every pupil is encouraged to regard its attainment as a necessary proof of diligence and attention. It is very carefully framed, so that its early requirements almost ensure the pupil's success in meeting its later and more obviously important ones. We shall lay these requirements before our pupils with a few observations on each, hoping that they will at least determine to reach this standard. If they please they can obtain the actual certificate by sending credible testimony (the best, is that of one who already possesses a certificate) to Mr. R. Griffiths, 13, Wood-street, Cheapside, Honorary Secretary of the Tonic Solfa Association, that they have passed the examination, and inclosing two postage stamps to cover expenses. This certificate is acknowledged as a ticket of admission to a large number of classes, lectures, and choral meetings, and is the token of membership with the association, which is striving to promote cheap vocal music for the people with great earnestness and success.

1. The first requirement is this,—*Bring thirty tunes to the examiner, and pitch and sing to words any three of them he may choose.* This may be done either from the new notation or the old,—the latter exercise being regarded as the more creditable. Less than thirty tunes thoroughly mastered would be a small foundation to build any musical certificate upon. Our pupils have nearly learnt that number already. They cannot too soon begin making up this list of the first thirty. Let them place on this list only those favourites which they often practise, and which they are certain of being able to sing perfectly at call—in singing which they cannot make a mistake. It will be pleasant to find this list growing till it has reached the required number. When these thirty tunes are mastered, they will justly feel that they *know something* in vocal music.

2. The second requirement is,—*Bring fifteen of these tunes, and point and solfa from the modulator, by memory, any five of them the examiner may select.* Now, as our pupils have done this in connection with every tune they have learnt, they will find no difficulty in doing it, in a perfect and unmistakeable manner, with fifteen chosen favourites. We do not know what we *can* do, neither do we know what we *cannot* do, *till we try*. Try, therefore, as soon as possible, and ascertain your true position as a singer. The attainment thus indicated will prove you to possess a very respectable degree of practical knowledge in "interval." To make it more difficult, and also a truer test, we would recommend you to *sing to words* while you point on the modulator. The man who has gained these two acquirements has gone so far in vocal music that he is *sure to go further*,—and this is no unimportant stage to reach! He has also gained that degree of knowledge of his subject which will enable him to *begin* teaching others,—and this we believe is the generous and noble design of many who are teaching themselves through the POPULAR EDUCATOR.

3. The third requirement is,—*Of these fifteen tunes, write in the tonic sol-fa notation from memory any three the examiner calls for.* Of course, if the syllables are really known thoroughly, it will not be difficult to write their initials down upon paper. The special object of this requirement, however, is to secure an accurate perception of length of notes and "measure." The pupil should practice well before he submits himself to this examination. He will find the pen a good teacher. The examiner should be strict. Those who are able to take an old notation certificate, should, in addition, write the same tunes from memory into the old notation.

4. The fourth requirement is,—*Follow the examiner's pointing on the modulator in phrases containing* TU, FI, NE, *and* NI. These "accidentals" our pupils have yet to learn. But we are setting before them the acquirements at which they are to aim. This will prove one of the easiest of the requirements. It will, however, imply a good command of voice and accurate modulation. Your examiner should not make this needlessly difficult. He should make you touch a few notes of the original key before each of these so-called "accidentals."

5. The fifth requirement, for which the others are only preparatives, is that which will be best appreciated by the world at large, which looks for RESULTS, and does not ask the PROCESS. *Sol-fa at first sight, and afterwards sing to words, any ordinary psalm tune.* The pupil should, of course, practice himself in sol-faing and singing to words, tunes which he has not seen before. But if he has passed the previous examinations, he will not find this difficult. They are so arranged as to prepare for this. This attainment is almost a necessary consequence of the others. It will do you great credit. No popular system of teaching music has yet submitted to have its value judged and measured by such a test. And yet, what can be the worth of a system if it does not accomplish thus much at least? It is a point which practical men will appreciate. It will be advantageously contrasted, for instance, with the government examination questions for schoolmasters, in which tests of musical knowledge are set forth, very good in themselves, but which could all be satisfactorily met by a clever deaf and dumb man! Let, then, our pupils come boldly up to this test, and take an honest pride in meeting it. It is hoped that all will endeavour to take it in the old notation, for the mastery of the old notation is easy to those who have learned music by the new. This we hope to prove.

6. The sixth requirement is this,—*Copy by ear, or tell the sol-fa notes of any simple chant of two phrases, not heard before, the examiner giving you the key-note and chord, and singing the chant to figures or words, but not more than three times.* We advise the pupil to take the key-note and chord also with his own voice. Then, remembering that every tune (with scarcely an exception) begins on DOH, ME, or SOH, and having been taught *to recognise the proper mental effect of notes*, he will find no difficulty in this exercise. Our pupils should seek very frequent opportunities for cultivating the ear in this way. This test is made as simple and easy as possible, and to our regular solfa-ers proves one of the least difficult. It could not have been omitted, because we were anxious that our certificate should imply, in its holder, *all* the elements—though it be only the *elements*—of a good musician.

7. The last requirement,—*Translate any short tune, including "accidentals," and divide "aliquots" or "beats," from the new notation into the old, and from the old into the new*,—is expected from those only who take an old notation certificate, and is prepared so as to indicate a thorough knowledge of that notation. It implies a practical familiarity with the ordinary signatures of "time" and "key," and, like all the other requirements, distinctly aims at real usefulness. THUS, WHILE OUR CERTIFICATE IS, TO THE DILIGENT STUDENT OF THESE LESSONS, AS EASY AS IT CAN BE, TO BE WORTH ANYTHING,—YET VIEWED IN RELATION TO THE AMOUNT OF MUSICAL KNOWLEDGE AND ABILITY FOR USEFULNESS AND RATIONAL PLEASURE WHICH IT IMPLIES, IT IS OF VERY HIGH VALUE. Onward, then, to the stage of musical knowledge thus definitely marked out. We can promise you that, when this point is reached, you shall have a most tempting view of the regions beyond. Now for that list of thirty perfect tunes, out of which all the rest is to spring!

As many of our pupils are forming *classes* for teaching singing in mechanics' institutes and schools, it will be well to suggest to them the use of the BLACK-BOARD, and the method of DICTATION for copying the tunes they need. THE BLACK-BOARD is a plain board, having several coats of black paint on it, and, what the painters call, "flatted." That used in the Plaistow public-school is, in size, four feet wide, by about four

feet nine inches high. It has large-sized white dots painted on it, thus :—

: : : : : :

: : : : : :

The distance from dot to dot, up or down the board, is about two inches. The width between each couple of dots is five inches. It is easy to see how, by the proper use of the chalk, these marks may be transformed to suit any "measure" that is wanted, thus :—

: | : : | :

: | : : | :

or : | : | : | :

: | : | : | :

Provided, in this way, with the lines to guide your hand, and the accent marks already written, the addition of the notes is simply a process of musical shorthand. It would be well to have the other side of the board painted with four staves of five lines, running lengthways, for the purpose of explaining the old notation, and writing tunes in it. Remember, that a tune or short phrase, rapidly written on the black-board, while your class is watching,—and seeming thus to spring out of your own head, as just the thing you want to illustrate the point in hand,—carries a charm of novelty and freshness with it which no book-tune can possess. "Sol-fa music paper," prepared like the black-board, is sold by Messrs. Ward and Co. (1s. a quire); but many prefer to use the ordinary paper, ruled at equal distances, with blue lines. In that case, the lines of your own writing should not be upon the blue lines, but across them, and you should use the blue lines to guide you in placing your accent marks, and to keep them at equal distances.

DICTATION (as applied to music) is the art of naming musical sounds, in successive announcements, so that they may be written down or sung by others. Take, for example, the tunes which follow. If we wished to "dictate" them to a class provided with the solfa music paper (the cleverest of the number, perhaps, writing on the black-board at the same time), we should do so in the following announcements, each of which you will be so kind as to compare with the tune.

FULL MANY A SHAFT ..... KEY G ..... soft (beat) SOH ..... loud soft (beat) SOH ..... soft (beat) ME ..... loud soft LAH ..... soft SOH ..... loud soft SOH ..... soft FAH ..... loud FAH ME ..... soft ME continued ..... the last three slurred, &c.

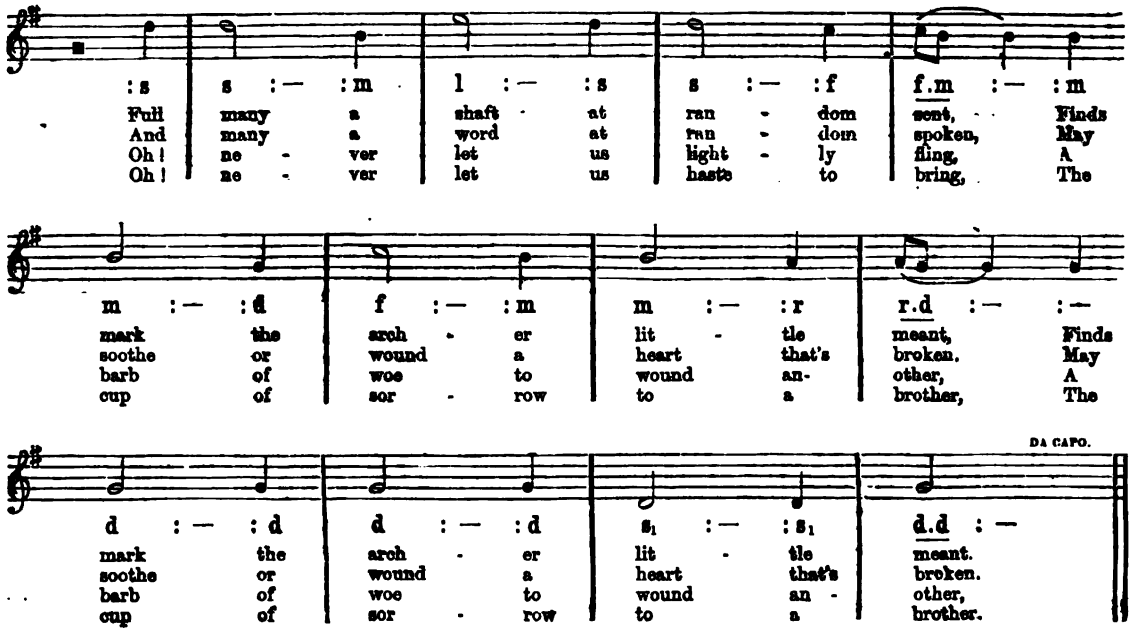
THE IRISH AIR ..... KEY F ..... soft DOH ..... loud and half soft SOH ..... half soft LAH ..... *medium* SOH, &c.

This | m.f,s might be announced "half medium ME" ..... "half medium FAH SOH;" and this | m.,s might be announced "medium ME *and* SOH," allowing the introduction of the word *and* to signify that the larger proportion of the aliquot or beat belongs to ME.

[If you wished the tunes copied into the old notation you would dictate thus, C clef ..... KEY G ..... crotchet SOH ..... BAR ..... minim SOH, &c.]

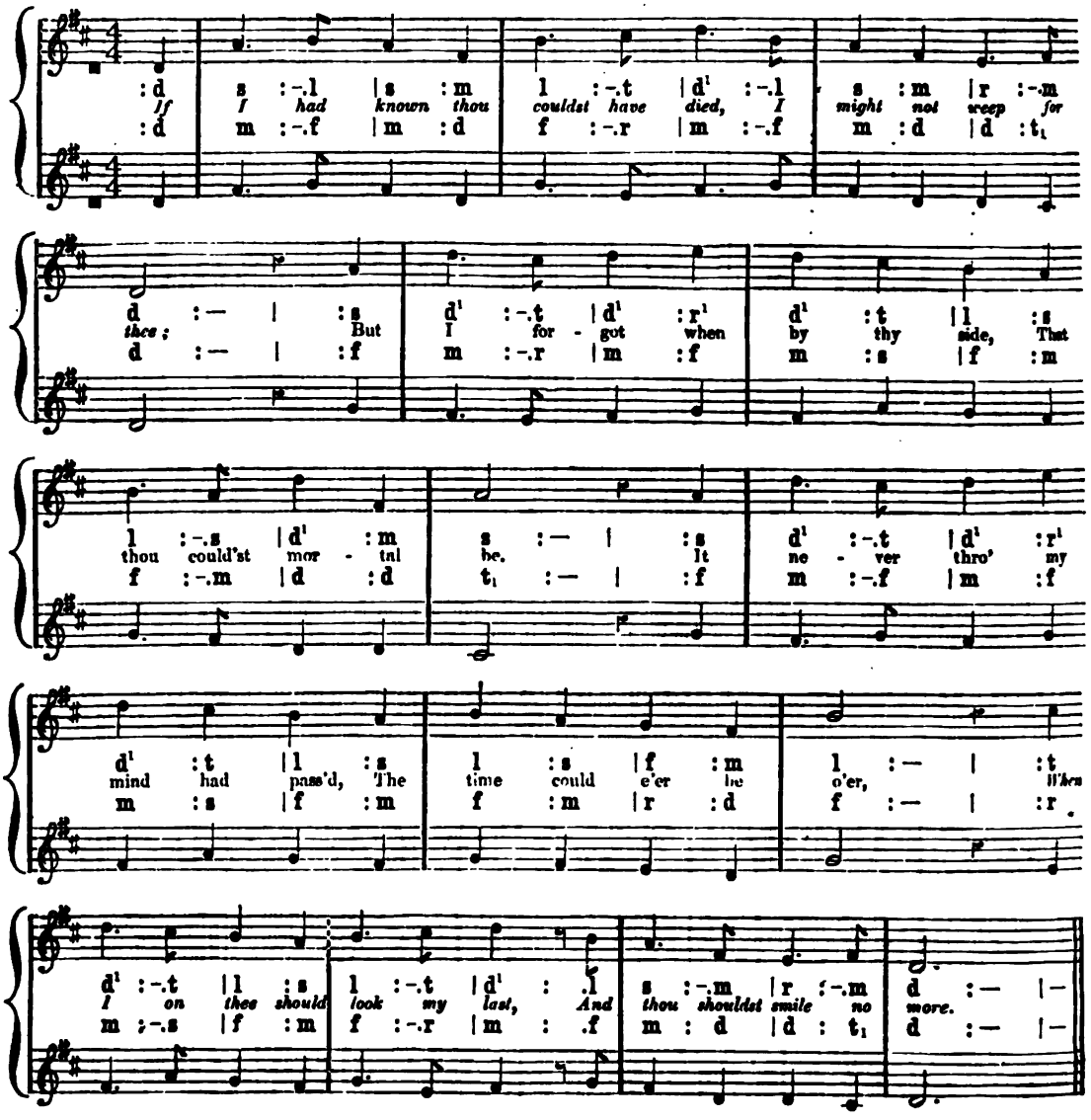
No exercises can so thoroughly fix in the mind of the pupil the principles of music and the exact use of its symbols, as those of dictating or of writing from dictation. The teacher should require perfect silence during the process of dictation. A whisper must be reckoned the greatest fault. If any one is afraid he has made a mistake, or has not heard the "announcement," or wants to cut his pencil, he must not interrupt the whole class for that. He must leave a space and go on. He can correct his manuscript afterwards. The "dictator" should give each announcement distinctly and only once. He should allow a regular interval of six or eight seconds between each announcement. In this manner the present writer supplied his first class with tunes, and in this way twenty copies of a tune were written sometimes in five minutes, sometimes in three.

EXERCISE 27. **FULL MANY A SHAFT.** KEY G. M. 96.

(A Round for Three Voices.)

:s s :— :m l :— :s s :— :f f.m :— :m
Full many a shaft at ran - dom sent, Finds
And many a word at ran - dom spoken, May
Oh! ne - ver let us light - ly fling, A
Oh! ne - ver let us haste to bring, The
m :— :d f :— :m m :— :r r.d :— :—
mark the arch - er lit - tle meant, Finds
soothe or wound a heart that's broken. May
barb of woe to wound an- other, A
cup of sor - row to a brother, The
DA CAPO.
d :— :d d :— :d s1 :— :s1 d.d :—
mark the arch - er lit - tle meant.
soothe or wound a heart that's broken.
barb of woe to wound an - other,
cup of sor - row to a brother.

NOTE.—Observe the effects of LAH and FAH very strikingly brought out by contrast with the notes preceding.

EXERCISE 28. **THE IRISH AIR.** KEY F. M. 66.

(The Words by the Rev. CHARLES WOLFE. The Tune, Irish.)

If I had known thou couldst have died, I might not weep for
thee; But I for-got when by thy side, That
thou could'st mor-tal be. It ne-ver thro' my
mind had pass'd, The time could e'er be o'er, When
I on thee should look my last, And thou shouldst smile no more.

2. And still upon that face I look,
And think t'will smile again,
And still the thought I will not brook
That I must look in vain.
But when I speak thou dost not say
What thou ne'er left unsaid,
And now I feel, as well I may,
Sweet Mary! thou art dead!

3. *If I could keep thee as thou art,*
All cold and all serene,
I still might press thy silent heart,
And where thy smiles had been;
While e'en thy chill bleak corse I have
I feel thee still my own,
But there—I lay thee in the grave,
And now I am alone.

4. *I do not think, where'er thou art,*
Thou hast forgotten me;
And I perhaps may soothe this heart
By thinking too of thee.
But there was round thee such a dawn
Of light ne'er seen before,
As fancy never could have drawn,
And never can restore.

NOTE.—This tune (commonly known as Grammachree) may well be set lower (in the keys of C or B) if the voice finds this key fatiguing. The touching and beautiful song, which few who have known bereavement can sing to this tune without tears, was written by the author of the well-known lines on the burial of Sir John Moore. Keep *perfect* tune. Mark *well* the "expression." It is almost unnecessary to call attention to the very effective use of LAH in this tune.

LESSONS IN NATURAL HISTORY.—No. XIII.

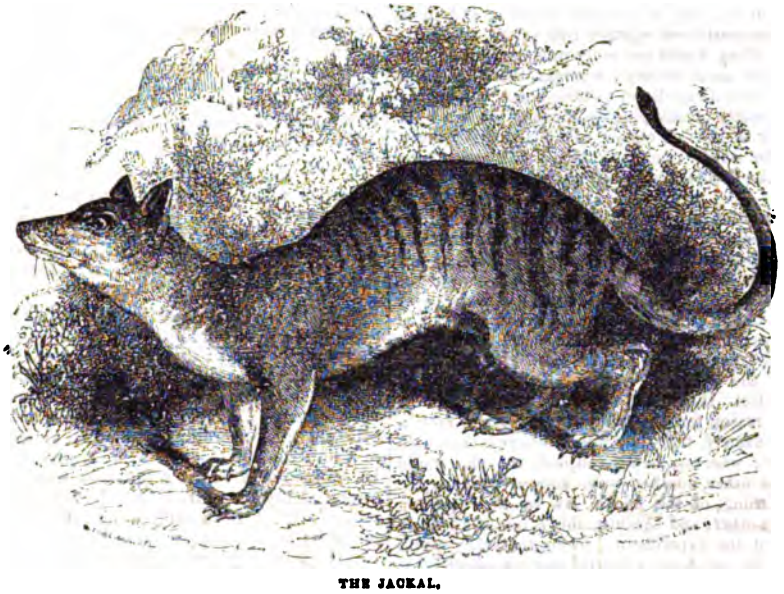
THE JACKAL.

(*Order* CARNIVORA.)

THE jackal is an animal resembling both the dog and the fox. It abounds throughout the Levant, Syria, and the eastern world, and in Africa from Barbary to the Cape of Good Hope. Its size is that of our common fox; its skin emits a strong and offensive odour; the pupils of its eyes are round, the ears are pointed, the tail is bushy, reaching only to the heel, and black at its extremity. The upper part of the body is a dirty yellow, a darker mark running along the back and sides; the under parts are yellowish white.

The jackal lives in packs or troops, frequenting ruins and the suburbs of all towns and villages throughout the coast, and along the shores of Africa. These animals come forth from their lurking places by night, and scour the streets and fields in search of food. In so doing they act as valuable scavengers, for they greedily devour carrion of every description, the offal of the shambles, and all the filth for which eastern houses are remarkable. But to this food they do not confine themselves; for they hunt down such animals as are too feeble to resist, or too slow to escape, their attack. The wounded antelope is, therefore, sure to fall a sacrifice; but having struck down their victim, it sometimes happens that the roused lion stalks in among a troop of jackals, and despotically appropriates the booty to himself.

Mr. Warburton thus describes the cry of these creatures:—"Troops of jackals, after dark, serenaded us with their mournful yelpings, of all cries the most sad and melancholy. Imagine some dozen children of tender age, mourning and sobbing to allay their pain, then bursting forth in chorus with bitter and heartrending lamentation; such is the cry of the jackal." A different impression is produced by the statement of Captain Beechey:—"The cry of the jackal has something in it rather appalling when heard for the first time at night; and as animals of this kind usually come in packs, the first shriek that is uttered is a signal for a general chorus. The sudden burst of the answering, long-protracted scream, succeeding immediately to the opening-note, is scarcely less impressive than the roll of the thunder-clap immediately after a flash of lightning."



THE JACKAL.

The jackal has been called "the lion's provider," because he is commonly supposed to hunt down the quarry for this noble beast; but the story is destitute of foundation. At least, if there be any ground whatever for the opinion, it is simply this: that when the cry of the jackal is heard, the lion comes forth, as above-mentioned, and, without any ceremony, seizes on all he can obtain.

An ingenious writer has turned the tables on the jackal, in a fable, with a moral which, known and observed, would have preserved many from serious injury. A jackal, leading forth a motley crew, determines that they shall assist him in the capture of an antelope, and this is speedily affected.

> "Now," thought the jackal, "how shall I
> Cheat each companion with a lie?
> If for myself I keep the feast,
> 'Twill last me for a week at least."

Finding a way of doing this, he tells the tiger that the making the victim was the work of the mouse:—

> "The tiger turned about and frowned,
> Then sought the wild woods with a bound,
> Growling, 'what tiger ever deigned
> To eat a meal a mouse had gained!"

To the wolf he whispered that, if he touches the prey, he will have to settle matters with the tiger; and he disposes, with equal facility, of the claims of the mouse, by describing the tiger as a cat.

> "Th' ichneumon now approached alone,
> To whom the thief with altered tone:—
> 'If you, sir, dare maintain a right
> In th' antelope, prepare to fight!'
> 'Not for the world,' th' ichneumon cried;
> 'One loss I patiently abide,
> The loss, when hungry, of a meal;
> But wounds are difficult to heal,
> Nor will I now expose my paw
> To burns from violence or law.'"

And now comes the moral:—

> "Trust not a shrewd projector's plan,
> Until you know and prove your man;
> E'en then proceed with thoughtful care,
> Lest, losing your invested *share*,
> You mourn your labour, worse than lost,
> Whilst knavery revels at your cost."

There is sometimes great difficulty in identifying the animals alluded to in the Sacred Scriptures. For example: there are several allusions in the Bible to an animal whose name, in the authorised translation, is rendered by the word fox, and which has habits ascribed to it not recognised in the natural history of that animal. The original word, in Hebrew, is *shual*, and, according to the opinion of many eminent men, it should be rendered by the word *jackal*. "The grapes are sour," is a phrase derived from the fabulous saying of the fox when the fruit of the vine was beyond his reach; but it may be traced to a fact popularly received respecting the habits of the *shual* in the countries where it dwells. In the "Song of Solomon," we read concerning the same animal: "Take me the *foxes*,—the little *foxes* that destroy the vines." But the fox, it should be known, is no lover of the fruit of the vine; while the contrary is the case with the jackal.

The celebrated botanist, Hasselquist, alluding to the abundant produce of the vine near the Convent of St. John, in the wilderness of Judea, about vintage-time, adds, that "the owners are obliged to set guards over the vines, to prevent jackals from destroying them." Colonel Sykes, also, in his notes on the jackal of India, which appears to be identical with the jackal (*shegal*) of Persia and the Levant, says, in that country "they are numerous, and terrible depredators in the vineyards."

Another passage of Scripture deserving notice, on account of its reference to the same animal, is, "O Israel, thy prophets are like the *foxes* in the deserts. They shall be a portion for *foxes*." Here, too, the term *shual* is more properly rendered *jackal*. "These animals," says Mr. Roberts, "are exceedingly numerous in the East, and are remarkably cunning and voracious." Speaking of them in India, he adds:—"They will not, *in general*, dare to attack man; but let him be helpless, or dead, and they have no hesitation. Thus our graveyards are often disturbed by these animals; and after they

have once tasted of human flesh, they (as well as many other creatures) are said to prefer it to any other. Their cunning is proverbial: thus, a man of plots and schemes is called a *nareyan*, i. e., a *jackal*. 'Ah! only give that fellow a tail, and he will make a capital jackal.' 'Begone, low caste, or I will give thee to the jackals.'"

In the history of Samson is recorded his destruction of the cornfields of the Philistines by means of *foxes*, tied tail to tail, and a firebrand put in the midst between two tails. Volney, who rejected the Scriptures, found here what he imagined to be a good point for attacking them. He states, "that in Syria, the wolf and the real fox are very rare, though there is a prodigious quantity of the middle species, which go in droves." And, again, he says:—"Jackals are concealed by hundreds in the gardens, and among ruins and tombs." In such circumstances, there was no difficulty in Samson's procuring three hundred of these animals, especially as the time he had to provide them for this purpose was not limited to a week or a month. Besides, it should be recollected, that Samson sustained the highest office in the commonwealth of Israel, and could be at no loss for persons to assist him in the accomplishment of this task.

There are not wanting men of eminence, however, who consider that *foxes* might have been employed, notwithstanding the denial of their existing in sufficient numbers, as stated by Volney; and among them is Colonel Hamilton Smith, who, observing it to be commonly supposed that two *foxes* were tied together by their tails with a firebrand between them, &c., declares that the opinion is wanting in due authority. He says:—"We understand the text to mean that each fox had a separate brand; and most naturally so, for it may be questioned whether two united would run in the same direction. They would assuredly pull counter to each other, and ultimately fight most fiercely; whereas, there can be no doubt that every canine would run direct to their holes, and sportsmen well know the necessity of stopping up those of the *fox* while the animal is abroad, or there is no chance of a chase. We therefore submit that, by the words rendered 'tail to tail,' we should understand the end of the firebrand attached to the extremity of the tail.

"Finally, as the operation of tying three hundred brands to as many fierce and irascible animals could not be effected in one day by a single man, nor produce the result intended if done in one place, it seems more probable that the name of Samson, as the chief director of the act, is employed to represent the whole party which effected his intentions in different places at the same time, and thereby insured that general conflagration of the harvest which was the signal of open resistance on the part of Israel to the long-endured oppression of the Philistine people."

[On this opinion of Col. H. Smith we would remark, that he has himself supplied a reason for the tying of two *foxes* or *jackals* together "tail to tail," namely, that they would otherwise run each to his own hole *for fear*; whereas, being coupled, the one would run one way, and the other another way, and so produce the desired effect—the burning of the corn. As to their pulling entirely counter to each other, and fighting, this is not at all likely (but he should have tried the experiment), seeing that they would be under the influence of the most powerful motives—both *fear and pain*,—and as they would naturally run to avoid both, there would be neither time nor inclination for fighting in the midst of the flames; therefore, they would make common cause, and run together for fear of the common enemy.]

LESSONS IN FRENCH.—No. XXXVII.

By Professor Louis Fasquelle, LL.D.

Section LXXXIII.

1. When a verb is preceded by several nouns not connected by *et*, it agrees with the last only, provided the nouns are in some way synonymous, or the mind dwells more forcibly upon the last:—

Son amour, sa tendresse pour ses enfants est connue de tout le monde.	*His love, his tenderness for his children, are known to everybody.*
Vos amis, vos parents, Dieu vous récompensera.	*Your friends, your relatives, God will reward you.*

2. When two or more nouns are united by the conjunction *ou* the verb agrees with the last only:—

Charles ou George écrira à votre ami.	*Charles or George will write to your friend.*

3. When a noun and a pronoun, or two or more pronouns (not being all in the third person), are joined by *ou*, the verb is put in the plural:—

Vous ou moi partirons demain.	*You or I will go to-morrow.*
Votre sœur ou vous irez à l'église.	*Your sister or you will go to church.*
Vous ou lui avez pu seuls commettre cette action.	*You or he alone have probably committed this act.*

4. When two nouns are joined by *ni* repeated, or when *ni l'un ni l'autre* is used as nominative to a verb, the verb is put in the plural, if the two nouns, or the two persons represented by *ni l'un ni l'autre*, perform or may perform the action together:—

Ni l'un ni l'autre ne liront.	*Neither the one nor the other will read.*

5. When, however, only one at a time can perform the action, the verb is put in the singular:—

Ni l'un ni l'autre ne sera nommé préfet de ce département.	*Neither the one nor the other will be appointed prefect of that department.*

Résumé of Examples.

Ni l'un ni l'autre n'ont trouvé le vin bon.	*Neither the one nor the other found the wine good.*
L'un et l'autre ont trouvé le dîner mauvais.	*Both found the dinner bad.*
Comment se trouvent Messieurs vos frères?	*How do your brothers find themselves?*
Ni l'un ni l'autre ne se trouvent bien.	*Neither find themselves well.*
L'un et l'autre se trouvèrent au rendez-vous.	*They both found themselves at the place of meeting.*
Ni l'un ni l'autre ne sera élu président.	*Neither will be elected president.*
L'un ou l'autre y trouvera à redire.	*One or the other will find fault with it.*
Lui ou vous avez trouvé quelque chose à redire à notre conduite.	*He or you have found something to blame in our conduct.*
Ni lui ni moi n'avons trouvé à redire à la conduite de vos enfants.	*Neither he nor I have found any fault with your children's conduct.*

Exercise 165.

Auteur, m. *author.*	Plutôt, *rather.*	Se trouv-er, 1. *ref. to find one's self.*
Devoir, m. *duty.*	Rempl ir, 2. *to fulfil.*	Veill-er, 1. *to watch.*
Ecriture, f. *writing.*	Rôti, m. *roast meat.*	Vie, f. *life.*
Eli-re, 4. ir. *to elect.*	Secrétaire, m. *secretary.*	
Expos-er, 1. *to expose.*	Trouv-er, 1. *to find, to like, to fancy.*	
Intérêt, m. *interest.*		

1. Remplissez-vous bien votre devoir? 2. Nous ne le remplissons ni l'un ni l'autre. 3. Cherchent-ils l'un et l'autre à s'exposer? 4. Ni l'un ni l'autre ne cherchent à exposer leur vie (La Bruyère). 5. M. votre père et Mme. votre mère, se trouvent-ils mieux aujourd'hui? 6. Ni l'un ni l'autre ne se trouvent mieux. 7. Avez-vous trouvé à redire à mon écriture ou à celle de mon secrétaire? 8. Je n'ai trouvé à redire ni à l'une ni à l'autre. 9. Cet auteur ne trouve-t-il pas à redire à tout? 10. Il trouve à redire à tous les livres. 11. Y trouvez-vous quelque chose à redire? 12. Ni lui ni moi n'y trouvons rien à redire. 13. Lui ou moi, nous veillerons à vos intérets. 14. Ni lui ni moi ne cesserons de veiller à la conduite de votre fils. 15. Nous y veillerons plutôt que d'y trouver à redire. 16. Lui et moi nous trouvâmes ensemble au rendez-vous. 17. Vous y trouverez vous l'un ou l'autre? 18. Nous nous y trouverons l'un ou l'autre. 19. L'un ou l'autre sera-t-il élu président? 20. Ni l'un ni l'autre ne sera élu. 21. Comment trouvez-vous ce rôti? 22. Je le trouve excellent. 23. Je trouve ce livre bon. 24. Je ne le trouve pas bon. 25. Je trouve cela bien fait.

Exercise 166.

1. How do you like that book? 2. Neither my sister nor I like it. 3. Did your brothers find the dinner good? 4. Both found it very good. 5. Did the professor find fault with your conduct? 6. He did not find fault with it. 7. Neither he nor my father find fault with my conduct. 8. Do they both watch over your conduct? 9. They both watch over my conduct and over my interests. 10. Have you both fulfilled your duty? 11. We have fulfilled it. 12. Have you not both criticised my writing? 13. Neither has criticised it. 14. Do not your two sisters find themselves better to-day? 15. One finds herself better. 16. The other does not find herself so well. 17. Do not those ladies find fault with every thing? 18. They find fault with nothing. 19. Will either be elected prefect of the department? 20. Neither will be elected. 21. How do

you like this bread? 22. I find it very good. 23. Did your two friends arrive in time at the appointed place? 24. Neither was there in (*d*) time. 25. Do you find fault with that (*cela*)? 26. I do not find fault with it (*y*). 27. Will you both expose yourselves to this danger? 28. We will not expose ourselves to it. 29. Do you find fault with my secretary's conduct? 30. I do not find fault with it. 31. Do you find fault with his writing? 32. I find fault with it; for it is very bad. 33. Will you not watch over my interests? 34. My brother and I will watch over them. 35. We will not cease to watch over your interests.

Section LXXXIV.

1. A verb having, as its subject, a general collective noun [§ 3 (6)] preceded by the article, agrees with the noun [§ 115 (1)]:—

La foule des pauvres est grande.	*The crowd of the poor is great.*

2. A verb preceded by a partitive collective [§ 3 (6)] takes the number of the noun following the collective, unless attention be particularly directed to the collective itself [§115 (2)]:—

Une foule de pauvres reçoivent des secours.	*A crowd of poor people receive assistance.*

3. The words, la plupart, *most*; un nombre, *a number*, &c., and the adverbs of quantity, peu, assez, beaucoup, plus, moins, trop, tant, combien, belong to this class.

4. Rester is often used unipersonally in the sense of *to have left*. The adverbial expression *de reste* is often used in the same manner as the English word *left*:—

Il me reste deux francs.	*I have two francs left*—or literally, *There remain to me two francs.*
Nous avons cinquante écus de reste.	*We have fifty crowns left.*

5. Devenir (2. ir.) *to become*, with être as an auxiliary, corresponds in signification to the English *to become*, followed by *of*. It is also Englished by *to become*, or simply *to turn*:—

Qu'est devenu votre frère?	*What has become of your brother?*
Il est en France, et est devenu avocat.	*He is in France, and has turned lawyer.*

Résumé of Examples.

La plupart de mes heures sont consacrées au travail.	*Most of my hours are devoted to labour.*
La foule des humains est vouée au malheur.	*The mass of mankind is devoted to misfortune.*
La plus grande partie des voyageurs le disent, et le répètent.	*The greatest number of travellers say it, and repeat it.*
Ne vous reste-t-il que cela?	*Have you only that left?*
Voilà tout ce qu'il me reste.	*That is all that I have left.*
Je ne sais ce qu'ils sont devenus.	*I do not know what has become of them.*
Je ne sais ce que vous deviendrez.	*I do not know what will become of you.*

Exercise 167.

S'appliqu-er, 1. ref. *to apply.*	Chemin, m. *way, road.*	Habile, *skilful.*
Apprenti, m. *apprentice.*	Désol-er, 1. *to desolate.*	Maigre, *thin, lean.*
Aveugle, *blind.*	Egar-er, 1. *to mislay.*	Naissance, *f. birth.*
Bagatelle, *f. trifle.*	Emplettes, f. p. *purchases.*	Rue, *f. street.*
Boiteux, se, *lame.*	Etat, m. *trade.*	Savant, e, *learned.*

1. La plupart de vos parents ne sont-ils pas venus vous voir? 2. Beaucoup sont venus. 3. Que sont devenus les autres? 4. Je ne saurais vous dire ce qu'ils sont devenus. 5. Que deviendra ce jeune homme s'il ne s'applique pas à l'étude? 6. Je ne sais pas ce qu'il deviendra. 7. Je sais qu'il ne deviendra jamais savant. 8. Combien de francs avez-vous de reste? 9. Il ne me reste qu'un franc. 10. Combien vous restera-t-il quand vous aurez fait vos emplettes? 11. Il ne me restera qu'une bagatelle. 12. Cet apprenti est-il devenu habile dans son état? 13. Il y est devenu habile. 14. Ce monsieur est-il aveugle de naissance, ou l'est-il devenu? 15. Il l'est devenu. 16. Savez-vous ce que sont devenus ces jeunes gens? 17. Ils sont devenus médecins. 18. Ne savez-vous pas ce que sont devenus mes livres? 19. Ils sont égarés. 20. Ne deviendrez-vous pas boiteux si vous marchez tant? 21. Je deviendrai boiteux et maigre. 22. La foule ne s'est-elle pas égarée dans ce bois? 23. La foule s'y est égarée, et n'a pu retrouver son chemin. 24. Une nuée de barbares désolèrent le pays. (Acad.) 25. Une foule de citoyens ruinés, remplissaient les rues de Stockholm. (Voltaire.)

Exercise 168.

1. Have not most of your friends become rich? 2. Most of them have become poor. 3. Has not that young lady become learned? 4. I think that she will never become learned. 5. Is not the American army (*armée*) very small? 6. The American army is small, but most of the American soldiers are very brave (*braves*). 7. Can you tell me what has become of that gentleman? 8. I cannot tell you what has become of him. 9. Is your brother blind by birth (was your brother born blind)? 10. No, Sir, he has become so. 11. Were you born lame? 12. No, Sir, I became so three years ago (*il y a*). 13. Are not most of your hours devoted to play (*jeu*, m.)? 14. No, Sir, they are devoted to study. 15. How much of your money have you left? 16. I have only twenty-five francs left. 17. Do you know how much I have left? 18. You have only a trifle left. 19. How much shall you have left to-morrow? 20. I shall only have six francs left. 21. I shall only have two francs left when I have made my purchase. 22. What has become of your grammar? 23. I have mislaid it. 24. Do you know what has become of my hat? 25. You have left (*laissé*) it upon the table. 26. Will not that gentleman become blind? 27. He will not become blind, but lame. 28. Has your son become skilful in his trade? 29. He has not become skilful in it. 30. What has become of him? 31. He has lost his way in the wood. 32. Did the crowd lose its way? 33. Most of the soldiers lost their way. 34. A cloud of locusts (*sauterelles*) desolated our country.

Section LXXXV.

1. The article, the demonstrative and the possessive adjectives, must be repeated, as before said, before every noun or adjective used substantively, which they determine [§ 80, 93, 21].

2. The prepositions *à*, *de*, and *en*, are repeated before every word which they govern [§ 141].

3. The verb quitter, *to leave* (*to quit*), is said of persons and places, and also of things in the sense of *to abandon, to give up*:—

Vous avez quitté vos parents et vos amis.	*You have left your relations and friends.*
Nous avons quitté nos études.	*We have discontinued our studies.*

4. Laisser, *to leave, to let*, is generally said of things. It is, however, said of persons in the sense of *to suffer to remain*:—

Vous avez laissé votre livre sur la table.	*You left your book upon the table.*

The examples below will illustrate the use of these two verbs.

Résumé of Examples.

N'avez vous pas quitté votre maison?	*Have you left your house?*
J'ai quitté mon pays et mes parents.	*I have left my country and relations.*
J'ai laissé ma bibliothèque en Europe?	*I left my library in Europe.*
Ne voulez-vous pas laisser votre fils ici?	*Will you not leave your son here?*
Je n'aime pas à le quitter.	*I do not like to quit him.*
J'ai laissé votre lettre à son domestique.	*I left your letter with his servant.*
Mon père m'a laissé cinquante mille francs.	*My father left me fifty thousand francs.*
Les avez-vous laissés tranquilles?	*Have you let them alone?*
Je leur ai laissé le champ libre.	*I have left them a free choice (free room).*
Ce malade a quitté le lit.	*That sick man has left his bed.*
Votre frère a quitté le barreau.	*Your brother has left the bar.*
Je vous laisserai ce chapeau à ce prix.	*I will let you have that hat at that price.*

Exercise 169.

A bon compte, *cheap.*	Mauvais, e, *bad.*	Pension, *f. boarding-school.*
Carte, *f. card.*	Moins, *less.*	Portier, m. *porter.*
Epée, *f. sword, army (figuratively).*	Noyau, m. *fruit-stone.*	Prix, m. *price.*
Habitude, *f. habit.*	Pourquoi, *why.*	Robe, *f. gown.*
Juge, m. *judge.*	Pavie, m. *clingstone-peach.*	Service, m. *service, army.*

1. Vos oncles, vos cousins et vos neveux, ont-ils quitté le commerce? 2. Ils ont quitté le commerce, et sont devenus médecins. 3. Le capitaine G. n'a-t-il pas quitté le service?

4. Il a quitté la France, mais il n'a pas quitté le service. 5. Où avez vous laissé votre fils? 6. Je l'ai laissé dans une pension. 7. Est-il trop jeune pour quitter ses études? 8. Il est trop jeune; il n'a que douze ans. 9. A qui avez-vous laissé votre carte de visite? 10. Je l'ai laissée chez le portier. 11. Pourquoi ne le laissez-vous pas parler? 12. Parce qu'il est temps que nous vous quittions. 13. Me permettez-vous de lui communiquer cela? 14. Je vous laisse le champ libre à cet égard. 15. Ce jeune homme n'a-t-il pas quitté ses mauvaises habitudes? 16. Il les a quittées. 17. M. L. n'a-t-il pas quitté la robe pour l'épée? 18. Oui, Monsieur; il n'est plus juge; il est capitaine. 19. Ces pêches quittent-elles facilement le noyau? 20. Non, Monsieur; ce sont des pavies. 21. Je vous laisse cet habit pour cinquante francs. 22. A quel prix me le laisserez-vous? 23. Je vous le laisserai pour dix francs. 24. Je vous le laisse à bon compte; je ne saurais vous le laisser à moins.

EXERCISE 170.

1. The son, daughter, and cousin, have left Paris. 2. My father, mother, and sister, have left me here. 3. Do you like to leave your country? 4. I do not like to leave my friends and country. 5. My parents do not like to leave me here; I am too young. 6. Why does not your brother let his son speak [Sect. 96, 4]? 7. Because he has nothing to say. 8. Have you let him alone? 9. I have let him alone. 10. Why do you not let me alone? 11. I will let them alone. 12. Has your friend left his bed? 13. He has not yet left his bed; he is yet very sick. 14. Has Captain G. left the army? 15. He has not left the army. 16. Has not that gentleman left the army for the bar? 17. He has left the army for the bar. 18. My friend has left the bar. 19. At what price will you let me have this silk? 20. I will let you have it at two francs a yard. 21. Can you not let me have it for less? 22. I let you have it cheap. 23. Will you let me have that book for twenty francs. 24. I will let you have it for twenty-two. 25. I could not let you have it for less. 26. With whom (*à qui*) have you left my book? 27. I left it with your sister. 28. Why did you not leave it with my servant? 29. Because he had left your house. 30. Do you like to leave your friends? 31. I do not like to leave them. 32. Where have you left your book? 33. I left it at my father's. 34. Has that merchant given up commerce? 35. He has not given it up. 36. Those peaches do not part easily from the stone; they are clingstone peaches.

ANSWERS TO CORRESPONDENTS.

MUSIC.—The following extracts from a letter written by an intelligent self-teacher we insert in the hope that they will stimulate and encourage many:—"Sir,—I cannot refrain from bearing my feeble testimony to the excellence and soundness of your method for imparting a thorough and substantial knowledge of music. I am, myself, but an humble amateur; yet, like the immortal Martin Luther, 'I would not for a great deal give up my poor knowledge of music.' It is now some years since I entered upon the study of the 'divine art,' and I may mention, for the encouragement of the million pupils of the EDUCATOR, and as an incentive to their increased perseverance and application, that it was not long ere I was able to read music with facility at sight. I have since, also, studied HARMONY to advantage, and have farther attained some proficiency on the pianoforte—and all this I have accomplished *without the aid of a single lesson from a teacher*, aye, and from books much less explicit and distinct than the lessons in the EDUCATOR. I now consider myself very fortunate in having acquired my knowledge of music under the old Guidonian sol-fa system inculcated by Mr. Curwen, as I am convinced of the utter worthlessness of the French method, where the syllable DOH is never changed from C. I had not long begun to study music, when the latter system became highly popular under the auspices of the late Dr. Mainzer. I was at first all but led away by the rapid progress of his pupils to adopt the same system myself, but being satisfied with the advance I was then making, and reflecting that, if there was no 'royal road' to the knowledge of the other sciences, there could be none to music, I resisted the temptation, and applied myself with renewed assiduity to my studies under the old system. Events have proved that my determination was right, for while the Mainzerian system seems now to be falling into merited oblivion, I have acquired, under the old method, a more lasting and thorough knowledge than I could ever have attained under the former. I can hardly imagine that a man of such talent as Dr. Mainzer could possibly be himself deceived, or that he truly supposed the system which he taught capable of imparting an effectual knowledge of music. His pupils certainly reached some degree of proficiency in the scale of C, but beyond this they could not advance one iota, for the moment the key was changed they were completely at sea. In his programme (now before me) announcing the performance of Handel's oratorio, 'Judas Maccabeus,' by two hundred and fifty of his *advanced* pupils (which took place in Edinburgh in June, 1847), he treats the mere fact of the performance of such a work as evidence of the great musical knowledge of his pupils, and as leading to the inference that, after such performance, they were capable of reading any music however difficult, while, so far from such an inference being correct, the truth is, that the children had been previously so well drilled that they had learned the oratorio entirely by *rote*, a fact of which he must have been perfectly aware. This result was certainly an instance of the doctor's great patience and perseverance (and I have myself seen him labouring for an hour in getting the children to master a few bars of the more difficult passages), but it was by no means an impossible task, for we are all familiar with the aptitude of children for learning music by heart, and the practice of many masters in so teaching them, without the smallest pretension being made to their ability to *read* music. I may add, that I have never in my experience met with a single *reader* of music who had learned under the Mainzerian system; and it is a singular fact that, on the occasion of the performance I have alluded to, not one of the doctor's adult pupils were qualified for the tenor and bass parts—these being taken by the professional choristers of the town! In short, it were easy to prove to demonstration the impracticability of overcoming the defects inseparable from this system, but this has already been ably illustrated in the lessons in the EDUCATOR. I am afraid I have trespassed too much on your time, but I have been induced to trouble you with the above remarks in the hope of their being useful in encouraging the pupils of the EDUCATOR *to redouble their exertions*, and resolve to profit by its invaluable lessons. With earnest wishes for the continued prosperity of your truly national work, I am, Sir, yours most respectfully, JAS. H."

D. M. J. (Newport): A good pair of 12 inch globes, to stand on a table, may be had for £3 or £4, at the following makers: Cary, Bardin, Newton, and Addison, London. We have not seen those he mentions.—PHILO (Buralam): The man who told you that man had been an actual observer for 4½ millions of years was greatly mistaken; don't believe him.—JOSHUA: Thanks for his good letter; Drawing has begun; try the glass harmonicas.—XENOPHON: The jubilee is mentioned by Josephus, ANT. iii. 12, who is a profane author.—A. R. J. (Belfast): 1. The solution is correct. 2. Cassell's Arithmetic is published, and may be had of the agent of the P. E. by order. 3. The binding of vol. I. in cloth is 1s, common edition; 1s. 6d., fine edition. 4. The penmanship is very fair, but not for a first-rate clerk.—A STUDENT (Belfast) is too hasty; it was at the request of many who intended to use the Arithmetic that the answers were purposely omitted. This want will be supplied to all who wish it; see Literary Notices.—W. BOOTH: Under consideration.—W. T.: The lessons he wants are in preparation.—ANGLO-SAXON (Limerick): See page 104, vol. II., col. 1, line 3 from bottom. Goethe is pronounced *gerté*.—PHI (West Ham, London): French first. Cassell's History of England is published at 3s. 6d. complete, 3 vols. in one.

LITERARY NOTICES.

MRS. HARRIET BEECHER STOWE, AUTHORESS OF "UNCLE TOM'S CABIN," &c.—A magnificent PORTRAIT of this celebrated and talented lady will be given in the ILLUSTRATED EXHIBITOR AND MAGAZINE OF ART, for the week ending December 25. John Cassell feels highly honoured by the kindness of Mrs. H. Beecher Stowe in furnishing him with her portrait, and thus enabling him to present to the British public a striking likeness, engraved in the first style of art, in a cheap and popular form. The ILLUSTRATED EXHIBITOR AND MAGAZINE OF ART is published in Weekly Numbers, price Twopence each. A new and improved Series, under the title of the ILLUSTRATED MAGAZINE OF ART, will be commenced on January 1, price 3d. in a neat cover; when, in addition to numerous Engravings in the text, each Number will contain a fine Engraving worked on Plate Paper; and with No. 1 will be presented, gratis, a splendid View of the Interior of St. Paul's Cathedral, during the Interment of the late Duke of Wellington; printed upon fine Plate Paper, measuring eighteen inches by thirteen. This Engraving will be worth four times the cost of the Number of the MAGAZINE OF ART.

THE ALTAR OF THE HOUSEHOLD; or, DOMESTIC WORSHIP. Part I. will be published on the 1st of January, 1853, price 1s. This work will contain a Series of Services for the Family, adapted for every morning and evening throughout the year, viz., portions of Scripture, Prayers and Thanksgivings, suitably adapted to each other, to which will be added short practical comments to explain the subjects read, or enforce the duties enjoined. This work will be edited by the Rev. Dr. Harris, Principal of New College, assisted by a band of eminent divines in London and the country.

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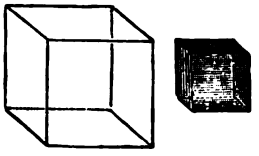
LESSONS IN DRAWING.—No. II.

ANGLES AND GEOMETRICAL FIGURES.

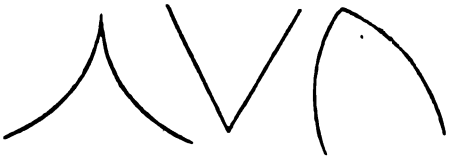
In learning to draw it is of great importance to have distinct and clear ideas on the subject of the directions of the lines that are to be drawn. For example, if you were told to draw a line inclining either to the left or to the right of a vertical (up and down) line, or in other words leaning either to the left or to the right upon a horizontal (sea level) line, you would naturally and properly ask how much to the left or how much to the right must I draw it? In this case, you see, precision and accuracy of expression are necessary to enable you to draw the line required; and where words fail to convey exact notions on the subject of the directions of lines, we must employ apparatus or geometrical construction. The word *angle* is generally employed in speaking of the directions of lines, and by making *angles* of various kinds we are enabled to give clear and definite explanations of these directions. The word *angle* originally meant a *corner*. For instance, a block of wood having six square faces (which is properly called a *cube* by geometers) has evidently *eight corners* (see fig. 13).

Fig. 13.



These corners are called *solid angles*, and are only seen in perspective in fig. 13, but with such solid angles we have nothing to do at present; we must first call your attention chiefly to *plane angles*, that is, angles which can only be properly represented or drawn on a *flat surface*. Now each face of the cube has four corners, which are called the *plane angles* of a square; the ordinary definition of a *plane angle* being this: "When two lines drawn on a plane or flat surface in different directions meet in a point, they are said to make an angle at that point." For drawing purposes it is necessary to include in this definition curve lines, as well as straight lines; hence, the figures represented in fig. 14 are all considered as plane angles. A plane angle is simply such a one as you can correctly draw upon paper.

Fig. 14.



The terms *horizontal* and *vertical* have been already so far explained, but it will be advisable to fix them in the mind by a more enlarged explanation. The *horizon* (pronounced *hori'zon*) is the extreme boundary line or limit of vision on the earth's surface. To understand this clearly, suppose that you were out at sea in a vessel, entirely out of sight of land, then the extreme boundary of the water as far as you can see, and whichever way you may look, where the sky and sea appear to meet, is called the *horizon*, from the Greek horos, *a limit* or *boundary*. The horizon, then, according to this explanation, is the circumference of a circle of which every point appears equally distant from the eye of the observer. Any straight line drawn from one point of the circumference of this circle to the opposite point, say from *north* to *south*, or from *east* to *west*, is called a *diameter of the horizon*; and any line parallel to a diameter of the horizon or to a *plane of the horizon*, that is, to the circle itself, is called a *horizontal line*. This is the direction which the surface of stagnant water always assumes; it is the direction which the surface of water in any vessel, such as a tumbler, always takes and preserves in every position of the vessel so long as it remains in the vessel.

The term *vertical* must now be explained, and this may be done at once by saying that it is the direction which the plumb-line or string of the plummet always assumes when allowed to hang freely. Lest any reader should be unacquainted with this instrument, we shall explain it farther. Fasten any weight to the end of a string sufficiently strong to bear it, then fasten the other end of the string to a stout nail in a wall, or, what is better, in a cross beam in a roof or in a ceiling, then allow the weight to hang freely, and the direction which the string takes when it is completely at rest is the *vertical*. This is frequently called the *perpendicular* direction as well as the *vertical* direction, but the former term alone is not strictly correct, according to the definition given by geometers; if, however, we say *perpendicular to the horizon*, it is then complete, and as accurate as the term vertical. The directions of straight lines that are either *vertical* or *horizontal*, will now be easily understood and recognised; but between these two directions there are an infinite variety of others, which may all be exhibited to the eye by taking the weight in the hand and gradually drawing the string out of the vertical position, by keeping it stretched until it reaches the horizontal position. Now there is some method by which any position between the horizontal and the vertical may be determined and remembered for future use. This method consists in the measurement of angles. To understand this it will be necessary to observe that when two lines form an angle, the magnitude of the angle does not depend upon the lengths of the legs or lines which form the angle, but upon the degree of divergence (*bending back*) or separation between them. Thus, in fig. 15, the angle B A C is the same as the angle D A E; that is, the angle is the same whether the legs A C, A B, be used, or the legs A E, A D. Let it be remembered also that when an angle is spoken of by three letters, the letter at

Fig. 15.

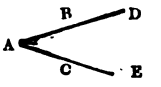
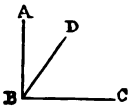


Fig. 16.



the point where the legs meet is always put in the middle between the two letters placed at a distance on the legs, or at their extremity. Thus the letter A is put in the middle between the letters C and B, or the letters E and D, in saying the angle B A C or D A E. An angle may be made up of other angles, or may be a part of another angle. Thus in fig. 16, the angle A B C is made up of the two angles A B D and D B C; and the angle D B C or the angle A B D is a part of the angle A B C. All plane angles formed of straight lines are divided into three kinds, *right* angles, *acute* angles, and *obtuse* angles. When a *vertical* line meets a *horizontal* line, the one line is said to be perpendicular to the other, or at right angles to it. The *vertical* line may meet the *horizontal* line at one extremity only, as in fig. 17; in this case, they form only one *right*

Fig. 17.

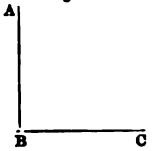
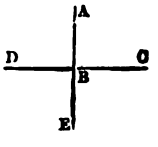


Fig. 18.

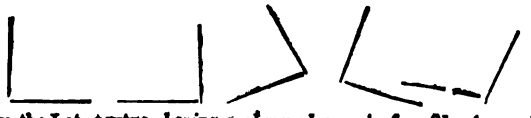
Fig. 19.



angle, as A B C. Or, it may meet the horizontal line somewhere between the two extremities, as in fig. 18; in this case, they form *two right* angles, as A B C, and A B D. Or, lastly, they may cross

each other, as in fig. 19; in this case, they form *four right* angles, as A B C, A B D, D B E, and E B C. *Right* angles may have their legs placed in all possible positions with regard to the horizon, as in fig. 20. An angle which is *less* that a right angle is called *acute*,

Fig. 20.



from the Lat. acutus, *having a sharp edge*, as in fig. 21. An angle which is *greater than* a right angle is called *obtuse*, from the Lat. obtusus, *blunt*, as in fig. 22. When one straight line meets another at any point between its extremities, it always makes either two right angles, as in fig. 18, or two angles which are together equal to two right angles, as in fig. 23, one being acute, and the other obtuse. When two straight lines cross each other, they always make either four right angles, as in fig. 19, or four angles which are together equal to four right angles, as in fig. 24, two being acute and equal to each other, and two being obtuse and equal to each other. Thus, the three kinds of angles, right, acute, and obtuse, are all that are spoken of in distinguishing plane angles from each other. It may also be observed, that two right angles occupy all the space about a point on one side of any straight line; and four right angles all the space about a point on both sides of it. Hence all the space made by any number of straight lines meeting in a point, are together equal to four right angles.

Fig. 21.

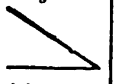


Fig. 22. Fig. 23. Fig. 24.

A circle is well defined to be a figure such that its boundary, called its circumference (from the Lat. circumferens, *carrying round*) or outline, is a line everywhere, that is, at all points, equally distant from a fixed point within the figure, which is called the *centre* (from the Greek kentron, *a point*), see fig. 25. The straigh line drawn from the centre to the circumference is called the *radius* of the circle (from the Lat. radius, *a rod*, or *spoke of a wheel*), see fig. 25. The straight line drawn through the centre,

Fig. 25. Fig. 26. Fig. 27.

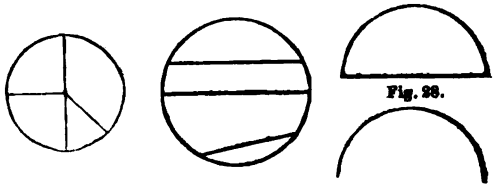
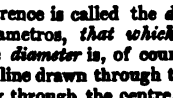


Fig. 28.



and terminated both ways in the circumference is called the *diameter* of the circle (from the Greek diametros, *that which is measured out*, or *across*), see fig. 26. The *diameter* is, of course, *double the radius* of a circle. Any straight line drawn through two points in the circumference, and not passing through the centre, is called a *chord* (from the Greek chordē, and Lat. chorda, a *string of a lyre*), see fig. 26. The half of a circle bounded by the diameter, is called a *semicircle* (from Lat. semi, *half*, and *circle*), see fig. 27. The half of the circumference is called a semicircumference, see fig. 28. The half of a semicircle is called *a quadrant* (from the Lat. quadrans, antis, *a fourth part*). Sometimes this term is applied to the half of the semicircumference.

The method employed by practical geometers to express clearly the magnitude of any angle, and consequently the direction of any line, is the following: they divide the whole circumference of a circle into three hundred and sixty equal parts called degrees, marked thus, 360°. Now, the magnitude of any angle is expressed in words by stating the number of degrees which this angle takes in, by supposing that the angular point is the centre of a circle, and that the legs of the angle intercept a certain number of degrees on the circumference of the circle; see the following instrument, fig. 29, used for this purpose, explained at page 50, col. 1, vol. I.

Draw a circle; and in it, draw two diameters at right angles to each other. Then, the whole circumference will be divided into *four* equal parts, see fig. 30; and the *arc*, or part of the circumference bounding each of these parts, contains 90°, or the fourth part of 360°. Whence, a *right angle* takes in, or contains 90°; and a *right angle* is commonly described as an angle of 90°, that is, "an angle of ninety," or, "an angle of ninety degrees." The *half* of a *right angle*, is therefore an angle of 45°; and the *third part* of a right angle is an angle of 30°. An angle composed of a right angle and a half, is an angle of 135°; and so on. You will see, therefore, that the size of the circle, and the lengths of the legs of the angle, cannot affect these numerical statements of the angles; for a right angle, if its legs be extended, will take in as fully and completely *one-fourth* part of the circumference of a circle of *forty feet radius*, as it will take in *one-fourth* part of one of only *four inches radius*. An *acute angle* is, from what we have seen in the previous definitions, an angle of less than 90°; and an *obtuse angle*, one of more than 90°. *Two right angles* make an angle of 180°; but in this case, the angle becomes a straight line, and the angular point the middle of that straight line, when the legs are equal. Such, then, is the method of measuring the slope or inclination of one line to another, or of two lines making an angle; and such is the method of measuring the inclination of a rail-road, or of a hilly-road of uniform slope, to the horizon or the level ground above which it is raised. The parts of a degree are expressed in minutes; that is, every degree is divided into *sixty* equal parts called *minutes*; whence, half a degree is called 30 minutes, and is marked 30′; a quarter of a degree, 15′; and so on. Again, every minute is subdivided into 60 equal parts called *seconds*; whence half a minute is called 30 seconds, and is marked 30″; a quarter of a minute, 15″; and so on. Small account, however, is taken of these minute subdivisions in drawing.

Fig. 29.

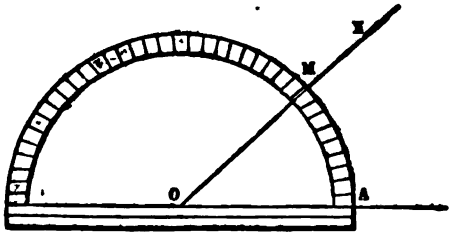
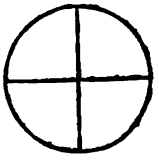


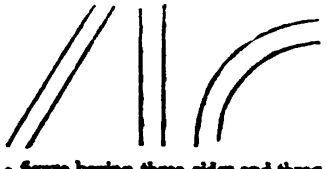
Fig. 30.



The lessons on practical geometry in vol. I. of this work will be very useful to you in the art of drawing, and you are recommended to study them attentively, after reading this lesson. More instructions, however, will be given as occasion arises, when treating of perspective, architecture, and ornament, but the lessons on practical geometry will explain to you some points of greater length than it will be necessary to repeat in our lessons on drawing. The following definitions of geometrical figures are those of which the knowledge is absolutely requisite for your future studies.

Lines are said to be *oblique* to one another when they are drawn in any directions not making right angles with each other.

When the breadth between two or more lines remains always the same, the lines are called *parallel* lines, whether they be curved or straight.



A *triangle* is a figure having three sides and three angles, that is, composed of three straight lines forming three angles at their point of meeting. When a triangle has it three sides equal it is called an *equilateral triangle*; equilateral means *equal-sided*.

When a triangle has two of its sides equal it is called an *isosceles* triangle (pronounced *eye-sose'-e-leez*). This word means *equal-legged*; that is, having equal legs.

When a triangle has its three sides all unequal it is called a *scalene* triangle. Scalene means *unequal-legged.*

A triangle is also said to be *right-angled* when it has one right angle; it cannot have more than one right angle.

An *obtuse-angled* triangle is that which has one obtuse angle; it cannot have more than one obtuse angle.

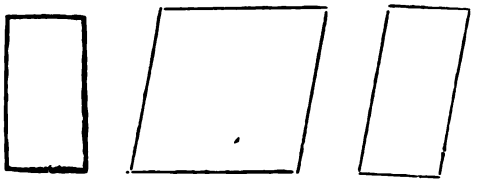
An *acute-angled* triangle is that which has three acute angles; it cannot have less than these, otherwise it would become one or other of the preceding two triangles.

A *square* has four sides and four angles, all its sides being equal, and all its angles right angles.

An *oblong* has all its angles right angles, and has four sides, but the sides are unequal. It is sometimes called a *long square*, but this is an absurd name. No side of a square can be longer than another.

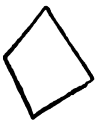
A rhombus, or lozenge, sometimes called a diamond, or diamond-shaped figure, has all its sides equal, but its angles are oblique, i. e., not right angles.

A rhomboid has its sides equal in pairs, opposite to one another; but



the one pair is not equal to the other pair, and its angles are oblique.

These four figures are all parallelograms (pa-ra-lel'-o-gram), the first two being right-angled parallelograms—the square having this distinction, that all its sides are equal.



All other four-sided figures are called trapeziums, or trapezoids, the trapezoid having one pair of its opposite sides parallel, and the trapezium none of its sides equal nor parallel. Trape'zium means a table or slab.

A five-sided figure is called a pentagon; and a six-sided figure, a hexagon. A seven-sided figure is a heptagon; a

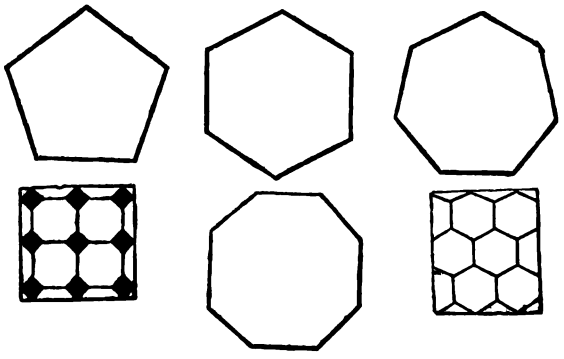


figure with eight sides is an octagon; one with nine sides is an enneagon; and one with ten sides is a decagon. Accent the first syllable in all these names, thus: pen'-ta-gon, dek'-a-gon. When the sides are all equal, and the angles also all equal, the figures are said to be *regular;* as a regular pentagon, a regular hexagon, &c. When the sides are not all equal, or the angles not all equal, the figure is called irregular; as, an irregular heptagon, decagon, &c.

A many-sided figure is sometimes called a *multilat'eral* figure, and a triangle, a *trilat'eral* figure, and four-sided figures are very commonly called *quadrilat'erals.*

By fixing these definitions in your memory, you will get distinctly-shaped images in your mind, which will last you through your whole life, and become clearer the oftener you refer to them.

It is scarcely possible to overrate the importance of geometrical information to the ornamental and architectural draughtsman; and it is of nearly equal utility in all landscape drawing which comprises buildings,—the buildings being actually constructed by strict geometrical rules. The architect, indeed, cannot work without them. Should we not, then, in our representations or drawings bear this in mind? We cannot fail to do so, if the principles be well understood, and it is only then that we can be said to draw with unimpeachable accuracy.

True, it is not absolutely necessary that you should study Euclid along with these lessons; but if you have any inclination for the study of geometry at greater length than can be given in these lessons, we cannot too strongly advise you to follow that inclination. For, if well followed up, you will thus make an acquisition of which the importance cannot be conceived until it be attained. The proportions of form and of quantity regulate all the works of nature.

The old Greeks assigned to the Graces and to the Muses the origin and the patronage of the arts. There is, indeed, a verbal connexion between the Graces and gratitude; and it may be truly said that all the arts are grateful as well as graceful. They return to the student, in the amplest manner, every attention he bestows upon them; and from them, at last, he receives his crown of laurel.

Endeavour to commit the greater part of this lesson to memory, as we shall have to refer to it from time to time throughout this course. Give it your early and best attention; and read, also, the lessons in practical geometry already mentioned. If you make yourself well acquainted with geometry, you will find in drawing natural objects that you know the leading characteristics of an immense number of forms at a glance, while in the most complex forms and outlines you will be able to *dissect* them, and to separate one component part from another with comparative ease. Read, again, what is said of outline in the first lesson, and you will see that, as outline is necessarily composed of lines, geometry must so far govern outline,—not, indeed, rigidly in all cases, as nature possesses a free hand; but you will still find yourself *compelled* to go to geometry for the forms and principles which nature handles with such freedom.

In our next lesson we shall treat of the drawing of curved and mixed outline. In the meantime, we recommend you to read both these lessons over again, and to practise them with the utmost care until you acquire a readiness in them which will be a prelude to future success.

LESSONS IN LATIN.—No. XXXVII.

By John R. Beard, D.D.

DEVIATIONS IN THE THIRD CONJUGATION.

7. *Perfect with Reduplication.*

The reduplication in the verbs, the first vowel of whose stem is *i*, *o*, or *u*, consists in the repetition of the first consonant of the stem, together with that vowel; in the rest, however, it consists in the repetition of the first consonant of the stem, together with *e*. The compounds have, in the perfect, no reduplication; except those from curro, *I run;* disco, *I learn;* and posco, *I demand.*

i. Cado, cadere, cecĭdi, casum, *to fall, happen.* Compounds are in cido, cidere, cidi, cāsum, thus: occido, *I go down, die;* incido, *I fall on* (E. R. *incident*); recido, *I fall back;* the rest want the supine; as, concido, concidere, concidi, *to fall together.*

ii. Caedo, caedere, cecīdi, caesum, *to cut, to kill.* Compounds are in cido, cidere, cidi, cāsum; as, occido, *I put to death.*

iii. Cano, canere, cecĭni, cantum, *to sing.* Compounds in cino, cĭnere, cĭnui; so concino, *to sing together;* and occino, *to sing inauspiciously;* the rest are without perfect and supine.

iv. Curro, currere, cucurri, cursum, *to run.* Most of the compounds in the perfect have, but oftener have not, the reduplication.

v. Disco, discere, didici (no supine, but discĭturus), *to learn;* so the compounds, as perdisco, perdiscere, perdidici, *to learn thoroughly.*

vi. Fallo, fallere, fefelli, falsum, *to deceive;* fallit me, *it escapes me, I am not aware, I am unconscious.* The participle falsus, *false,* is mostly employed as an adjective; compound, refello, refellere, refelli (no supine), *to refute.*

vii. (Pango) pangere, pepĭgi, pactum, *to conclude a treaty*. The present, with this meaning, is supplied by paciscor; but pango, in the sense *I strike, fasten*, has panxi (seldom pegi), panctum (pactum, E. R. *pact*). Compounds, pingo, pingere, pĕgi, pactum; as, compingo, *I put together;* depango, *to fix in;* and repango, *to set into* (without the perfect).

viii. Parco, parcĕre, peperci, parsum (with dat.), *to spare*.

ix. Pario, părĕre, pepĕri, partum, *to bear, bring forth, to get, acquire;* P. F. pariturus; ovaparere, *to lay eggs*.

x. Pello, pellere, pepŭli, pulsum, *to drive*. Compounds are in pello, pellere, puli, pulsum; as, expello, *I drive out*.

xi. Pendo, pendere, pependi, pensum, *to cause to hang, to weigh, to pay, to suffer*. Compounds are without reduplication; as, appendo, appendi, *I hang to*, or *fasten on*.

xii. Posco, poscere, poposci (no supine), *to ask, demand;* so the compounds, as, exposco, expoposci, *to get by asking*.

xiii. Pungo, pungere, pŭpŭgi, punctum, *to prick*. Compounds in perf. punxi; as, interpungo, *to place a point between*.

xiv. Tango, tangere, tĕtĭgi, tactum, *to touch*. Compounds are in tingo, tingere, tĭgi, tactum; as, attingo, *to touch upon*.

xv. Tendo, tendere, tetendi, tentum, and tensum, *to stretch;* tendere insidias, *to place in ambush*. Compounds are without reduplication, and with the supine in tentum; as, contendo, contendere, contendi, contentum, *to strive;* but retentum and retensum, extentum and extensum, are used; nevertheless, detendo and ostendo have only detensum and ostensum: ostentus is the same as obtentus, as, ostentus soli, *exposed to the sun*.

xvi. Tundo, tundere, tutŭdi, tunsum, *to pound, beat*. Compounds are in tundo, tudi; as, contundo, *to pound together, to beat in pieces, to weary*.

The two ensuing verbs have the reduplication in the present, and retain it throughout: bibo, bibĕre, bibi, bibĭtum, *to drink;* in the same way, the compounds; sisto, sistĕre, stiti, stătum (stătus, *set fast*), *to place*. Monosyllabic compounds of dare belong to this class; as, addo, addĭdi, addĭtum, *to add*.

Vocabulary.

Concinĕre, *to sing together, to sound in harmony*; excidere, *to cut out*; obtingere, *to obtain*; confirmare, *to confirm*; devolare, *to fly down*; populari, dep. *to lay waste*; evertere, *to overturn, destroy*; inspicere, *to look into*; recedere, *to go back*; restituere, *to restore*; emollire, *to soften*; induciae, arum, *f. a truce*; noctu, *by night*; epulae, arum, *f. a feast*; fides, ei, *f. a lyre*; gallina, ae, *f. a hen*; fidĭbus canĕre, *to play on the lyre*; praesto, *present, quickly*; tibia, ae, *f. a pipe, flute*; Londinum, i, n. *London*; tuba, ae, *f. a trumpet*.

Exercises.—Latin-English.

Et discas oportet, et quod didicisti, agendo confirmes; male parta male dilabuntur; ut hirundines aestivo tempore praesto sunt, frigore pulsae recedunt, ita falsi amici sereno vitae empore praesto sunt, simulatque [illegible] fortunae viderint, devolant omnes; quid casărum sit, incertum est; quod cuique obtigit, id quisque teneat; Clitum amicum senem et innoxium a se occisum esse Alexander dolebat; ingenuas didicisse fideliter artes, emollit mores nec sinit esse feros (eos); non tam utilitas, parta per amicum, quam amici amor ipse delectat; Hannibălem non fefellit ferocius quam consultius rem hostes gesturos esse; ex quo (tempore) pecunia in honore fuit, verus rerum honor occidit; silva vetus ocĭdit, ferro quam nemo cecidit; Epaminondas fidĭbus praeclare cecinisse dicitur; Cato scribit priscos Romanos in epulis cecinisse ad tibiam clarorum virorum laudes atque virtutes; datur cohortibus signum, cornuaque ac tubae concinuerunt; in pugnă ad Trasimenum anno ccxvii ante Christum natum commissă, quindecim millia Romanorum in acie caesa sunt; decem millia sparsa fugă per omnem Etruriam, diversis itineribus urbem petierunt; constet Numantiam a Scipione excisam et eversam esse; si id quod dixi falsum erat, cur me non refellisti? hostes pacem nobiscum pepigerunt, ut milites a nobis captos restitueremus; Cleomĕnes, Lacedaemonius, quum triginta dierum essent cum hoste pactae induciae, noctu populabatur agros, quod dierum essent pactae non noctium induciae; dux quum urbem cepisset, aedificiis omnibus, publicis et privatis, sacris et profanis sic pepercit, quasi ad ea defendenda non expugnanda cum exercitu urbem intrasset; urbe expugnată, milites furore capti, juraverunt se non aetate confectis, non mulieribus, non infantibus parsuros esse; ovorum inter se similitudo est in proverbio; tamen Deli (*at Delos*) fuerunt complures qui permultas gallinas alentes, quum ovum inspexerant, quae id gallina peperisset, dicere solebant; mihi crede te tuă virtute maximam laudem tibi parituram esse.

English-Latin.

The hen has laid an egg; the hens will lay eggs; how many eggs a-day (in dies) do your hens lay? thy mother has borne a son; the general will not spare the public buildings; the soldier, seized with fury, slew his general; doest thou think that the enemy was spare those who are worn down with age? I know not whether the enemy will spare the women and children; a truce has been made with the enemy for twenty days; the voices sounded in harmony; the sign having been given; thy brother sang to the lyre the praises of great men; twenty thousand of our soldiers were slain.

Vocabulary.

Compungere, *to stab*; condere, *to found, build*; distinguere, *to distinguish*; erumpere, *to break forth*; percurrere, *to run through*; perdere, *to destroy*; conclamare, *to shout together*; stimulare, *to goad*; sustentare, *to support*; doliarium, *a cellar*; loquacitas, ātis, *talkativeness*; potus, ūs, m. *drink*; spurius, a, um, *illegitimate, not genuine, spurious*; insidiae, arum, *snare, plot, ambush*; de coelo tactum esse, *to be struck with lightning*; piper, ĕris, n. *pepper*; condio, ire, īvi, ītum 4, *to season*; dolium, i, n. *a cask*.

Exercises.—Latin-English.

Catilina multas insidias Ciceronis vitae tetendit, sed hic omnes illius machinationes contŭdit; admiramur praeclaros illos viros qui semper summis laboribus et periculis ad summam laudem gloriamque contenderunt; Garrulus homo loquacitate sua aures meas plane tutŭdit; dic a quo haec grana tunsa sint; Metellus in Numidiam proficiscitur magnă spe civium; avaritiă enim magistratuum ante id tempus in Numidiă Romanorum opes contusae hostiumque (opes) auctae erant; Verres simulac tetigit provinciam, maximae avaritiae totum se tradidit; totum librum legendo percucurri; duae in Capitolio aedes, multăque alia aedificia uno anno de coelo tacta sunt; Agesilāus, quotiescunque congressus est cum hostibus, multo majores adversariorum copias pepulit; tu temeritatis tuae maximas poenas pependisti; conclamabant omnes Carthaginienses, satis suppliciorum a se pro temeritate unius hominis, Hannibălis, pensum esse; milites urbem ingressi, non cibum aut potum poposcerunt, non armorum onus deposuerunt; tu ex animo scrupulum evellisti, qui me dies noctesque stimulavit ac pupŭgit; Philosophia, si paupertas momordit, si ignominia pupŭgit, si quid tenebrarum offŭdit exsilium, singularum rerum proprias consolationes adhĭbet; festivitatem habet narratio, distincta personis et interpuncta sermonibus; Aristarchus, grammaticus, eos Homeri versus qui, spurii ei videbantur, notis quibusdam compunxit; omnes cives, belli calamitatibus confecti, pacem expoposcerunt; Romani in doliariis condĭta habebant vina, pipere et melle condĭta; Graeciae civitates, dum imperare singulae cupiunt, imperium omnes perdiderunt; perditis rebus omnibus, ipse virtus se sustentat.

English-Latin.

This garment is distinguished (marked differently) with colours; the general asked for peace, his troops being killed; what have you laid up in your cellar? I know not how many things are laid up in my cellar; the casks are distinguished so that they may be severally known; the enemy will lay an ambush against the king; believe me, the enemy has laid an ambush against our army; great men will strive for great things; the grains have been pounded; those dogs have wearied my ears; I fear this house will be struck with lightning; the temple of Jupiter is said to have been struck with lightning; thy friends have run through the city; will they strive to return (seek) the city? yes, they will seek London by different routes; it is certain that London has not yet been taken by the French; will the French take London? I do not think the French will ever take London; things badly obtained do no good; is your friend present; friends are present in prosperity; false friends fly away in adversity; I know not what will happen to thee; Alexander slew Clitus; Clitus was slain by Alexander; hast thou learned the liberal arts? my sons will learn the liberal arts; Epaminondas is said to have learnt to play on the lyre.

Aesopi Fabulae.

Vulpes et Leo.

Vulpes quae nunquam leonem viderat, quum ei forte occurrisset leo, ita est perterrita, ut paene moreretur formidine. Eundem conspicata iterum, timuit quidem sed nequaquam ut antea. Tertio illi obviam facta, ausa est etiam propius accedere, eumque alloqui.

Cancri.

Cancer dicebat filio: "Mi fili, ne sic obliquis semper gressibus incede, sed rectă viă perge." Cui ille "mi pater," respondit, "libenter tuis praeceptis obsequar, si te prius idem facientem vidĕro."—Docet haec fabula adolescentiam nullă re magis quam exempli instrui.

Boves.

In eodem prato pascebantur tres boves in maximă concordiă, et sic ab omni ferarum incursione tuti erant. Sed dissidio inter illos

orto, singuli a feris petiti et laniati sunt.—Fabula docet quantum boni sit in concordiâ

ASINUS.

Asinus pelle leonis indutus territabat homines et bestias, tanquam leo esset. Sed forte, dum se celerius movet, aures eminebant; unde agnitus, in pistrinum abductus est, ubi poenas petulantiae dedit.—Haec fabula stolidos notat, qui immeritis honoribus superbiunt.

MULIER ET GALLINA.

Mulier quaedam habebat gallinam; quae ei quotidie ovum pariebat aureum. Hinc suspicari coepit illam auri massam intus celare, et gallinam occidit. Sed nihil in ea reperit nisi quod in aliis gallinis reperiri solet. Itaque dum majoribus divitiis inhiabat, etiam minores perdidit.

VOCABULARY.

Vulpes, is, f. *a fox*; perterreo, ēre, ui, ĭtus 2, *to alarm*; conspicor, ari, atus sum, dep. *to behold*; nequaquam, *by no means*; cancer, cri, m. *a crab*; obliquus, *oblique, across, sidewise*; gressus, ūs, m. *a step*; pergo, pergere, perrexi, perrectum 3, *to proceed*; rectā, viâ, *in a straight path, straight forward*; dissidium, i, n. *disagreement*; lanio, are 1, *to cut up like a butcher, tear, rend*; quantum boni, literally, *how much of good*, that is, *how much good*; tanquam, *as if*; emineo, eminēre, eminui 2, *to show one's self*; pistrinum, i, n. *a mill*; petulantia, ae, f. *impudence*; inhio 1, *to grasp at, to long for, to covet*; perdo, perdere, perdĭdi, perdĭtum 3, *to lose, destroy*.

THE PHILOSOPHY OF STUDY.—No. II.

"Industry is the law of our being: it is the demand of nature, of reason, and of God."

ADVICE is good or bad according to the result which it produces. The advice which we gave in our last lesson on the necessity of forethought may be good advice to some, but it is likely, if left alone, to prove bad advice to others. Men when driven from one extremity are ever apt to fly to another,—or rather, they carry their old principle into their new course of action, and instead of the result desired, produce a new one as opposed to it as the course they have left.

Reflection rightly exercised is opposed to rashness, but those who have been accustomed to act inconsiderately, will, when called to reflect, carry their want of consideration even into the act of reflection.

We are not prepared to enter here into a full consideration of the nature of forethought and the manner in which it ought to be exercised, but it is necessary that we should say something of it in order to prevent the misapplication of the advice which we have already given. Nothing will better serve this purpose than to inculcate the necessity of patience, both for learning the nature and acquiring the habit of this kind of reflection.

We have said that forethought is a consideration of the advantages and disadvantages of the course which you propose to pursue; we may add that it is a consideration of every possible course in order that you may choose the best.

From these statements we may make the two following deductions. That as the exercise of forethought implies the consideration of many things with which we are imperfectly acquainted, it is not fitted to lead to conclusions of absolute certainty, or to give the assurance of dogmatical accuracy; and, that even if possessed of all the materials for a correct decision, it were idle to expect an unpractised judgment to lead at once to the proper conclusion.

Our object in making these observations is to show that forethought does not render us independent of experience; at the same time it must be remembered, that, while it is only a degree of uncertainty which attaches to the exercise of forethought, all is uncertain without it. Whether your information be great or small, whether your judgment be strong or weak, you may be sure of arriving at a better conclusion as the result of deliberation, than you could reach without it, and this while you are maturing your judgement, and rendering its decisions more unerring for the future.

We should learn from this the necessity of distinguishing between persistence and perseverance, and the danger of imagining that when once we have decided on a course of action, we may adhere to it for ever after. We should exercise forethought continuously, and study to keep our judgments untrammelled by past conclusions, as they will impede their exercise and hinder their growth; thus forethought will enable us to profit by experience, and experience teach us to exercise forethought.

Trusting that these hints will be sufficient to prevent any hasty misapplication of what we have said on the exercise of forethought, we will now proceed to the next part of our subject, the consideration of the plan of study.

He whose eye has scanned the boundary of a mighty forest till he has formed a conception of its grandeur and magnificence, or whose footstep has measured its depths till he has familiarised himself with its variety of form and foliage, may form a conception of the power of development in material things, when he conceives it shrunk up into a single seed for each species which it incloses in its countless combinations. From the effects of development in the world of matter, we may form an idea of its power in the world of mind. There is no better test of truth than its productiveness. One correct idea rapidly branches forth into others; it attracts to itself nourishment from all around it, and grows on the materials of everyday observation and experience. The first principles of knowledge are few, simple, and obvious; so are the first principles of the art of acquiring it. Let it not be supposed, then, that in treating study as a science, we are introducing you to vague and abstract discussions on matters of remote or uncertain import; it is our object, on the contrary, to set before you those simple and obvious elementary truths, which, if fairly received and fully carried out, will secure for themselves a development which will put our labour in inculcating, and yours in receiving them, at as great a disproportion to their results as is the single seed to the stately forest.

Whoever studies must of necessity have a plan of study,—that is to say, he must have something which he proposes to do, and a certain way in which he proposes to do it. There is labour to be undergone, and he must have the expectation of advantages to be derived from it; there is an end to be gained, and he must have the conception of means to attain it.

Let us see what extent of consideration is necessary to lead to this result.

The choice of a plan of study may be arbitrary, or it may be intelligent. By an arbitrary choice we understand one which is formed without a decisive reason; by an intelligent choice one which proceeds on a full knowledge and accurate understanding of everything that affects its wisdom or folly.

From this it will be seen that an arbitrary choice is not necessarily an unreasonable one. Where there is sufficient ground for the decisive choice of one of two courses, it is unreasonable not to adopt it; but where it is necessary to make a choice without such reasons as to render the adoption of one of the alternatives imperative, it is proper to choose that which appears the best, although the choice is arbitrary to the extent to which the grounds for it are imperfect. An arbitrary choice, then, is reasonable only when an intelligent one is impossible.

The choice of a plan of studies is arbitrary when the grounds of its adoption are derived from a partial consideration of the end for which it is intended, and the circumstances in which it is made. Let us consider how far such a choice is reasonable.

The object with which we enter on this investigation is to show the importance of an intelligent choice of studies. To effect this there are two objections which it is necessary to answer,—first, that which questions the possibility of such an investigation as this supposes; and second, that which questions its propriety. The first may be very summarily disposed of. We only ask an investigation to the extent to which it is possible, and the difficulty of carrying it to a state of absolute completeness does not hinder it from being pushed to the utmost limit which the intelligence of the student renders practicable. It only remains to show that it is advisable to do so.

In every practical undertaking we meet with those who are fonder of action than of reflection; to such, an arbitrary decision presents a ready way of cutting short a long investigation, and they may be ready to object that there are shorter and better ways of reaching the same result than that which we propose. It is true there are certain considerations which occur obviously to every one who proposes to enter on a course of study, and on which it may be easy for him to found a plan of procedure; and we readily admit that these considerations are usually the most valuable, but they are not the only one, and the object to be

gained by them may frequently be defeated by a want of proper attention to others; and even these considerations themselves have a much deeper import, and require a more extensive investigation, than is apparent from any view of them which may present itself to the unreflecting.

There are three objections to which any plan of study founded on merely obvious considerations is liable. First, it involves a waste of time; second, it involves a risk of failure; and third, it involves a sacrifice of enjoyment. We will take a single illustration of these objections from what is perhaps the most common consideration in the choice of studies—that of taste. There are two things to be gained in the prosecution of any study; in order to obtain the full advantage of either, it is necessary that it should be kept in view both in its selection and pursuit. The one is the knowledge which we derive from the study itself, the other the facility which it gives us for the pursuit of other studies. Taste has regard only to its immediate object; therefore if we make it the sole consideration in the choice of our studies, we overlook altogether the half of the object of study; and no one who knows what study is will suppose that the advantages which are thus overlooked, will be gained to the same extent in the mere course of study which takes no cognisance of them, as if they were made one of its primary objects; and it is obvious that when two objects are to be gained, it is a waste of time to gain only one of them. But taste not only leads to the neglect of part of the aim of study, it leads also to the choice of inappropriate studies. There is a tendency among students to prefer the more advanced studies as apparently the most attractive, and this tendency constantly leads to the selections of studies for which they are not prepared. Hence, repeated and vexatious failures, and the ultimate risk of becoming disgusted with study altogether. From this it will be obvious that by making taste the sole guide to our studies we frequently defeat our own end, which is to increase the enjoyment of study; and a little further consideration will serve to show that we always do so. If enjoyment were merely a contingent of study, we might at least be certain that in consulting our taste we were taking the best means to secure it; but it is not so. The student has a right to expect enjoyment in his studies. There is enjoyment in the exercise of his powers, enjoyment in their expansion, enjoyment in the discovery of truth, and enjoyment in the contemplation of the beautiful. All these enjoyments, study is fitted to give, and we have a right to look for them at every step of our progress. But how and in what proportion? In proportion certainly to the progress we make; and as by studying taste alone, we lessen our progress in knowledge, we lessen also our enjoyment of study.

Whether the choice of studies be arbitrary or not, it usually proceeds from a complication of reasons. It is possible, therefore, that the simple consideration which we have presented in this illustration, may not be the sole one of any particular student; but the principle which it serves to illustrate holds good in every case where any important consideration is omitted, namely—that such an omission is certain to occasion a similar deficiency in the plan of study. We may therefore generalise the deficiencies brought out in this particular case, and say that every plan of study chosen on arbitrary grounds is liable to these three objections:—

First. The danger of omitting part of the object of study;
Second. The danger of choosing inappropriate studies; and,
Third. The certainty of lessening the enjoyment of study.

LESSONS IN ENGLISH.—No. XXIX.

By JOHN R. BEARD, D.D.

GREEK STEMS. *(Concluded.)*

THE word metropolis, literally *mother-city*, shows how much terms, while they retain a trace of their primitive meaning, in process of time, deviate greatly therefrom. *Metropolis* originally had reference to the Greek system of colonisation, and was equivalent to our term *mother-country*; that is, the country to which each colony belonged. Properly, then, metropolis is the *mother-country* (in German, *father-land*), and the counterpart was *colony*. Here, metropolis retains its etymological signification, for Athens (for instance) was the mother of the colonies she planted. But now the metropolis of England, namely, London, stands in no strictly maternal relation to the provinces or even to the colonies of the empire. London is not the mother-city of the population of Lancashire, or of Calcutta, and its claim to bear the name metropolis arises almost exclusively from the fact that it is the centre of the empire, and the seat of its central government. So marked an instance of the departure of a word from its primitive meaning may teach you how cautious you should be in the etymological study of words, and how necessary it is in such studies to call in the aid of history and general knowledge.

Our word *pyre* is from the Greek pyr.

> "When his brave son, upon the fun'ral *pyre*
> He saw extended, and his beard on fire." *Dryden.*

From pyr and latreia (Gr. *worship*) is formed pyrolatry, or *fire-worship*, and from the same, with manteia (Gr. *divination*), is formed pyromancy, *or divination by fire*.

"Divination was invented by the Persians, and is seldom or never taken in good sense; there are four kinds of divination, *hydromancy, pyromancy, aeromancy, geomancy*."—*Aylife.*

These four kinds you ought now to be able to make out for yourself, if I tell you in addition that *aer* is the Greek for *air*, the two terms being different forms of the same word.

From pyr we have also *pyrotechnics, the art of making fire-works*. *Pyra*mid is derived from the same, as appears from the following instructive quotation:—

"The seven *pyramids* that are become wonders of the world; which in how long a time and with what difficulty they were brought up so high, Herodotus sheweth; towers they be, erected to such an height as exceedeth the handywork of man; of a huge breadthe in the bottome, and rising to a most sharp-pointed top; which figure in geometry is termed *pyramis*, for that [like] *to the form of fire*, it cometh to be small in the head, in fashion of a cone or pine-apple."—*Holland.*

Sarcophagus, or *flesh-devourer*, the Greek name for coffin, had its origin in the fact that a stone (alumen schisti) was employed for the purpose, which had the quality of accelerating decomposition. According to Pliny, bodies put into such coffins were, except the teeth, totally destroyed within forty days. Perhaps from religious considerations the Greeks took means to hasten the breaking up of the frame, as is instanced in their practice of burning the dead.

Strophé, which properly signifies *a turning*, was the portion of a song which was sung in the Greek theatre while the chorus moved from one side of the stage to the other; when they began to move in the opposite direction, they sang the *anti*strophé, or *opposite* strophé.

To some it may not appear that enthusiast comes from theos; in the Greek original, however, the derivation is clear. Enthusiasm, according to its derivation, denotes the presence of God in the soul, and an enthusiast was one who had God in his soul. Hence, anciently, enthusiasm was the same as inspiration. By degrees the word fell into bad odour, as may be seen in these words:—

"I mean *enthusiasm*, which, laying by reason, would set up revelation without it. Whereby in effect it takes away both reason and revelation, and substitutes in the room of it the ungrounded fancies of a man's own brain, and assumes them for a foundation both of opinion and conduct."—*Locke.*

The word is, however, also taken in a good sense, and then has for its inferior partner fanaticism:—

> "He comes! he comes! the saviour of the land!
> His drawn sword flames in his uplifted hand,
> *Enthusiast* in his country's cause." *Logan.*

Zoology is *the science of life*, that is, of animal life, as may appear in the quotation:—

"*Zoology* is the noblest part of natural history, as it comprehends all sensitive beings, from reasonable man, through every species of animal life, till it descends to that point where sense is wholly extinct, and vegetation commences."—*Pennant*, "British Zoology."

Azote, literally *life-less*, is also the name of the gas called nitrogen, in which animal life cannot be sustained.

The Greek *a* privative is found in several other words which form part of our language. It appears in *azymes*, mentioned in the preface to King James's translation of the Bible, and in the Rheims version of 1582. The word is made up of *a*, *not*; and *zyme*, *leaven*.

I subjoin several translations of the words found in Matt. xxvi. 17:—

"In the first days of *therf* loaves."—*Wiclif*, 1380.
"The fyrst daye of *swete* breed."—*Tyndale*, 1534.
"The fyrst daye of *swete* breed."—*Cranmer*, 1539.
"On the fyrst day of the feast of *vnleavened* bread."—*Geneva*, 1557.
"The first day of the *Azymes*."—*Rheims*, 1582.
"The first day of the feast of *unleavened* bread."—*Authorised*, 1611.

The *a* privative is found also in *asbestos* (a, *not*; and sbennumai, *I burn*) literally *unburnable*. Asbestos is a species of fossil stone which may be split into threads and filaments from one inch to ten inches in length, very fine, brittle, yet somewhat tractable, silky, and of a greyish colour: also endued with the property of remaining unconsumed in fire. This stone is said to be found in Anglesey and in Aberdeenshire. Out of it the ancients made the cloth which is known under the same designation. By enveloping the body in a covering of asbestos, the ancients, in burning corpses, kept the ashes of the corpse separate from the ashes of the fuel, and so had the former for preservation in funereal urns.

Exercises for Parsing.

A pedagogue is a term of Greek origin equivalent to our schoolmaster. Pedagogue is a word which is now used contemptuously. In an oligarchy the interests of a few predominate. In a democracy the interests of the many prevail. The real and the apparent interests of men are sometimes very different. A polemical spirit is undesirable. Polemical writings are occasionally required. The character of the apostle Paul is very noble. Apostolical virtues are rare. The apostles received their mission immediately from Christ. Without enthusiasm the best of causes cannot be carried forward. Enthusiasm is in danger of degenerating into fanaticism.

EXERCISES IN COMPOSITION.

Words with their Prepositions to be formed into sentences.

	F. R.
Ballot for,	Fr. ballotte, *a little ball*
Banish from,	Fr. bannir, *to banish*
Bare of,	Sax. bare, *naked*
Bargain for,	Fr. barguigner, *to hesitate, chaffer*
Bear up, on, with,	Sax. beoran, *to carry*
Beguile of,	Fr. guiller, *to conceal*
Believe in,	Gr. glauben, *to believe*
Belong to,	Gr. belangen, *to belong to*
Bereave of,	Sax. bereafian, *to take away from*
Bestow on,	Sax. bestandan, *to give*
Betray to,	Fr. trahir, *to betray*
Betroth to,	Sax. treoth, *fidelity*
Bigotted to,	Sax. bigan, *to bow, to worship*
Bind to, in, up, on,	Sax. bindan, *to surround with cord*
Blame for,	Fr. blamer, *to blame*
Blush at,	Sax. blosen, *to be red*
Boast of,	Welsh, bostio, *to brag*
Border on,	Fr. border, *to edge*
Brag of,	Welsh, braggio, *to vaunt*

Report the following anecdote:—

Escape of the Duke of Albany.

King James III., of Scotland, after his marriage with Margaret, Princess of Denmark, having disgusted his proud nobility by patronising and receiving into favour many persons of inferior rank, deep and dangerous intrigues were formed against him. By these minions and upstart counsellors he was speedily made aware that his brothers—Alexander, Duke of Albany, and John, Earl of Mar—were forming conspiracies against him, and that the former aimed at nothing less than wresting the sceptre from his hand,—a fact which has since been proved by authentic documents. In 1482, Albany was committed to the Castle of Edinburgh, where he was kept a close prisoner by those who knew that his accession to power would assuredly be their destruction. He had not been long in durance until he formed and matured a plan of escape, which, with desperate courage, he executed in the following manner. Terrified by the mysterious fate of Mar, and aware that his day of trial was approaching, some of Albany's numerous friends in France or Scotland, contrived means to acquaint him that a small vessel, laden with Gascon wine, lay in the roadstead of Leith, by which he might escape if he made an effort. The tower in which he was confined was probably *David's*, for we are informed that it "arose from the *northern* verge of the rock on which the castle is founded, where the height of the precipice seemed to bar all possibility of escape." He had but one attendant (styled his chamber-chield) left to wait upon him, and to this trusty follower alone he revealed his intention. From the French vessel he received two small rumlets or barrels of wine, which luckily the castle-guard permitted to be carried into his apartment untasted and unexamined. On opening them in private, the duke found that they contained Malvoisie, and, what was of more importance, a strong rope and a waxen roll inclosing an anonymous letter, urging him to lose no time in attempting to escape, as the king's minions had determined he should die *ere the morrow's sunset*; and the billet ended by an assurance that the boats of the French vessel should await him at the shore of Leith. The first point to be gained was to lull the suspicions of the captain of the guard, for which purpose the duke invited him to supper, and by pressing him and three of his soldiers to drink freely of the Malvoisie, succeeded in partially intoxicating them. After gaming and drinking until the hour grew late, Albany found the moment for action had come! Rushing upon the captain, he snatched a long dagger from his baldrich, and buried it repeatedly in his breast; then, quick as thought, he despatched the intoxicated soldiers in the same manner, and, in token of his hostility and contempt (with the assistance of his chamber-chield), he savagely threw the bodies on the great fire that blazed in the stone fire-place of the tower; and there in their armour they broiled and sweltered like tortoises in iron shells. Having secured the keys of the doors, they locked them as they retired, and stealthily hurried to the wall, which they prepared to descend at the most retired part. The chamber-chield lowered himself first over the beetling crag, which is two hundred feet in height, but the cord proving too short, it slipped suddenly through his hands, he fell to the bottom, and there lay senseless. We may imagine how the heart of the blood-stained Albany must have beat at this terrible crisis! Every moment was fraught with danger, and his death or life were hanging by a hair. Rushing back to his apartment in the tower, he tore the sheets from his bed, twisted them into a rope, lengthened the cord, looped it around an embrasure, and, lowering himself over the rampart, and the rugged rocks it overlooked, reached the bottom in safety. There he found his attendant stretched on the ground, with his thigh-bone broken. Unwilling to leave behind him, to the mercy of his enemies, one who had been so faithful, Albany, with a sentiment of gratitude which seems almost incompatible with his previous ferocity, lifted him on his shoulders, and, being a man of gigantic stature and uncommon strength, carried him thus with ease to Leith, where they embarked without delay; and, setting sail before the rising sun brightened the German sea, cast anchor under the towers of Dunbar, the patrimonial castle of Albany. During the whole night nothing was known of his escape; but daylight revealed the rope and twisted sheets hanging over the northern ramparts; there was immediately given an alarm, which the dreadful stench in David's tower must have increased. His flight was discovered, and the half-consumed corpses were found in the fire-place of his chamber. Enraged and confounded, James III. refused to credit the intelligence until he had examined the place in person.—*Memorials of the Castle of Edinburgh, p. 52-56.*

LESSONS IN GEOLOGY.—No. XXIII.

By Thomas W. Jenkyn, D.D., F.G.S., &c.

CHAPTER II.

ON THE ACTION OF WATER ON THE EARTH'S CRUST.

SECTION VII.

ON THE DISINTEGRATING POWER OF FALLING WATER.

The abrading power of running water has been already explained and instanced in the slow erosions of the Simeto, in Sicily, and in the magnificent excavations of Niagara. In the mechanical action of a stream, then, there are modifications and accessions of power, for the consideration of which we had no space in our last lesson.

The design of the last lesson was to illustrate the abrading power of water in gliding along the surface and against the sides of a rock. It showed that the mechanical power of rivers to abrade rocks is greatly increased by its motion, its weight, its rapidity, and by the attrition of the gravel, and the pebbles, or logs of wood, which the current bears along with it. All these aqueous powers are multiplied when a river falls perpendicularly in cascades and cataracts.

The destructive power of a waterfall will, of course, be according to the weight of the volume of water that falls, and according to the depth to which it falls. You are aware that whatever be the weight of a volume of water at the ledge over which the cataract dashes, that weight is multiplied by every foot and inch that it falls. The knowledge of this modification of aqueous action is useful, not only to understand the excavation of river gorges, and the progressive recession of

the falls of a stream, but also to account for columnar masses of rocks which are found as a series of pillars running across the bed of a river, and for the pepetual deepening of the narrow ravine or cleuch in which the waterfall is found.

Your conception of the form of a cataract will be rendered more distinct and vivid by the aid of fig. 51, which represents the cataract of the Giessbach, one of the most beautiful and picturesque in Switzerland. The calm water before and beneath you is the Lake of Brientz, so called from the village that you see at the extremity of the lake. Imagine yourself to be coming westward from Brientz in that skiff which you see on the lake. As you approach the south-eastern shore, you have a full view of the river Giessbach, tumbling, dashing, and foaming into the lake. You land, and climb to an overhanging ledge whence you look up to the successive

Fancy yourself placed in the position of either of the observers represented in the picture. You see that the cavernous gallery is formed in the shape of a crescent on a ledge of rock overhanging an awful abyss. You stand behind the cataract, where you see nothing but the descending sheet of water, which, to all appearance, seems to fall from the sky. In the illustration of the abrading power of the Falls of Niagara, it was mentioned that the ledge of limestone over which that river falls is perpetually undermined by the decay and crumbling of the shales which underlie it. This gallery behind the cascade of the Giessbach will give you a good idea of the cavern that is formed behind the Falls of Niagara, into which some adventurous travellers have the courage or the rashness to enter. This gallery behind the Giessbach furnishes you with a good apartment for studying, geologically, the

Fig 51.

Cataract of the Giessbach, Bernese Oberland, Switzerland.

heights that peer towards the Faulhorn, and see five or six sheets of silver foam one above the other, and all rushing with terrific impetuosity towards you. One of these falls is sixty feet deep, and another one hundred. This series of cascades has altogether a fall of two thousand feet, a depth equal to half the height of Snowdon or Ben Nevis. You climb, again, to a rude bridge thrown across the tremendous chasm, and here, as you look upward, the torrent rages as if to overwhelm you; and if you look downward, you see it raging in foams into depths you know not where. You ascend yet higher up a zig-zag path on the acclivity, and you come to a crescent-shaped gallery, or cavern, which has been hollowed out in the rock by the chemical action of the spray, and by the mechanical force of the gusts of wind which drive the spray against the sides.

abrading action of the stream on the roof over you, and the disintegrating force of the cataract at the bottom of the abyss below.

If a geologist finds "books in the running brooks," he has illuminated editions of them in cataracts and cascades, which illustrate many phenomena of great interest. Your own country, especially Wales and Scotland, supply you with many scenes for studying the phenomena of a river leaping from ledge to ledge, and rushing from basin to basin scooped in the rock.

At Devil's-bridge, near Aberystwyth, South Wales, the torrent Mynach has a series of four successive and concatenated cascades from ledge to ledge. The first is where the river is much confined by rocks. Here it is propelled with a velocity that drives it six feet beyond the ledge over which it falls, and

at the depth of eighteen feet, sinks into a basin apparently unfathomable, from which it escapes and immediately plunges sixty feet, and in the course of a few yards another twenty feet. It here forms another basin amidst prodigious rocks, and then in one unbroken torrent it falls one hundred and ten feet. The cascades, altogether, fall two hundred and ten feet.

In many instances, where a waterfall has scooped out a deep basin for its waters, the agitated stream in that basin abrades the sides of it perpetually, and, in the line of the direction of the current, or where it meets with a softer portion of the rock, it excavates the rock until it has perforated through it an aperture which lets the struggling waters escape to a lower level. Through the perpetual activity of the water in eroding the lower surface and the sides of this aperture, an arch is formed over the cascade. The combination of the chemical and mechanical powers of the spray wears away the upper part of the arch so completely as that only the sides remain, either as walls or in many instances as pillars. This is the case at Pistyll Rhaiadr, in North Wales, the highest cataract in the Principality. The entire fall is two hundred and forty feet. For about one hundred and seventy feet the stream flows down the perpendicular sides of the slate rock. It then meets a projecting ledge. After forming a basin in this ledge, it perforates an outlet through the rock, from which the torrent plunges another seventy feet. This perforated rock now forms an arch over the lower cascade.

The manner in which cataracts fall upon projecting ledges, wear away fragments of the rock, form deep basins under their falls, and then escape in fissures which they have either perforated through the rocks or abraded on their surface—and also the manner in which large boulders of stone and heavy logs of wood increase the disintegrating power of the stream—is well exhibited in the illustration, fig. 52, representing a waterfall under the celebrated bridge of Cauterets, so terrible to travellers in the Pyrenees.

After a careful observation of the various geological phenomena represented in this engraving, imagine what must be the effect of such a series of cascades when they occur in an immense body of water such as a first-rate American river. If the North American river Niagara furnishes the most stupendous example of a perpendicular cataract, it is probable that vast river the Orinoco, in the north part of South America, presents the most magnificent specimen of cascades known in the world. So majestic is this river, that when Columbus approached it, he thought that it was one of the famous rivers that flowed from the Garden of Eden.

Where this river enters the sea on the north coast of South America, its current between the continent and the island of Trinidad is so powerful and violent, that ships, with all sails set and with a favourable breeze, can scarcely make way against it. Here detached cliffs rise above the foaming flood like so many towers. These cliffs must once have been continuous, and have formed one high mass of rock, over whose height this mighty stream must have flowed and dashed before they were severed by the force of the current. There are now visible geological proofs that at that epoch the island of Trinidad was united to the coast.

Fig. 52.

The Cascade of Cerisaio, under the bridge of Cauterets, in the Pyrenees.

High up its course, near San Fernando, are the celebrated waterfalls of Atures and Maypures, commonly called by geographers the "the cataracts of the Orinoco." In this district the river bed is everywhere hemmed in by colossal masses of rock. Ledges of rock also run across the stupendous river, so as apparently to divide its bed into enormous separate reservoirs. Near the village of Maypures the foaming flood now runs at the foot of a mountain, but on both sides of it there are clear indications that, at a former age, even in historical time, its bed was thirty feet above its present level.

The cascades of the Orinoco, at Maypures, are not, like those of Niagara, formed by the single precipitous descent of a vast mass of water, nor are they of the character of narrow passes or rapids through which a river runs with accelerated impetuosity. These falls of the Orinoco consist of a countless number of small cascades, succeeding each other from ledge to ledge like steps, for the distance of four miles. Some of these steps are only two or three feet high, and others are much higher, averaging nine or ten feet.

At the commencement of the cascades, this large river has contracted itself into the breadth of nearly two miles, and in the course of the falls, this mass of water is narrowed into a bed of twenty feet wide. From a point at the lowest cascade, when you look upward in a southerly direction, the river presents a scene of unequalled wonder. You see nothing but one foaming surface for four miles. A perpetual mist hovers above the tremendous flood, and when the sun shines in the evening its rays are refracted in the exhalation, by means of which coloured bows glitter, vanish, and re-appear, and the ethereal image is swayed hither and thither by every sportive breeze. The noise produced by the struggling, rushing, dashing, and foaming of such a magnificent river, over such a series of ledges, and through such narrow gorges, is overwhelming. The result will be in the course of ages that the mighty stream will either wear these ledges into one inclined plane, and thus form a rapid four miles in length; or, perhaps, abrade these rocks backward, and thus form a huge cataract.

LESSONS IN FRENCH.—No. XXXVIII.

By Professor Louis Fasquelle, LL.D.

Section LXXXVI.

1. The nominative pronouns *je, tu, il, elle, nous, vous, ils, elles*, must be repeated, when the first verb of the sentence is negative, and the second affirmative, when the verbs are in different tenses, and when the different prepositions are connected by conjunctions other than *et, ou, ni, mais* [§ 99, 2]:—

Il ne lit pas; il écrit.	*He does not read; he writes.*
Elle ne viendra pas; elle est partie.	*She will not come; she is gone.*

2. The pronouns of the third person are often omitted before the second verb in cases not coming within the above rule. The other nominative pronouns are also, sometimes, omitted. We should, however, not advise the student to omit the latter pronouns. It is always correct to repeat the nominative pronouns.

3. The student will bear in mind, that the objective pronouns must always be repeated.

4. Connaître à answers to the English expression, *to know by*:—

Je le connais à sa démarche.	*I know him by his walk (carriage).*

5. Connaître de nom, de visage, de vue, mean, *to know by name, by sight.*

6. Se connaître à quelque chose, or en quelque chose, corresponds in signification to the English expression, *to be a judge of something*:—

Vous vous connaissez en pierreries.	*You are a judge of precious stones.*

Résumé of Examples.

Je le connais, je l'aime, et je lui rends justice. GRESSET.	*I know him, love him, and do justice to him.*
Il s'écoute, il se plaît, il s'adonise, il s'aime. J. B. ROUSSEAU.	*He listens to himself, is pleased with himself, adorns himself, loves himself.*
A quoi connaissez-vous ce monsieur?	*By what do you know that gentleman?*
Je le connais à son habit noir.	*I know him by his black coat.*
Je le connais de vue.	*I know him by sight.*
J'ai reconnu ma mère à la voix.	*I recognised my mother by her voice.*
A quoi vous connaissez-vous?	*Of what are you a judge?*
Je me connais en marchandises.	*I am a judge of goods.*
Je ne m'y connais pas.	*I am not a judge of it (of them).*
Il ne s'y connaît point du tout.	*He is not the least judge of it (of them).*
Il s'y connaît mieux que moi.	*He is a better judge of it (of them) than I.*
Je m'y connais aussi bien que lui.	*I am as good a judge of it (of them) as he.*

Exercise 171.

Artisan, m. *mechanic.*	Etoffes, *cloths of all kinds.*	Grain, m. *grain.*
Blond, e, *light.*	Fabricant, m. *manufacturer.*	Orfèvre, m. *goldsmith.*
Bouclé, e, *curled.*	Forgeron, m. *blacksmith.*	Oeuvre, f. *work.*
Chevelure, f. *head of hair.*	Gestes, m. p. *gestures.*	Poésie, f. *poetry.*
Cheveux, m. p. *hair.*	Gracieux, se, *graceful.*	Tout, *quite.*

1. Ne reconnaissez-vous point votre amie? 2. Je la reconnais à sa chevelure blonde. 3. A quoi reconnaissez-vous cette demoiselle? 4. Je la reconnais à sa démarche gracieuse. 5. N'auriez-vous point connu votre ami à la voix? 6. Je l'y aurais reconnu. 7. A l'œuvre on connaît l'artisan (La Fontaine). 8. Ne le reconnaîtres-vous point à ces marques? 9. Je l'y reconnaîtrai. 10. Cet orfèvre ne se connaît-il point à cela? 11. Il ne s'y connaît point du tout. 12. Vous y connaissez-vous aussi bien que le forgeron? 13. Je m'y connais tout aussi bien que lui. 14. Ne vous connaissez-vous point en poésie? 15. Je ne m'y connais guère. 16. Le fabricant se connaît-il aussi bien en étoffes qu'en grain? 17. Il ne connaît beaucoup mieux à celles là qu'à celui-ci. 18. Ne reconnaissez-vous pas ce monsieur à ses gestes véhéments? 19. Je le connais à ses cheveux bouclés. 20. Ne vous êtes-vous pas fait connaître (*told your name*)? 21. Je me suis fait connaître. 22. Ne nous ferons-nous pas connaître? 23. Vous vous ferez connaître. 24. Ils se feront connaître par leurs vertus (*they will make themselves known*).

Exercise 172.

1. Do you not know that man? 2. Yes, Sir; I know him by his large (*grand*) hat. 3. By what do you recognise me? 4. I recognise you by your walk. 5. Do you recognise my friend by his gestures? 6. No, Sir; I recognise him by his black coat. 7. Do you know him well? 8. I know him by sight, but I have never spoken to him. 9. Are you a judge of iron? 10. No, Sir; the blacksmith is a judge of iron. 11. By what will you know your book? 12. I shall know it by those marks. 13. Have you not known your friend by her voice? 14. No, Madam; I knew her by her light hair. 15. Have you told your name? 16. I have not told my name. 17. Did you know your sister's friend by her curled hair? 18. I knew her by it. 19. Is the merchant a good judge of cloth? 20. He is a better judge than I. 21. Is he a better judge of it than the manufacturer? 22. He is quite as good a judge as he. 23. Is not the goldsmith as good a judge of precious stones as you? 24. He is a better judge of them than I. 25. Of what are you a judge? 26. I am a judge of nothing. 27. Are not your sisters good judges of poetry? 28. They are not the least judges of it. 29. Do you not know that young lady by her dress (*robe*)? 30. I know her by her graceful carriage. 31. Have they made themselves known? 32. They have made themselves known by their merit (*mérite*). 33. Is not the workman known by his work? 34. The workman is known by his work. 35. He is a judge of it.

Section LXXXVII.

1. Quelque, *whatsoever, however, some, any*, followed by a noun takes the form of the plural. It is invariable, when it is followed by an adjective or an adverb [§ 97 (1) 2, 3]:—

Quelques livres que vous ayez.	*Whatever books you may have.*
Quelque bons qu'ils soient.	*However good they may be.*

2. Quel que, followed by a verb, is written as two words, the first (*quel*) agreeing in gender and number with the nominative of that verb [§ 97 (1) 1]:—

Quelles que soient vos vertus.	*Whatever your virtues may be.*

3. The above examples show that quelque—que and quel—que govern the subjunctive.

4. Tout meaning *entirely, quite, nothing but*, though an adverb varies through euphony before a feminine noun commencing with a consonant or an *h* aspirate:—

L'espérance, toute trompeuse qu'elle est, sert au moins à nous mener à la fin de la vie par un chemin agréable. (La Bruyere.) — *Hope, deceitful as it is, serves at least to conduct us to the termination of life by an agreeable road.*

5. The word gré signifying *consent, will, meaning*, &c., forms a number of idioms :—

Je lui sais [savoir, 3. ir.] bon grè de cette action.	*I am thankful to him* (1. e., *owe him good-will*) *for that action.*
Il nous sait mauvais gré de cela.	*He is displeased with us for that.*

Résumé of Examples.

Ne le ferez-vous pas de bon gré ?	*Will you not do it willingly ?*
Il s'est marié contre le gré de ses parents.	*He married against the will of his parents.*
Sa chevelure voltige au gré de vent.	*His hair flutters at the will of the wind.*
Je sais mauvais gré à votre frère de vouloir se mêler de mes affaires.	*I am displeased with your brother for wishing to interfere with my affairs.*
Je lui en sais bon gré.	*I am thankful to him for it.*
J'espère que vous ne me saurez pas mauvais gré, si je ne vous écris pas.	*I hope that you will not be displeased with me, if I do not write to you.*
C'est à mon gre le meilleur enfant du monde.	*He is, to my thinking, the best child in the world.*

Exercise 173.

Bon gré, mal gré, *willing or not willing.*	Men-er, 1. *to take, to lead.*	Secret, m. *secret.*
Chambre, *f. room.*	Nou-er, 1. *to tie, to fasten.*	Silence, m. *silence.*
Gard-er, 1. *to keep.*	Oblig-er, 1. *to oblige.*	Suite, *f. consequence.*
Lit, m. *bed.*	Offre, *f. offer.*	Vol-er 1. *to fly.*
Malgré, *in spite of.*	Recommand-er, 1. *to recommend.*	

1. Savez-vous mauvais gré à votre oncle de ce qu'il a dit ? 2. Je ne lui en sais aucun mauvais gré (Voltaire). 3. Ne me sauriez-vous pas bon gré si je vous menais avec moi ? 4. Je vous en saurais le meilleur gré du monde. 5. Ne leur savez-vous pas bon gré d'avoir gardé ce secret ? 6. Je leur sais bon gré de l'avoir gardé. 7. Ne leur avez-vous pas recommandé de garder le silence ? 8. Je leur ai recommandé de le garder. 9. Ce malade garde-t-il encore le lit ? 10. Il ne garde plus le lit, mais il est encore obligé de garder la chambre. 11. Votre chevelure est-elle bien nouée ? 12. Non, Monsieur, elle vole au gré du vent. 13. Garderez-vous votre domestique ? 14. Je le garderai, il fait tout à mon gré. 15. Quelques offres qu'on lui fasse, il ne veut pas me quitter ? 16. Quelque bonnes que soient ces dames, elles ne sont pas à mon gré. 17. Quelles que soient les suites de cette affaire, je vous sais bon gré de vos intentions ? 18. Toute belle qu'elle est, elle n'est pas à mon gré. 18. L'avez-vous fait malgré vous ? 20. Non, Monsieur ; je l'ai fait de bon gré. 21. Bon gré, mal gré, il patira. 22. Me garderez vous le secret ? 23. Je vous le garderai. 24. Il change d'opinion au gré des événements.

Exercise 174.

1. Will he marry against his father's consent ? 2. He will not marry against his parent's consent. 3. Why are you displeased with me ? 4. I am not displeased with you. 5. Is your little girl's hair tied ? 6. It is not tied ; it waves (*flotte*) with the wind. 7. What do you think of my book ? 8. It is, in my opinion, the best book that I have read [Sect. 73, 3, 4]. 9. Will you not be displeased with me, if I do not come to-day ? 10. I shall not be displeased with you. 11. Will you not read that letter ? 12. However well written it may be, I will not read it. 13. Are those ladies handsome ? 14. However handsome and good they may be, they do not strike my fancy. 15. Are you displeased with my brother ? 16. No, Sir, I am thankful to him for his intentions, whatever may be the consequences of his conduct. 17. Will you keep this secret (for me) ? 18. I will keep it willingly. 19. Does your sister keep her bed willingly ? 20. She does not keep her room willingly. 21. Willingly or not, she must keep ner room when she is sick ? 22. Will you keep silent on this point ? 23. I will willingly. 24. I am thankful to you for your good intentions. 25. Are you thankful to him for this (*de cela*) ? 26. I am thankful to him for it. 27. Will the judge keep his servant ? 28. He will keep him. 29. Does he do his work to his fancy ? 30. He does it to his fancy. 31. Is your brother obliged to keep in the house ? 32. He is obliged to keep his bed. 33. Has he not left his room ? 34. He has not yet left his room ; he is too sick to leave it. 35. I should be under the greatest obligations in the world to you, if you would do this.

Section LXXXVIII.

1. Servir [2. ir.] is used in French in the sense of the English expression *to help to* :—

Que vous servirai-je ?	*To what shall I help you ?*
Vous servirai-je de la soupe ?	*Shall I help you to some soup ?*
Vous n'avez pas servi monsieur.	*You have not helped that gentleman.*

2. Je vous remercie, *I thank you*, said in answer to an offer, is in French always a refusal. This phrase is never employed like the English expression, *I thank you for* (*this* or *that*), to signify a request. The French make use of other forms : — Oserai-je vous prier de ..... Oserai-je vous demander ..... Je vous prie de ..... Je vous prierai de ..... :—

Oserai je vous demander une aile de cette volaille, un morceau de ce rôti ?	*I will thank you for a wing of that fowl, a slice of that roast meat.*

3. S'il vous plait, corresponds to the English, *if you please*. The verb is used unipersonally in that sentence and in the following :—

Comme il vous plaira.	*As you please.*
Il ne me plait pas d'y aller.	*It does not suit* or *please me to go there.*
Que vous plait-il ?	*What would you please to have?*

4. Au plaisir de vous revoir, au revoir, adieu, jusqu'au revoir, mean *till I have the pleasure of seeing you again, till I see you again*, &c.

Résumé of Examples.

Qu'aurai-je le plaisir de vous servir ?	*To what shall I have the pleasure, of helping you ?*
Je vous demanderai un morceau de ce jambon.	*I will thank you*, or *I will trouble you, for a slice of that ham.*
Vous offrirai-je un morceau de ce rôti ?	*Shall I offer you a slice of this roast meat ?*
Je vous remercie, Monsieur ; je prendrai de préférence une aile de cette volaille.	*I thank you, Sir ; I would prefer a wing of that fowl.*
N'a-t-on pas encore servi ?	*Is not the dinner yet on the table ?*
Je vous souhaite le bon soir.	*I wish you good evening.*
J'ai souhaite le bonjour à Madame.	*I have wished the lady a good morning.*
Ayez la complaisance de vous asseoir.	*Have the goodness to sit down.*
Messieurs, ayez la complaisance d'entrer.	*Gentlemen, have the kindness to walk in.*

Exercise 175.

Adieu, m. *adieu.*	Grâces, *f. p. thanks.*	Pri-er, *to beg, to desire.*
Aile, *f. wing,*	Jambon, m. *ham.*	Remercîment, m. *thanks*
Attend-re, 4. *to wait for.*	Légume, m. *vegetable.*	Rôti, m. *roast meat.*
Bouilli, m. *boiled meat, beef.*	Mett-re (se), ir. ref. 4. *to sit down.*	Soupe, *f soup.*
Congé, m. *leave.*	Ortolan, m. *ortolan.*	Suffisamment, adv. *sufficiently.*
Cotellette, *f. cutlet.*	Perdrix, *f. partridge.*	Tranche, *f. slice.*

1. Monsieur, qu'aurai-je le plaisir de vous servir ? 2. Je vous demanderai une tranche de ce jambon. 3. Je vous prie de servir ces messieurs. 4. Oserai-je vous demander un morceau de ce bouilli ? 5. Vous offrirai-je une tranche de ce rôti ? 6. Je vous rends grâce, Monsieur ; j'en ai suffisamment. 7. Mademoiselle, aurai-je l'honneur de vous servir une aile de cette perdrix ? 8. Je vous remercie, Monsieur ; je prendrai de préférence un de ces ortolans. 9. Monsieur, vous enverrai-je de la soupe ? 10. Madame, je vous prie de servir mademoiselle. 11. Je vous en demanderai après. 12. Jean, présentez cette cotellette à monsieur. 13. Ces légumes sont délicieux. 14. Monsieur, je suis bien aise que vous les trouviez bons. 15. Monsieur, ne voulez-vous pas vous asseoir ? 16. Mille remerciments, Monsieur, mon père m'attend à la maison. 17. Ne leur avez-vous pas souhaité le bonjour ? 18. Je leur ai souhaité le bon soir. 19. Leur avez-vous dit adieu ? 20. J'ai dit adieu à mon frère. 21. J'ai pris congé d'eux. 22. Les avez-vous priés d'entrer ? 23. Je les en ai priés. 24. Messieurs, on a servi. 25. Ayez la complaisance de vous mettre ici.

Exercise 176

1. Madam, to what shall I help you ? 2. I will trouble you for a slice of that ham. 3. Shall I send you a wing of the fowl ? 4. No, Sir, I thank you. 5. I thank you, Sir (*s'il vous plait, Monsieur*). 6. Sir, shall I have the pleasure of helping you to a slice of this ham ? 7. I thank you, Sir, I would prefer a slice of the partridge. 8. Shall I offer you a little of this boiled meat ?

9. I thank you, Sir; I have some. 10. Madam, shall I send you a little of this soup? 11. Much obliged to you, Sir [*see* No. 16, *in the above exercise*]. 12. Sir, will you have the goodness to help this young lady? 13. With much pleasure, Sir. 14. John, take this soup to the gentleman. 15. These ortolans are delicious. 16. I am very glad that you like them. 17. Is the dinner on the table? 18. No, Sir; it is not yet on the table. 19. It is too early. 20. Does it please you to go there? 21. It does not please me to go to his house; but I will go, if you wish it. 22. Shall I go with you. 23. As you please. 24. Will not your friend sit down? 25. He is much obliged to you; he has not time to-day. 26. Have you wished your friend a good morning? 27. I wished him a good evening. 28. Have you not bid him farewell? 29. I have bid him farewell. 30. Have the goodness to sit down here. 31. I have taken leave of them. 32. I have taken leave of all my friends. 33. Madam, have the goodness to walk in. 34. We are much obliged to you, Sir. 35. Our father is waiting for us at home.

BIOGRAPHY.—No. VIII.

SAMUEL BUDGETT, THE SUCCESSFUL MERCHANT.

In the little town of Wrington, in Somersetshire, the birth-place of John Locke, one of England's greatest philosophers, Samuel Budgett, the subject of the present notice, was born on the 27th of July, 1794. From this place he was soon afterwards removed to Backwell, and subsequently to Nailsea.

In a brief narration of the leading events of his life, he tells us that the oldest circumstance of any importance which he recollected, was that of a Mr. Taylor, an Irish gentleman, coming to lodge in his father's house, and offering to undertake the education of the children. He acknowledges that his parents were both extremely kind and indulgent; but this offer was so far from producing, as it ought to have done, anything like hope or pleasure in his mind, and made him so much afraid on the occasion (although not aware that the gentleman ever spoke an unkind word to any one), that, for a short time, he seemed as if he would have preferred death to the prospect before him, and life became a complete burden, from no other cause than the idea he had formed of the warmth of this gentleman's temper. His mind, however, was completely relieved from its apprehensions when he learned that the offer was not accepted. This circumstance left an indelible impression, and produced great care in his after life, to prevent an occurrence of the kind in the case of his own children. There are two points here which ought not to escape the attention of parents and instructors, and the observation of self-educators. One is the constitutional sensitiveness and timidity of the young mind; and the other, the disposition of such minds to store up present experience for future occasions.

The childhood of Samuel Budgett had its perils. On one occasion he was hardly rescued from drowning in a tan-pit. On another, he had an equally singular escape, on this wise: a laden cart, drawn by three horses, was moving onwards, when Samuel, who was then between five and six years of age, ran before the wheels, and falling on his back, the broad wheel passed over the top of his right thigh, across his body, and over his left shoulder, grazing his chin, and leaving a mark which became indelible.

In 1801, the family removed to Kingswood, where, he remembered, that his father and mother took a shop which was termed "the great shop on the causeway." Two years after, this shop was left in the hands of a brother, many years older than he was, and the son of another mother; his parents then opened a small general shop at Coleford.

But, what of his education, it will be asked? On this point, Samuel Budgett says:—"We went to school to a Mrs. Stone, at the Yew-tree, whose usual mode of punishment was to put us in the corner with her husband's long speckled worsted stocking drawn over our heads, and the foot hanging over our faces, either for a long or a short time, according to the nature of our offence. This degradation I had twice to submit to: once for picking up an apple under the tree, and the other time for washing my shoe in her pan of clean water."

We are here told of the dame's mode of exercising discipline, but as to that of her teaching, we are left quite in the dark; it is natural, however, to suppose, that there was more punishment than progress, and more laziness than learning. Of his next instructor, he says:—"I was then placed at school with an old woman who spun worsted, and the only good I remember receiving was a tremendous belief in, and dread of, ghosts and hobgoblins. In order to keep the children quiet, she would tell us the most terrific stories of apparitions, as she walked to and fro by her spinning-wheel; such as the following:—'A man, once chopping wood at a place called Goodheavers, by accident chopped his bowels out. The hatchet became so fixed in the block, that it could never afterwards be removed, and this man's ghost ever afterwards haunted the place; and frequently, when many persons were present, he would make his appearance, put his finger into the fire, and light his pipe with it. After annoying the people for some time, he would descend into the coalpit. He was twice laid, but still made his appearance and terrified those who attended the pit; when a number of good men met together, and laid him in the Red Sea, and she was not aware whether he had since made his appearance, or not.' This is [given] just to show the kind of tuition in that temple of literature."

"Temple of literature, indeed!" says one of his biographers, "and the priestess too! It is positively a marvel that this giant English people have ever grown to the proportions wherein they stand before the world to-day, considering the mental aliment on which the bulk of them were reared. Poor children! handed over, by way of education forsooth, to witness an old woman spinning two yarns, one of worsted, the other of hobgoblins. And the quality of her ghosts, too! They had not even the small profit of being poetical, to weigh against all the needless fears and pains they originated in the heart of a poor child!" As, however, time rolled on, Samuel was freed from this pernicious nonsense; he was sent, on the removal of the family, to another school, and afterwards, with his brother, to a third, which appears to have been of a higher order than any of the former.

When Samuel was about ten years of age, the following incident occurred, as he was going to school. He says:—"I picked up a horse-shoe, carried it about three miles, and sold it to a blacksmith for a penny. That was the first penny I ever recollect possessing, and I kept it for some time. A few weeks after, the same man called my attention to a boy, who was carrying off some dirt opposite his door; and offered, if I would beat the boy, who was bigger than myself, to give me a penny. I did so; he made a mark upon it, and promised that if I would bring it to him that day fortnight, he would give me another. I took it to him at the appointed time, when he fulfilled his promise, and I thus became possessed of threepence; since which I have never been without, except when I gave it all away." It is a trite saying that

"The boy is father to the man;"

and, in the circumstances thus simply narrated, we have the foreshadowing of what Samuel Budgett afterwards became. In that selling of the horse-shoe, he laid the foundation of his habits and his fortune as a British merchant; and that he could give away, as well as see to profit, the following statement will attest:—"By the time I left Coleford for Kingswood, when I was between fourteen and fifteen years of age, I had saved thirty pounds, which I presented to my parents; which they intended returning, but never were able to do so." This was, indeed, a noble sacrifice; but it should be remembered that Samuel was a youth, and had been brought up under the power of religious principle; and as this daily directed his course, so, relying on God, he was enabled not only to make this sum, but through His blessing, "which maketh rich," he greatly prospered in his future labours.

Meanwhile, his brother occupied what was termed "the great shop on the causeway," though it was only a humble place of business; and to this brother, Samuel, who was his junior by fifteen years, was bound apprentice. Being very little of his age, and withal not very strong, he failed to give satisfaction to his brother, who accordingly gave him notice to leave "for want of ability." With much anxiety and many fears, he applied to a Mr. B. in Bristol, who had a vacancy, and his biographer graphically sketches what occurred on the interview:—"I fear you are not strong enough for my situation."—"O, do try me, sir, I am sure I can do."—"Will you write your address?" Not being quite certain what the word "address" might mean, he replied, "I can write an invoice, sir."—"Very well; write 86 lbs. of bacon at 9½d. per lb."—He wrote, but the reckoning was wrong. He tried a second time, but again failed. His heart sank. Then, in came a young man looking for the situation, taller, better dressed, and in every way more eligible in appearance than he. At him he looked

with despair; against such a rival he could have no hope. Mrs. B. was present, and observing the excitement of the poor boy, said a word in his favour. "But he is not strong enough; you could never carry those heavy cheeses," pointing to some high upon the the shelves.—"Do let me try, sir; I am sure I can do it." In a second, he was up to the cheeses, and triumphantly displayed his strength. His feelings were always highly excitable, and on an occasion so urgent, they rose to a nervous intensity. This, with his whole spirit, quite won Mrs. B. She pleaded for him; her husband consented; and he left the shop happy in the knowledge that, when his month was ended, he had a place awaiting him.

He now set out for Coleford, accompanied by a younger brother, an apprentice in Bristol. And what was, at this time, uppermost in his thoughts? His failure in rightly reckoning the pounds of bacon at Mr. B.'s. As, therefore, his brother had received a better education than he had, he availed himself of the opportunity presented by the journey, to improve himself in arithmetic, and went on calculating the amounts of pounds of bacon, and butter, and various other things, long after his brother was tired of such exercises in ready reckoning.

All this was strangely characteristic. Eager had he been for the acquisition of knowledge; and that he continued to be so, is evident from the following fragment from his pen of a later date:—"My time is flown, and I am what I *am*, instead of being what I might *have been*. My object, now, is to regain, as far as possible, what I have lost, and to obtain all that is attainable. My question now is, how shall I become what I *may be*? Shall I not do better, as I am single, *to remain so for the present*, and to keep my eye singly directed to the attainment of religious and useful knowledge? O wisdom! O knowledge! The very expressions convey ideas so delightful to my mind that I am ready to leap out *and fly*; for why should my ideas always be confined within the narrow compass of our shop walls."

But we anticipate. After Samuel had been with Mr. B. about six months, his brother "in the causeway" told him it was his duty to serve out his time; he therefore proceeded to do so, though his employer gave him up with evident reluctance. On the expiration of his apprenticeship, he engaged with his brother at a salary; and at the end of three years, he had saved out of it three hundred pounds. But now came another act of self-denial. The first thirty pounds which he saved he gave to his parents. Some time afterwards, his whole store amounted to fifteen shillings, and this he freely bestowed on his sisters. Now master of so much, and seeing that though his brother's regular business was thriving, he was in difficulty from a banking speculation, Samuel begged his acceptceptance of *all he had*.

Not long after this evidence of his generosity he became a partner with his brother; he soon greatly extended the business, and at length became the head of the house as a "General Provision Merchant." Most skilful, energetic, and persevering in this character, he was exceedingly considerate and generous towards the numerous people he employed, and munificent in his public charities. He died in May, 1851, leaving behind him as a motto on which he invariably acted, and which he considered essential to success in business, the following words:

"TACT,—ENTERPRISE,—PRINCIPLE."

[We have been asked already to explain the word *tact*; and we are likely to be asked again. We shall therefore take this occasion to explain the whole three words, *tact*, *enterprise*, *principle*.

The word tact originally signifies *touch*; and as the whole *body* is the organ of *touch*, so when applied metaphorically to the operations of *mind*, the term *tact* implies that the whole soul is alive to those proceedings in business which are touching or are likely to touch the profit of the merchant. But it implies more than this: it implies immediate action, according to the necessity of the case; it implies a correct and instantaneous judgment, and a prompt and decisive putting of it into execution. In short, tact means the doing of the right thing, at the right time, without one moment's delay. We have had many brilliant examples of *tact* and the *want of tact* in public men in modern times. The character of Wellington as a general may be summed up in the single word *tact*. The secret of his great success was not, as many persons have foolishly supposed, his good fortune or his great luck, but his remarkable tact, visible in the history of his campaigns in the Peninsular or elsewhere. On the other hand, the ruin of Napoleon the great, Emperor of France, and subjugator of Europe, was the *want of tact* on many occasions, and especially in his attempt on Moscow. 'Twas there that he fell, and not at Waterloo; but it was on the plains of south Brabant, that

"He left a name, at which the world grew pale,
To point a moral, or adorn a tale."

As a statesman, the secret of Sir Robert Peel's popularity was his *tact*; and the changes which have frequently taken place in the administration of this country, can only be attributed to the *want of tact* in the leading men of the ministry.

When *tact* has performed its duty, then *enterprise* ought to follow as a matter of course. Enterprise means the undertaking of some bold course of action under the reasonable expectation of success, and the actual accomplishment of the same. In actual business, this quality of mind is termed *pushing*; thus we say of an active and energetic man of busines, that he is a *pushing fellow*, and that if any one will succeed, he will. Enterprise, however, is not *speculation*; there are many persons who mistake a *speculating* spirit for an *enterprising* spirit. Many speculations turn out successful, but such do not constitute enterprise. A speculation has no proper grounds for its proceedings; no reasonable prospect of success in its result; no tact has been displayed in getting it up; and no experience has been employed in its management and operations. An enterprise, on the contrary, has most advantageous and safe grounds for its commencement; the most reasonable expectation of its accomplishment; the best application of tact has been exhibited in its arrangements; and the dictates of experience are visible in all its transactions. Without enterprise, the world would stand still; with speculation, it would go to ruin.

Principle is the next important quality in a man of business, a statesman, or a public instructor. *Principle* is only another term for *downright honesty* in all our transactions. This has been admired in all ages; it is the unalterable foundation of all mercantile success. It is the standard characteristic of the British merchant. Without it, the walls of the Royal Exchange would fall down, the doors of the Bank of England would be broken open, and the port of London would become a waste and howling wilderness. The necessity of *principle* in the every-day business of life is set forth in several trite and well-known, but expressive proverbs, such as the following: "Honesty is the best policy," "Honesty stands the longest," "Steal a penny, steal a pound," "Dishonest in little, dishonest in much," &c. Principle will be seen like a vein of silver in a seam of coal, running through the whole of a man's character and transactions; all the particulars of his character, and all the nature of his business, we may not be acquainted with, but principle will peep out very clearly in the smallest transaction, and will enable you to judge of all the rest. We do not pretend to be particularly skilful in physiognomy, but we think we can after a few interviews, and even sometimes at a glance, tell what we think is our opinion of a man's principle, and we have rarely been deceived. There are some people who cannot look you straight in the face, and who have no defect of vision, who always look down, or up, or sideways, or at something else, when you are speaking to them, beware of such characters. There are other people who boldly stare you in the face, who do not care if they should put you out of countenance, and who even seem to wish to do so by their effrontery; beware of such characters also. Again there are a third class who receive you with the mildest and blandest countenance you ever saw, and with the politest and softest tongue you ever heard; of these characters we say also beware. Honesty or principle needs no such appearances. Dishonesty may be concealed under pretended modesty or shamefacedness; it may be concealed under a proud, haughty, and overbearing demeanour; and it may be concealed under the greatest show of politeness and gentleness of manners. One or two actual transactions in business, however, will soon reveal the true character, and will show that we are correct in our observations.]

LESSONS IN GERMAN.—No. XXVIII.

SECTION LIII.

VERBS REQUIRING TWO ACCUSATIVES; ALSO THOSE GOVERNING THE ACCUSATIVE WITH THE DATIVE.

Several verbs in German, as in English, govern two accusatives. Ex.: Er lehrt mich die deutsche Sprache, he teaches me the German language. Gott nannte das Licht Tag, und die Finsterniß Nacht, God called the light day, and the darkness night.

Man nennt ihn nur den guten Walther, (Pfeffel), they call him only the good Walter. (§ 132. 2.)

Verbs signifying to compare, to give, to take away, &c., govern the accusative and the dative. (§ 129. 1.) Ex.: Nimm dir wieder einen Sprachmeister, take to thee again a language-master. Wem soll ich dich vergleichen? to whom shall I liken thee? Die Feinde nahmen ihm Alles, the enemy took from him all (every thing).

Exercise 57.

Absicht, *f.* view, intention;
Achtung, *f.* esteem, respect;
An'denken, *n.* remembrance, keep-sake;
An'vertrauen, to confide to;
Bescheiden, considerate;
Beweis, *m.* testimony;
De'müthig, humble;
Empö'rer, *m.* rebel;
Erpro'ben, to prove;
Geheim'niß, *n.* secret;
Gei'ßel, *f.* scourge;
Heuchler, *m.* hypocrite, dissembler;
Hun'nenkönig, *m.* king of the Huns;
Klar, clear;
Lehre, *f.* instruction, lesson;
Le'bensgeschichte, *f.* history of life;
Liebevoll, affectionately;
Mehrmals, at several times;
Mißhan'deln, to misuse, ill-treat;
Neugierde, *f.* curiosity;
Prinzeß'in *f.* princess;
Reichen, to reach, extend;
Schelten, to scold, chide;
Schimpfen, to disgrace, (to call names);
Schönheit, *f.* beauty;
Telemach, Telemachus;
Taufen, to christen, baptize;
Treue, *f.* fidelity;
Tyrann, *m.* tyrant;
Uebereinstimmen, to accord, to correspond;
Ueberfluß, *m.* superabundance;
Vergan'genheit, *f.* time past, things past;
Verlei'hen, to endow, to bestow;
Verräther, *m.* betrayer, traitor;
Verschwiegenheit, *f.* secrecy, discretion;
Versöh'nung, *f.* reconciliation;
Vorzug, *m.* preference;
Weigern, to decline.

Herr, lehre mich deinen Weg. — Teach me thy way, O Lord.
Er nannte ihn seinen lieben Sohn. — He called him his beloved Son.
Man (Sect. 26. 4.) heißt ihn den Vater der Waisen und den Tröster der Wittwen. — They call him the father of the orphan, and the comforter of the widow.
Den Feigling schimpft man einen Hasen. — They call a coward a hare.
Er giebt sich viele Mühe um dich. (Gellert.) — He gives himself much trouble about you.
Gieb mir immer den erquick'enden Trost, daß ich dich bald freudiger wie'dersehen werde. (Weiße.) — Give me still the refreshing consolation, that I shall soon see you more joyful again.
Dir ein Bild sind sie gege'ben. (Schiller.) — To thee are they given (as) a picture.

1. Den Fürsten, der sein Volk mißhandelt, nennt man einen Tyrannen. 2. Er frägt mich um Dinge, die ich ihm nicht nennen kann. 3. Schilt mich was (Sect. 70. I.) du willst, nur keinen Verräther. 4. Diejenigen Leute muß man Heuchler schimpfen, die schön reden und schlecht handeln. 5. Man hat die Prinzessin Louise getauft. 6. Ich fragte ihn dieses nicht aus Neugierde. 7. Attila, ein Hunnenkönig, nannte sich eine Geißel Gottes. 8. Ich nenne den einen Freund, der mich nicht auf meine Vorzüge, sondern auf meine Fehler liebevoll aufmerksam macht. 9. Er heißt Alles Feinde und Empörer, was nicht mit ihm ist. 10. Der Lehrer schalt den Schüler einen faulen Knaben. 11. Ich fragte ihn vergebens seinen Namen. 12. Ich verdiene nicht, daß mich das Volk einen Verräther nennt. 13. Ich gebe Ihnen dieses Andenken zum Beweise meiner Liebe und Achtung. 14. Wie gern verzeihen Eltern ihren Kindern die begangenen Fehler, wenn jene dieselben herzlich bereuen. 15. Er erzählte mir mehrmals seine Lebensgeschichte. 16. Sie vergaben mir mein Unrecht und reichten mir die Hände zum Beweise ihrer Versöhnung. 17. Wohl dem Menschen, dem die Natur einen gesunden Geist und einen klaren Verstand verlieh, aber doch wohler dem, welchem sie ein demüthiges und bescheidenes Herz schenkte.

1. Mentor taught Telemachus the art of governing. 2. They will teach him this language. 3. The time past gives to men the best instruction for the future. 4. In his last letter he wrote to me the following news. 5. The rich should contribute a little from their superabundance with pleasure to the poor. 6. He showed me the beauty of nature. 7. I trusted him with the secret with the intention to prove his discretion and fidelity. 8. Görgey is called a betrayer of his country by his own people. 9. He chides me with being a fool, as I declined to follow those principles, which do not correspond with my inclinations. 10. The "Popular Educator" teaches the English, French, and German languages in the easiest manner.

Section LIV.

Prepositions requiring the genitive.

The prepositions, mittelst, oberhalb, ungeachtet, vermittelst, vermöge, &c., (§ 109. § 110.) govern the genitive. Ex.: Oberhalb der neuen Brücke ist der Fluß breit und tief; above the new bridge the river is broad and deep. Aller Mühe ungeachtet gelang es nicht; notwithstanding all the pains it did not succeed. Mittelst seines Beistandes setzten wir es durch; by means of his assistance we carried it through (achieved the design). Das kannst du, vermöge deines Verstandes, begreifen; that canst thou, by dint of thy understandig, comprehend. Vermittelst Uebergabe kam die Stadt in Feindes Hände; by means of surrender, the town came into (the) enemy's hands. Vermöge seines Versprechens mußte er kommen; in consequence of his promise, he was obliged to come.

Exercise 58.

Amt, *n.* office, charge;
Aengstlich, anxious:
Auf'serhalb, without, out of, beyond;
Besorgt', solicitous;
Bleich, pale;
Diesseit, on this side;
Empfeh'len, to recommend;
Erlaubniß, *f.* permission;
Gallier, Gauls;
Halben, or halber, for the sake of, on account of;
Herrschen, to reign, prevail;
Hunger, *m.* hunger;
In'nere, inner, internal;
In'nerhalb, within;
Jenseit, beyond, on the other side;
Kraft, by virtue of;
Kreuz, *n.* cross;
Landhaus, *n.* country-seat;
Längs, along;
Laut, according to, in consequence of;
Mittelst, by means of;
Oberhalb, above, at the upper part of;
Pappel, *f.* poplar;
Thal, *n.* vale, valley;
Trotz, in defiance of, in spite of;
Ueberzeu'gung, *f.* conviction;
Umher'gehen, to go about;
Ungeachtet, notwithstanding;
Unterhalb, below, at the lower end;
Unterstütz'en, to support, assist;
Unweit, not far off;
Verbot', *n.* prohibition;
Verhaf'ten, to arrest;
Vermittelst, by means of, (See mittelst);
Vermö'ge, by means of, (See above);
Verzweif'lung, *f.* despair, despondency;
Wegen, on account of, by reason of;
Zufolge, in pursuance of, in consequence of;
Zurück'kehren, to return;
Zusage, *f.* promise, word;

Der poli'tische Flüchtling tret au'ßerhalb seines Va'terlandes umher'. — The political fugitive wanders about beyond the limits of his native country.
Laut eines kai'serlichen Befehls' mußten die Bürger ihre Waffen ab'geben. — In consequence of an imperial command the citizens were forced to give up their arms.
Während des sie'benjährigen Krieges belagerte Friedrich II. die Stadt Prag. — During the seven years' war Frederic II. besieged the city (of) Prague (§ 123. 6.)
Wegen seines gesell'igen und mun'teren Betra'gens liebte man ihn. — On account of his social and cheerful deportment they loved him.

1. Kinder dürfen, ohne Erlaubniß ihrer Eltern, nicht außerhalb des Hauses umhergehen. 2. Diesseit des Flusses steht ein schönes Landhaus. 3. Des Vaters halber ist die ängstliche Mutter besorgt. 4. Innerhalb der Stadt herrschte Hunger und Verzweiflung. 5. Jenseit des Berges ist ein schönes Thal. 6. Kraft seines Amtes verhaftete er den Dieb. 7. Laut seiner inneren Ueberzeugung sprach er diese Worte. 8. Längs des Stromes stehen viele Pappeln. 9. Mittelst eines Briefes empfahl er ihn. 10. Vermittelst eines guten Freundes kam er in dieses Haus. 11. Oberhalb der Stadt steht ein Kreuz. 12. Anstatt des Kaffee's trinkt er Wasser. 13. Trotz des starken Regens geht er spazieren (Sect. 65.). 14. Unterhalb dieses Dorfes liegt eine schöne Wiese. 15. Ungeachtet des Verbotes seines Vaters besuchte er das Theater. 16. Unweit dieses Waldes sah ich einen großen Vogel. 17. Vermöge seines Reichthumes kann er die Armen unterstützen. 18. Während der letzten Zeit sah er sehr bleich aus. 19. Wegen des Krieges fliehen die reichen Einwohner. 20. Dieser Zusage zufolge kehrte er zurück.

1. He did it in spite of his relations. 2. I found myself quite happy beneath the humble roof of that countryman.

3. Everything below the sun is subject to change. 4. What had you for desert besides melons and grapes. 5. The poor emigrants hope to live better on the other side of the ocean. 6. He persevered in spite of all opposition. 7. The Gauls directed their toilsome march along the sea shore. 8. It is beneath the indignation of an honest man. 9. Greenwich is within five miles of London. 10. He ought to be spared on account of his age. 11. He is a nobleman by right of his birth.

Section LV

Prepositions requiring the Dative.

The prepositions, entgegen, gemäß, nebſt, ſeit, &c., (§ 111. § 112.) govern the dative. Ex.: Dem Strome entgegen ſchwimmen iſt nicht leicht; to swim against the stream is not easy. Er erzählt die Sache der Wahrheit gemäß; he relates the affair conformably to the truth. Er, nebſt ſeinen beiden Söhnen, iſt in Amerika; he, together with both his sons, is in America. Seit dem Tage, daß er ſeine Heimath verließ, iſt alle Freude von ihm gewichen; since the day that he left his country, (home) all gladness has forsaken him.

Exercise 59.

Auf'löſung *f.* dissolution;
Auf'ſchauen to look up;
Außer, except, out side;
Bogen, *m.* bow;
Karthа'go, Carthage;
Entge'gengehen, to go to meet;
Entge'genrücken, to approach toward;
Erſt, first;
Fall, *m.* fall;
Fordern, to demand, call for;
Gegenü'berſitzen, to sit over opposite;
Gemäß', conformably to;
Indía'ner, *m.* Indian;
Jagd, *f.* hunt, chase;
Kampf, *m.* battle;
Meh'rere, several;
Nackt, naked, bare;
Nebſt, together with;
Oberſt, *m.* colonel;
Pfeil, *m.* arrow;
Römiſch, Roman;
Rütli, *n.* Rütli (a mountain in Switzerland);
Sammt, altogether;
Scene, *f.* scene;
Verabredung, *f* agreement;
Verbündete, *m.* confederate, ally;
Verlie'ren, to lose;
Zunächſt', next to;
Zuſam'menkommen, to come together;
Zuwi'der, contrary to, (i. e disagreeable).

Vergebens ſuchte er ſich dieſe trüben Gedanken aus dem Sinne zu ſchlagen. — In vain he sought to drive these gloomy thoughts from the mind.
Bei dieſem Kampfe erwarben unſere Waffen wenig Ehre. — At this battle, our arms acquired little honour.
Von allen Bäumen zieht die Eiche am liebſten den Blitz an. — Of all trees, the oak the most readily attracts the lightning.
Mit dem Verſprechen iſt das Halten verbunden. — With the promising the performing is connected.

1. Aus dieſem Grunde verließ ich mein Vaterland. 2. Außer dem nackten Leben hatte er nicht gerettet. 3. Bei dem Kampfe verloren mehrere Soldaten ihr Leben. 4. Unſere Truppen rückten dem Feinde entgegen. 5. Dem Freunde gegenüber ſaß der Prediger. 6. Der Verabredung gemäß kamen die Verbündeten in der Nacht auf dem Rütli zuſammen. 7. Nach dem Falle Carthago's ging das römiſche Reich ſeiner Auflöſung immer mehr entgegen. 8. Nächſt dem General kommt der Oberſt. 9. Ich habe Herrn N., nebſt ſeinen Kindern, zum Eſſen eingeladen. 10. Wir werden Sie in den erſten Tagen ſammt unſerem Freunde beſuchen. 11. Mit dem Pfeil und Bogen geht der Indianer auf die Jagd. 12. Seit dem dreißigjährigen Kriege hat es nicht ähnliche Scenen gegeben. 13. Von mir dürfen Sie Alles fordern. 14. Zu dem Himmel aufſchauend gab der Kranke ſeinen Geiſt auf. 15. Ihm zunächſt ſtand der König. 16. Das Geſicht dieſes Menſchen iſt mir zuwider.

1. I am going on, according to my former custom. 2. My friend went against my enemy. 3. Opposite me sat my mother by the side of my uncle. 4. I rode across the park. 5. He is inquiring after my sister. 6. Since I was there, I have heard nothing more about the affair. 7. I have not seen him since yesterday. 8. I have sent the letter to his house. 9. He went out of the room. 10. I was with my brother. 11. This is against the law.

CORRESPONDENCE.

SOCRATIC METHOD.

Sir,—In No. 24 of your excellent periodical, I observe a letter, signed John Scott, in which he takes exception to a remark of mine, printed in No. 25 of the Popular Educator, concerning the Socratic method of disputing. If he will peruse the paragraph again, with a little more care than he seems to have done, he will find that he has mistaken its meaning, and that I have passed no opinion on the subject. The object of the communication was, to speak favourably of the merits of an English grammar, which, I have since ascertained, was written by the celebrated Sir Richard Steele, one of the contributors to the "Spectator." The only remark I made, was an expression of my dissatisfaction with "the *manner* and the *matter* of the example" given as an illustration of the Socratic method of disputing,—that example, in my opinion, not being calculated to give a favourable impression of the merits of the Socratic system in investigating and discovering the truth. The subject discussed in the example is, "the efficacy of the Divine Providence,"—a question arising out of that problem which has puzzled—and which will continue to puzzle—all finite intelligence from the beginning till the end of time, viz., how the free will of the creature can co-exist with the eternal and immutable purposes of Him who is infinite in power, and excellent in working. In the progress of discussion, material things and ideas are compared with spiritual; the ways of God are considered as like the ways of man; infinity is attempted to be measured and grasped by a finite and very limited understanding; and the result is as futile as it is unsatisfactory. Observe, hitherto I have given no opinion of the Socratic method, and I have, at present, neither the inclination nor the opportunity thoroughly to examine the subject. I am, however, inclined to agree with your correspondent, when he states that he considers "the Socratic method most admirably suited for the purpose of confuting or silencing an opponent;" but whether confuting an opponent is investigating truth, may reasonably be doubted. No mere man dare, and no sober-minded man will say, with one of old, "I am the truth." If the question as to the value of this method in ascertaining truth might be settled by an *argumentum ad auctoritatem*, I would scarcely venture to stake the opinion of John Scott, who is so enamoured of the method, against the *experience* and sagacity of Benjamin Franklin, who, we are informed by his biographer in No. 17, vol. 1, of the Popular Educator, soon "discontinued it, considering it less adapted to inform or convince than to gain a triumph."

The rules and explanations of the Socratic method I need not give, as your correspondent has given their substance and *meaning* with tolerable accuracy. They are, however, a little more plainly and far more *plausibly* expressed in the work alluded to. In conclusion, I would remark, that however useful and necessary an acquaintance with the rules of logic may be, the *habitual* cultivation of the reflective and reasoning powers is of much more value and importance. A man who can think for himself, will not likely be led astray by the arguments of sophists, either political or religious, however specious they at first sight may appear. Yours, &c,

James Adamson.

St. Martin's, 22nd Nov., 1852.

[We entirely agree with our correspondent in his concluding remarks, and we recommend them strongly to the attention of our readers. We can admit no more discussion on the Socratic method.]

LITERARY NOTICES.

Mrs. Harriet Beecher Stowe, Authoress of "Uncle Tom's Cabin," &c.—A magnificent Portrait of this celebrated and talented lady is given in the Illustrated Exhibitor and Magazine of Art, for the present week. John Cassell feels highly honoured by the kindness of Mrs. H. Beecher Stowe in furnishing him with her portrait, and thus enabling him to present to the British public a striking likeness, engraved in the first style of art, in a cheap and popular form. The Illustrated Exhibitor and Magazine of Art is published in Weekly Numbers, price Twopence each. A new and improved Series, under the title of the Illustrated Magazine of Art, will be commenced on January 1, price 3d. in a neat cover; when, in addition to numerous Engravings in the text, each Number will contain a fine Engraving worked on Plate Paper; and with No. 1 will be presented, gratis, a splendid View of the Interior of St. Paul's Cathedral, during the Interment of the late Duke of Wellington; printed upon fine Plate Paper, measuring eighteen inches by thirteen. This Engraving will be worth four times the cost of the Number of the Magazine of Art.

The Altar of the Household; or, Domestic Worship. Part I. will be published on the 1st of January, 1853, price 1s. This work will contain a Series of Services for the Family, adapted for every morning and evening throughout the year, viz., portions of Scripture, Prayers and Thanksgivings, suitably adapted to each other, to which will be added short practical comments to explain the subjects read, or enforce the duties enjoined. This work will be edited by the Rev. Dr. Harris, Principal of New College, assisted by a band of eminent divines in London and the country.

Cassell's Euclid.—The Elements of Geometry. Containing the First Six, and the Eleventh and Twelfth Books of Euclid. Edited by Robert Wallace, A.M., price 1s. in stiff covers, or 1s. 6d. neat cloth.

The Self and Class Examiner in Euclid, containing the Enunciations of all the Propositions and Corollaries in Cassell's Edition, for the use of Colleges, Schools, and Private Students, is now ready, price 3d.

Cassell's Elements of Arithmetic (uniform with Cassell's Euclid), is now ready, price 1s. in stiff covers, or 1s. 6d. neat cloth.

The Answers to all the Questions in Cassell's Arithmetic, for the use of Private Students, and of Teachers and Professors who use this work in their classes, is preparing for publication.

ANSWERS TO CORRESPONDENTS.

R. TAYLOR (Cardiff): We must defer his question until a suitable opportunity.—B. C., L. M., and F. SHAW (Dudley), will soon be gratified.—I. SANDERSON (Galashiels) is too inquisitive; he asks more than we have decided upon ourselves.—DISCIPULUS wishes to become familiar with some important work, containing rules for the pronunciation of the English language; the most important, in our estimation, is a *pronouncing dictionary*; say Smart's, Walker's do.—E. G.: We really do not know what he wants; we are quite in the dark.

INCONSTANCY is like hundreds of his fellow creatures; he must learn to take things coolly, and he will be sure to succeed; remember the advice, "In your patience possess ye your souls."—SIMON ARGUS: 1. We advise him to write to Victoria College, Jersey, at once, for the information he wants. 2. We do not know. 3. Dr. Thomson says *Pa-na-ma'* and *Ni-ag'-ara*. 4. We do not know.—J. D. (Basingstoke): Algebra is promised. The best edition of the P. E. is bound in cloth for 1s. 6d.—Q. V. Z.: His exercises in composition require considerable amendment both in the inditing and the spelling.—M. E. S. (St. Austell) is wrong to discontinue; let her persevere; and let her try to find a friend who knows better than herself to assist her a little.

G. SIMPSON (Low Tory), and ALPHA: Received.—JUNIOR CLERK: See vol. I., p. 288, col. 2, line 49.—R. M. (Aberdeen): Study mathematics and chemistry.—J. ATTENBRO (Loughbro'): Mathematics is absolutely necessary for astronomy in its noblest and highest view: see Sir John Herschell's observations in his introductory chapter of the volume on this science in the "Cabinet Cyclopædia."—J. R. BARTON (Bankside): See Literary Notices.—GARRULA (Wortley): 1. The explanations you require will be given. 2. the History of Scotland is completed in 2 vols. 3. The works you mention are good; to them you may add Graham's "English Composition" and Bell's "Elocution." 4. Thomson's or Young's Algebra. 5. Make yourself master of English Grammar, and of the subject you wish to speak on, and your labours will be crowned with success.

R. C. (Guyzance) should consider how many persons there are, even in Northumberland, who cannot write, and who are thankful for the copy-heads; and he should remember the apostolic advice, we that are strong ought to bear with the weak, and not to please ourselves.—G. HARRISON (Worthing): Very soon.—J. ADAMSON (St. Martin's): The principle of squaring a number is well known; see vol. I., p. 121, col. 2, line 18.—E. W. (Bingley): Under consideration.—J. S. (Woodhall Colliery): Right.—J. S. S. (Barnstaple): We really do not know.—C. K. Y. Z.: His question is a good one; but it will be explained under astronomy.—ARCHIMEDES (Newcastle): See our Literary Notices.—CORAZZA (London): In *guttu percha*, the *ch* is pronounced like *ch* in *church*.—X. Y. Z. (London): Thanks for his hints.—JUVENIS VERITAS (Whitehall): We really cannot advise him. Phonographers assert that the fastest speaker can be followed.—J. C. (Caston Pewsey): Right.—S. A. JONES (Southport): His proposal is very ingenious, and among the best of the kind we have seen; but we fear that it would not work well without general superintendence, and this could not be done without expense.—CUNCTATOR: We beg humbly to differ from him.—SHERERNESS: See Literary Notices.—S. EMSLEY (Sheffield): We cannot tell.—A STUDENT (Bradford): *As* is often used in England for *has*, but the words are very different: *has* is the third person singular of the present indicative of the verb *to have*—thus, *I have, thou hast, he has*; *as* is a conjunction used in sentences of comparison—thus, "*as* he is *so* are we in this world."

LATIN.—Let SARAH BRADLEY begin to study Dr. Beard's Lessons on English; she will find her difficulties solved in due time. One who has her talents would find much light accrue from the study of Latin.—JUVENIS: Passive verbs have no object.—J. S.: The participal future in rus with verbs in the past tense is Englished by might, would, or should.—A POOR SCHOLAR will never become a rich or a ripe one if he attempts all things at once; in due time instructions on the collocation of words in Latin sentences will be given. Meanwhile, let him correct his exercises according to the key.—AMANS LITERARUM: Keep to Dr. Beard's Lessons in this work, study also his "Latin Made Easy;" beyond these the proper book, the only one worth buying, is "Zumpt's Grammar of the Latin Language," by Schmitz, price 14s. Mr. Cassell will shortly publish a first-rate Latin Dictionary at a comparatively small price; wait for this.—D. D.: The continuation of the key to Dr. Beard's Latin Lessons will appear in a week or two.

SHORTHAND WRITER (Devonshire), and J. B. M., will be answered soon.—JOHN POOSON (Mossley) should study Cassell's Euclid. Logarithms will be explained.—MODESTUS (Liverpool): Wrong in the snail query; thanks for his letter.—J. M. LEATH (Otley): Thanks for his correction. The questions already inserted must be solved before we give any more. In the additions made to the "Nautical Almanac," of late years, there is a treatise, we believe, on eclipses.

FARMER (Gamrie): The books in common use are "Crocker's" and "Nesbit's" land-surveying.—A DEVONSHIRE BOY wishes to know what are the instruments which are contained in the boxes patronised by the Society of Arts, viz., the 6s. box, and the 2s. 6d. box.—H. T. (Derbyshire): Norie's Navigation, price 16s.—G. D. HACKELTON (Haverfordwest): See vol. I., p 239, col. 2, line 34; and the 12th axiom of Euclid, Book I.—A FARMER'S SON (Farford) is quite right; we have not lost sight of the subject he mentions.—A. W. J. has kindly pointed out the following misprint in our Euclid: p. 29, line 13 from bottom, for A B D read A B C.—W. A. (South Molton): We recommend Whatsley's Logic and Bell's Elocution for the present. See vol. I., p. 288, col. 1, line 24 from bottom. We thank him for his letter.—DAWSON (Knaresborough): Right.—A TEACHER (Notts): "He leaped over the hill;" in this sentence *leaped* is an active verb.—ÆGYPTUS (Stamford) should study Penmanship and English first. In making globes, after the paper slips containing the names are pasted on them, they are coated with a strong varnish which makes them look like glass.—E. H. N. C.: Cassell's Arithmetic is published, price 1s. Colenso's is, we believe, a pretty good one. Such questions as he has proposed will appear in the P. E.—L. L. A. (Tower-street): Yes; but we cannot say when.—CYMRAES (Llanbedarn-mawr): We feel obliged by her useful hints; they will be kept in view.—IGNORAMUS must really know better than we do his own deficiences. Read the Philosophy of Study.

BANSWATER: It is not right.—B. (Cork): We should scarcely recommend A. Murray's plan to any one. The student would require to live to the age of Methuselah who should study languages on his system; and, after all, his learning would only consist in words, not in ideas.—ETA (Kensington): Certainly not; his suggestion will be kept in view.—CONSTANT SUBSCRIBER (Southampton): If one steamer starts at 12 o'clock and sails at the rate of 10½ miles per hour, and another starts at half-past 1 o'clock and sails in the same direction, at the rate of 11½ miles per hour, the latter will overtake the former in 22½ hours after 12 o'clock, 21 hours after it started.—THEODORE (Higham Ferrers): 1. See vol. I., p. 280, col. 2, 7th line from bottom. 2. We have seen an edition of the "Latin Poets" in one vol. 8 vo, but we forget the publisher. The "Regent Classics" may be had cheap. 3. Cassell's "French Manual," price 3s.—H. C. (Theed): We do not know.—VERITAS (Rutland): Your bookseller is bound to give you a perfect copy of the part for June in return for the imperfect; he will not lose by it, because he has only to return it to the proper quarter. As to the question about Manetho, &c. see vol. I., p. 96, col. 1, line 6 from bottom.—J. F. L.: 1s. common edition, 1s. 6d. fine.—R. SMITH (Cardiff): As soon as possible; thanks for his letter.—METAPAN (Glasgow): It will be done. For "but and ben" say *two rooms on a floor*. In olden time, the kitchen was the *first* room, and the parlour the *second* or best room, but the passage to it was through the kitchen. Favoured visitors were admitted *within*, common visitors remained in the kitchen *without*. "But" means *be-out* or *without*; and "ben" means *be-in* or *within*.

H. WILLIAM (Chester): Fractions.—W. H. (York): Not quite right; read, and *think*, and *try* again.—A YOUNG READER (Rochdale): Right.—AN ADMIRER has sent us some interesting remarks on Sir Christopher Wren, the great architect of St. Paul's Church, London; we would have inserted them at once had we known their parentage; but we think now that it will be better to include them in a biography of this eminent man.—WORKER FOR A WIDER CIRCULATION (Darwen): Both expressions are equally correct. The pronunciation he proposes is *too short* for the second syllable, although the *emphasis be* on the *first*.—R. M. A. (Aberdeen). Both forms are used, *inclosure* and *inclosed*, *enclosure* and *enclosed*, and both are in Chalmer's abridgement of Todd's Johnson.—A. O. Z.: Decimals are of the greatest use imaginable for simplifying and shortening calculations, and we recommend the view of them given in Cassell's Arithmetic, price 1s.—GEORGE COX (Thomas-street, West Bromwich) wishes the address of a JOURNEYMAN GLASSCUTTER.—W. W. (Ochiltree): Many thanks for his letter.—R. H. M. (Delph): Very well done.—JAMES WIGHTMAN (Retford): His theory of fairy rings is very ingenious, but it does not meet all the cases, such as those found in sheep pastures, where no horses are.—T. WILLIAMS (Oldham): Thanks.—P. B. A.: Thanks for his letter.—THOMAS C—(Cork): By all means take the P. E. to America; we cannot answer your other question.—J. B—N (Dublin): We cannot tell yet.—J. D. H. X.: A candle has no *base*, but a candlestick has.—G. HENRY G. (Bristol): How many rules in arithmetic do you want for a shilling?

I. WYATT (Henley-on-Thames): For the pronunciation of the French, we recommend "Lessons in French," reprinted from the "Working Man's Friend," and to be had from this office on the receipt of seven penny stamps.—FAINT, YET PURSUING (Dorchester): If, by "bad language" you mean *incorrect English*, the first point is to ascertain what is the *correct English* to be used instead, and then to carefully use it on all necessary occasions; if you are laughed at for your precision, never mind, a laugh does not hurt those who are conscious they are doing right; in due time you shall reap, if you faint not. Your penmanship would be improved by imitating our court-hand.—N. B. (Portsea): Exercise 3 to Prop. 20 Cassell's Euclid, is applicable to any position of the points.—NOSTOLLITE: Thanks for his suggestions.—BEAVER: Not at present.—PERTINAX (Fulham): The sentence, "I am informed that *neither you nor I are* much esteemed by him," is very bad grammar; why not say "I am informed that *we are* not much esteemed by him." His useful suggestions will be kept in view.—JAMES WIGHTMAN (Retford): Received.—UN ECOLIER ATTENTIF (Kerry) will find all his queries answered in Cassell's "Lessons in French" above mentioned. *Music* will be noticed.—ARTHURUS MACDUFF: We shall be glad to be informed of the *real truth* of his experience in the matter to which he refers.—HAMDESA: Her inquiries shall be answered.—F. L. (Luton): His solution is curious, but does not exactly answer the requirements.—E. FARNCOMB (London): His communication will be considered.—C. RUMLEY (Bristol): The trisection of an angle is a failure; try the construction on an obtuse angle and you will be convinced.

A. B. (Cardiff): We wish all the Cardiffians liked the English Lessons as much as he does; indeed, we hope they will do much good in the Principality. His penmanship is really very good, but the nearer he comes to the court-hand the better.—W. S. (Leeds): Right.—GULLIELMUS ROPER (Norwich): His penmanship is not good enough for a counting-house; the Latin Dictionary is, we believe, in progress.—J. BLACKBURN (Preston): We don't know any receipt for strengthening and clearing the voice for singing, except attending to the general health of the system, and avoiding all intemperance.—HABACUC will have a tolerably good notion of the French from the study of the "Lessons" and the "Manual," but he will gain a more complete knowledge from the lessons in our pages.—ROBERT (Drogheda): We should be glad to insert the lessons he wishes, but we have not room for them, and we fear that they would not be generally acceptable to our subscribers.—R. CROSBIE (Basingstoke): The most useful languages for a printer to learn appear to us to be the following; English, Latin, French, Greek, German, Hebrew, Dutch, Romaic, Spanish, &c.—T. G. (Brecon): See vol. I., p. 411, col. 2, line 2 from the bottom.—JUNIUS (Stafford) must learn the original tongues *first*.—G. SOME (Manchester): French and German are equally in demand in business.

ERRATA.

No. 35, p. 136, col. 2, lines 36 and 37, for 26 read 12.
Vol. II., p. 71, col. 2, line 38, for *unequal* read *equal*.
Vol. II., p. 73, col. 1, line 14, for *noun* read *noon*.

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LESSONS IN PHONETIC SHORT-HAND.—No. I.

By Alex. Melville Bell, F.R.S.S.A.,

Professor of Elocution and Vocal Physiology, Member of the British Phonetic Council, Author of the "Principles of Speech and Elocution"—"The Elocutionary Manual"—"Steno-phonography," &c.

In the present day, arts that economise time are of the first importance; and especially to be esteemed are those that do so in connexion with intellectual pursuits. Of this nature is the art of stenography, or short-hand writing. This study has always possessed strong attractions for the youthful student; and the comparatively few persons whose perseverance has given them facility in its use have ever been loudest in praise of its advantages. It is emphatically an art of which may be said, that "the more you know it, the better you will like it." Its fascinations are less felt at the outset than on a more thorough acquaintance; its difficulties are chiefly rudimental, giving way before industry with a most encouraging rapidity. The benefits of short-hand writing are by no means limited to the professional reporter: all classes of the community, literary, commercial, or mechanical, may share in the many advantages of this economiser of time and labour, this sharpener of the faculties, this hand-maid of taste and ingenuity. To none is this art of more consequence than to the working man, enabling him, as it does, to jot his fleeting thoughts, or to treasure up knowledge for future reference, on scraps of paper, and in scraps of time.

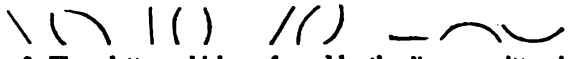
The following system is simple in its theory, very brief even in its full alphabetical writing, easily written, and easily read. It is called *phonetic* (from the Greek *phone*, a sound) because it is founded not upon letters but upon sounds; words being spelt for writing by analyzing their pronunciation. Thus in the words *debt*, *psalm*, *wright*, &c., the ear recognises no *b* in the first, no *p* or *l* in the second, no *w*, *g*, or *h* in the third, but simply *d—t*, *s—m*, and *r—t*. These letters, then, form what is called the "articulate skeleton" of the word, requiring but the filling in of a sign for the different vowels to complete a perfect representation of the spoken word.

The elements of speech are *vowels*,—open throat-sounds,—and *articulations* (from the Latin *articulus*, a joint)—close conjunctions of the various parts of the mouth. These latter are more commonly called *consonants* (from the Latin *con* and *sonans*, sounding together) from their presumed incapacity of being sounded without the aid of a vowel. In this work we shall use the term *articulation* in preference to *consonant*, the latter being associated with a faulty definition, and one especially at variance with the art of reading from our short-hand characters, which very often requires the "consonants" to be "sounded alone."

Of these elements of speech, articulations are the more *various* in kind, the more *fixed* in use, and the more *characteristic* in the representation of words; and vowels are the more *fluctuating* in dialects, and the less *distinctive*, either as sounds or as etymological signs. In short-hand writing, therefore, more attention is paid to the former than to the latter class of elements. Indeed, to one who writes or reads a language with the phraseology of which he is familiar, the insertion of vowels may be, to a very great degree, dispensed with, if care be taken merely to indicate where vowels do, and where they do not, occur. This has been attained, hitherto, in short-hand, only by the use of vowel points or dots, the omission of which was fatal to perspicuity, often rendering the MS. altogether unintelligible even to the writer himself. The reason of this will be evident when it is considered that such words as *part*, *prate*, *parrot*, *apart*, *upright*, and *operate*, all contain the very same articulations, namely, *p—r—t*, and can only be distinguished one from another either by the insertion of the appropriate vowel marks, or by some clear indication of the *relative positions of* the vowels and the articulations. By a novel principle of writing the articulations so as to show the vowel positions, without inserting vowel marks or adopting a single arbitrary character, we are enabled to furnish a means of perfectly distinguishing all such words in their "articulate skeleton."

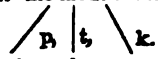
1. All the articulations (consonants) are represented by straight or curved lines, written—either upwards or downwards, backwards or forwards, as may be most convenient—in one of other of the following *directions*:—

Slanting from *left to right.* | Up and down or *perpendicular.* | Slanting from *right to left.* | Across the page or *horizontal.*

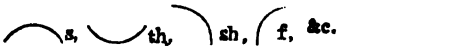


2. Those letters which are formed by the *lips* are written in the direction *slanting from right to left*; those which are formed by the *middle or back of the tongue*, are written in the direction *slanting from left to right*; those which are formed by the *point of the tongue raised*, are written in the direction *up and down the page*, or *perpendicularly*; and those which are formed *with the tongue flat* (the sibilant, S and Th) are written *across the page* or *horizontally*.

3. *Straight* lines are appropriated to those letters—called "*obstructives*"—that shut the mouth and *obstruct the breath* in their formation, thus:



4. *Curved* lines denote those letters—called "*continuous*"—that are formed by near approach only, or by partial contact of the organs, and *do not obstruct the breath* in their formation, thus:

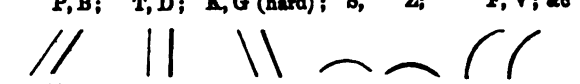


5. The letters of the alphabet are of two kinds, phonetically considered, that is, with regard to their mode of utterance, as formed of *whispered breath* or of *sonorous voice*; the "*breath*" letters consisting of simple puffs or hisses of breath from the mouth, as *p*, *f*, *s*, &c.; and the "*voice*" letters, of the same oral breathings, accompanied by a murmuring effort of voice from the throat, as *b*, *v*, *z*, &c. The following are all the *simple forms* of articulation divided into these two classes:—

Breath Letters: F, S, Sh, Th (as in *thin*), Wh, Yh, P, T, K.
Voice Letters: V, Z, Zh, *Th* (as in *then*), W, Y, B, D, G; L, R, M, N, ng.

6. The *breath* letters are represented by *thin* hair-stroke lines; and the *voice* letters by the same forms written comparatively *thick* and heavy, thus:

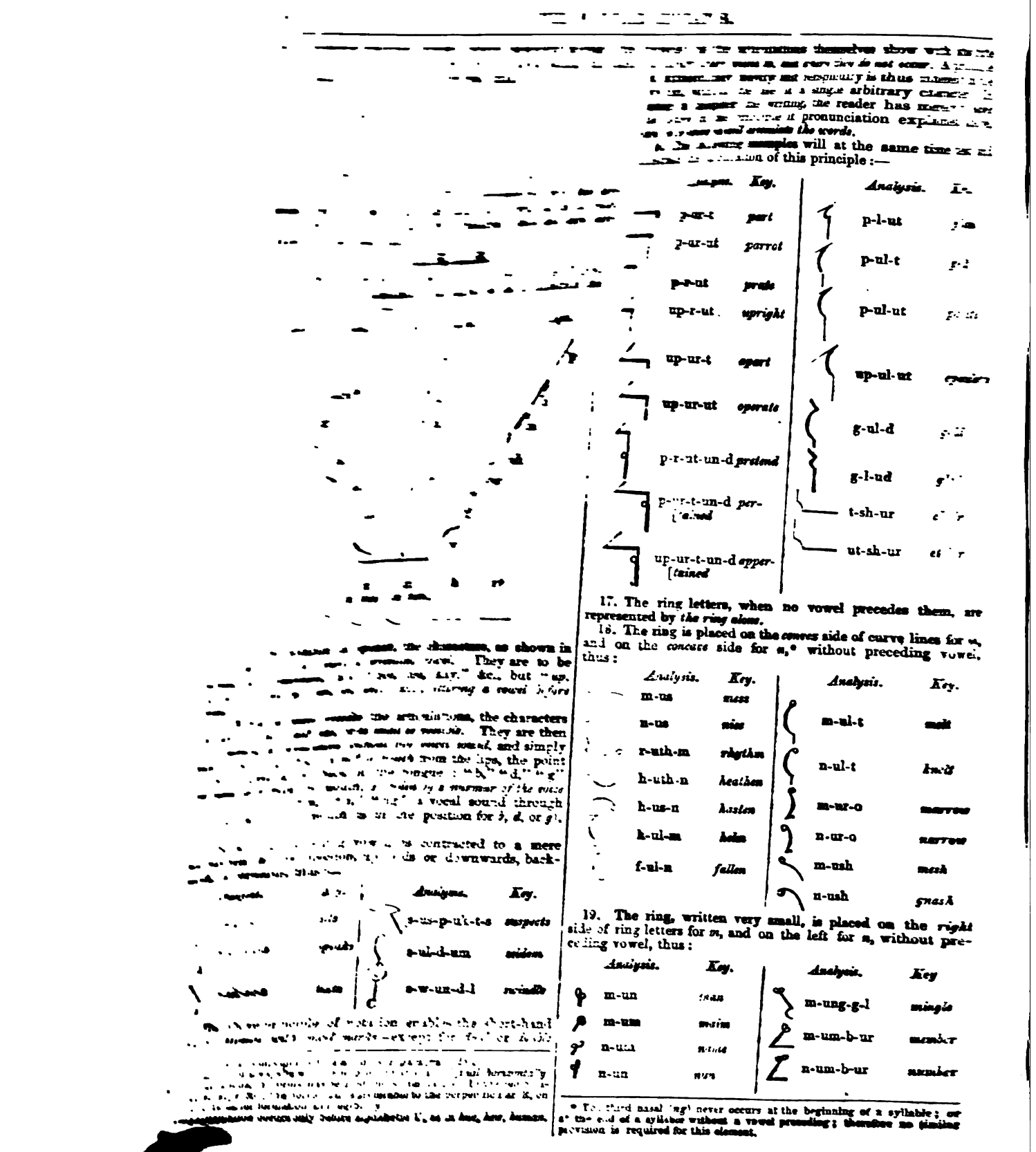
P, B; T, D; K, G (hard); S, Z; F, V; &c



7. The letters M, N, ng (called "*nasals*"), are formed with the mouth *in the same obstructive positions as for B, D, G*, while the voice from the throat issues freely *through the nose*.

8. The *nasal* passage of the breath is indicated by a small *ring*, which aptly represents a nostril; and to this a very short *straight line* is added to denote the *obstructive position of the mouth*, thus:

M, (formed as B)
N, (formed as D)
ng, (formed as G hard)



Analysis.	Key.
p-ur-t	*part*
p-ur-ut	*parrot*
p-r-ut	*prate*
up-r-ut	*upright*
up-ur-t	*apart*
up-ur-ut	*aparte*
p-r-nt-un-d	*pretend*
p-ur-t-un-d	*pertained*
up-ur-t-un-d	*appertained*

Analysis.	Key.
p-l-ut	*plate*
p-ul-t	*pelt*
p-ul-ut	*polite*
up-ul-ut	*opulent*
g-ul-d	*guild*
g-l-ud	*glued*
t-sh-ur	*chair*
ut-sh-ur	*etcher*

17. The ring letters, when no vowel precedes them, are represented by *the ring alone*.

18. The ring is placed on the *convex* side of curve lines for *n*, and on the *concave* side for *s*,* without preceding vowel, thus:

Analysis.	Key.
m-us	*muss*
n-us	*nice*
r-uth-m	*rhythm*
h-uth-n	*heathen*
h-us-n	*hasten*
h-ul-m	*helm*
f-ul-n	*fallen*

Analysis.	Key.
m-ul-t	*melt*
n-ul-t	*knelt*
m-ur-o	*marrow*
n-ur-o	*narrow*
m-ush	*mesh*
n-ush	*gnash*

19. The ring, written very small, is placed on the *right* side of ring letters for *m*, and on the *left* for *n*, without preceding vowel, thus:

Analysis.	Key.
m-un	*man*
m-um	*mourn*
n-um	*mine*
n-un	*nun*

Analysis.	Key.
m-ung-g-l	*mingle*
m-um-b-ur	*member*
n-um-b-ur	*number*

* The third nasal 'ng' never occurs at the beginning of a syllable; or at the end of a syllable without a vowel preceding; therefore no similar provision is required for this element.

20. In connexion with straight lines, a *loop* or *oval* must be used instead of a ring for *m* and *n* without a vowel preceding.

21. The loop is placed on the *right* or *upper* side of the straight line for *m*, and on the *left* or *under* side for *n*, without a vowel preceding, thus:

Analysis.	*Key.*	*Analysis.*	*Key.*
n-ut	*night*	m-ur	*mere*
m-ut	*might*	n-ur	*near*
n-uk	*neck*	h-ud-n	*hidden*
m-uk	*make*	f-ut-n	*fatten*
m-up	*map*	uk-mi	*acme*
n-up	*nap*	h-uk-ni	*hackney*

22. The reason that a loop rather than a ring is necessary with straight lines is to be found in the fact before explained, that *the "nasals" (m, n, ng), are of the same oral formation as the "obstructives" (b, d, g)*, and consequently are represented in full by a short straight line after the nasal ring; so that a ring before a full-sized straight line would signify a *full-sized nasal*, followed by a *half-sized obstructive*, thus:

or (the ring on either side) is *un* and *t*, connected;

" " " " is *un* and *d*, connected;

" " " " is *ung* and *k*, connected;

" " " " is *um* and *p*, connected.

LESSONS IN LATIN.—No. XXXVIII.

By JOHN R. BEARD, D. D.

DEVIATIONAL VERBS.

8. *Inchoatives.*

THOSE verbs are called inchoatives (from the Latin inchoo, *I begin*) which denote a commencement, or a transition from one state into another, with special reference to the idea conveyed by the roots from which they are severally formed; e. g.; vetus is *old*; accordingly the inchoative veterasco means, *I grow or become old*. Inchoatives are of the third conjugation, and follow the perfect and the supine of their radical verb.

i. Inveterasco (Radical, invetĕrare), inveterascĕre, inveteravi, inveteratum, *to grow old*.

ii. Exardesco (R. ardēre), exardescĕre, exarsi, exarsum, *to burst into a flame, to burst into anger, break out*.

iii. Indolesco (R. dolēre), indolescĕre, indolui, indolĭtum, *to feel pain*.

iv. Revivisco (R. vivĕre), reviviscĕre, revixi, revictum, *to live again, to revive*.

v. Concupisco (R. cupĕre), concupiscĕre, concupivi, concupĭtum, *to desire*, (E. R. *concupiscence*).

vi. Obdormisco (R. dormīre), obdormiscĕre, obdormivi, obdormĭtum, *to fall asleep*.

The inchoatives of the obsolete oleo, olĕre, olui, *to grow*, are formed thus: adolesco, adolescĕre, adolēvi (adultus, as an adjective, *grown up, adult*), *to grow up*; exolesco, exolescĕre, exolēvi (exoletus, as an adj., *grown old, worn out, antiquated*), *to grow out, grow old, become obsolete*; inolesco, inolescĕre, inolevi (no supine), *to grow upon, to add to one's growth*; obsolesco, obsolescĕre, obsolēvi, obsoletum, *to grow down, become obsolete*. Very many inchoatives want the perfect and the supine, as augesco, *to increase*, from augeo, augēre, auxi, auctum. Here may be placed the inchoatives which are derived from substantives or adjectives, as repuerascĕre, *to become a boy again* (puer, *a boy*) only a small part of them form a perfect in ui, as matūresco, maturescĕre, maturui, *to become ripe* (matūrus).

VOCABULARY.

Coalesco, coalescere, coalui, coalĭtum, *to grow together, unite, coalesce*; consanesco, ui, *to become sound* (sanus) *or healthy*; convalesco, ui, *to grow well or strong* (valĭdus); defervesco, bui, *to cease fermenting, to cool down* (fervidus); illucesco, illuxi, *to become bright, to shine forth (as the day)*; recrudesco, dui, *to grow raw (or sore) again, to break out again* (intransitive); condemnāre, *to condemn*, with capĭtis, *to condemn to death*; permanāre, *to flow through*; advertĕre, *to turn to*; auditor, oris, m. *a hearer*; viscus, ĕris, n. (commonly in the plural, viscera), *the bowels*; adulterīnus, a, um, *false, adulterate*; omnis, e, *every*; rescisco, *to come to know find out*; imprudens, entis, *without knowing it*; aborigines (ab and origo), *the original natives*.

EXERCISES.—LATIN-ENGLISH.

Credo omnem diem tibi illuxisse supremum; Socratis responso sic judices exarserunt ut capitis hominem innocentissimum condemnarent; ratio, quum adolevit atque perfecta est, nominatur rite sapientia; quaeritur si sapiens adulterinos nummos acceperit, imprudens pro bonis, quum id rescierit, soluturusne sit eos pro bonis; incredibile memoratu est quam facile Romani et Aborigines coaluerint; quum est concupita pecunia, nec adhibi a continuo ratio, quae sanet eam cupiditatem, permanat in venas et inhaereat in visceribus illud malum; Endymio, nescio quando, in Latmo, Cariae monte, obdormivit, neodum est experrectus; oratori abstinendum est verbis quae propter vetustatem obsoleverunt; convaluistine tandem ex morbo, quo tamdiu laborasti? illius oratoris ardor animi, qui prius omnium auditorum animos ad se advertebat rapiebatque, jam plane defervuit; vulnus meum quod jam consanuisse videbatur, nunc recruduit.

ENGLISH-LATIN.

The last day has shone on thee; has the last day shone on my brother? my father broke into anger at my foolish words; judges should not break into anger; between the Romans and the Carthaginians a terrible war broke out; all things have grown old with our enemies; did you take that bad money for good? I took it without knowing it; I have now found it out, and shall not pay it for good; the Romans and the aboriginal inhabitants soon coalesced; Endymion will fall asleep on the mountain; I have fallen asleep on the pillow; many words have grown old, many words will grow old; your ardour has cooled down (defervesco); my ardour will not cool down; the wound has broken out afresh; my wounds have not healed; I do not know whether my father's wounds have healed.

DEVIATIONS IN THE FOURTH CONJUGATION.

1. *Perfect in ivi and ui; Supine in tum.*

i. Sepelio, sepelire, sepelevi, sepultum, *bury, inter* (E. R. *sepulture*).

ii. Salio, salire, salui (no supine), *to leap* (E. R. *sallent*). Compounds: silio, silire, silui, sultum; as, assilio, assilire, assilui, assultum, *to spring at*.

2. *Perfect in i; Supine in tum.*

i. Comperio, comperire, compĕri, compertum, *to experience, to find by experience*.

ii. Reperio, reperire, repĕri, repertum, *to find*. Apĕrio has aperui aperire, apertum, *to open* (E. R. *aperture*). Opĕrio and cŏŏpĕrio, *to cover*, have rui, rtum.

iii. Vĕnio, venire, vēni, ventum, *to come*.

3. *Perfect in si; Supine in tum.*

i. Amicio, amicire (amixi and amicui, both rare), amictum, *to clothe*.

ii. Farcio, farcire, farsi, fartum, *to stuff*. Compounds in fercio, fersi, fertum, as refercire, *to stuff quite fully*.

iii. Fulcio, fulcire, fulsi, fultum, *to prop, to support*.

iv. Haurio, haurire, hausi, haustum, *to draw up, drink*.

v. Sancio, sancire, sanxi, sancitum (more seldom sanctum; sanctus, a, um, as an adj., *holy*), *to consecrate, confirm*.

vi. Sarcio, sarcire, sarsi, sartum, *to repair, make good, replace*.

vii. Sepio, sepire, sepsi, septum, *to hedge in*.

viii. Vincio, vincire, vinxi, vinctum, *to bind, put into chains*.

4. *Perfect in si; Supine in sum.*

i. Sentio, sentire, sensi, sensum, *to feel, to be of opinion*.

VOCABULARY.

Consentire, *to agree with, consent*; dissentire, *to disagree*; desilire, *to leap apart, to open*; transilire, *to jump over*; exhaurire, *to exhaust*; indagāre, *to investigate*; dispellĕre, *to drive out, dispel*; catena, ae, f. *a chain*; munificentia, ae, f. *liberality*; documentum, i. *a proof*; dumentum, i, n. *a place full of bushes*; ludibrium, i, n. *scoffing, sport*;

parricidium, i, n. *killing of a father, parricide*; curatio, ōnis, f. *healing*; explorator, ōris, m. *an explorer, spy*; rector, ōris, m. *a ruler, director*; coetus, ūs, m. *an assembly*; affluenter, *richly*; undique, *on all sides*; desidero 1, *to require*; vepres, is, m. *a briar*; probe, *well*.

EXERCISES.—LATIN-ENGLISH.

Regis sepulchro haec verba inscripta sunt; probe vixit, improbos vinxit, hostes vicit; hostes victi et catenis vincti in servitutem abducti sunt; imperium justis legibus fultum esse debet; rex, pace compositâ, rempublicam labefactam suâ virtute fulsit; virtus difficilis inventu est, rectorem ducemque desiderat; artes innumerabiles repertae sunt, docente naturâ; vita, si undique referta bonis est, beata dicitur; homines urbes moenibus sepserunt; occultae inimicitiae magis timendae sunt quam apertae; quis est tam miser ut non Dei munificentiam sensérit? Dei, induti specie humanâ, fabulas poetis suppeditaverunt, hominum autem vitam superstitione omni referserunt; continuis bellis reipublicae spes exhaustae sunt; quo quis affluentius voluptates undique hauserit, eo gravius ardentiusque sitiet; spero te mecum consensurum esse; Cicero Archimēdis sepulchrum septum undique et vestitum vepribus et dumetis indagavit; fama est ludibrio fratris Remum novos urbis muros transiluisse; Lycurgus nihil lege ullâ in alios sanxit, cujus non ipse primus in se documenta daret; Hippias gloriatus est, pallium quo amictus esset, se manu suâ confecisse; speramus pacem omnia belli damna brevi sarturam esse; unâ victoriâ omnia prius accepta detrimenta sarsit; Caesar ubi per exploratores comperit hostes adventare, protinus milites e castris eduxit; nebula, horâ quartâ sole dispulsa, aperuit diem; Plato Athenis (at Athens) in Academia sepultus est.

ENGLISH-LATIN.

The king, dying, said I have lived well; I have bound bad men; I have conquered enemies; the soldier being conquered was put into chains; they will be led away into slavery; he props the falling republic; he will prop the falling house; the art of writing has been discovered; they have opened the book; my life has been with the good; I fear hidden enemies; peace being arranged, I shall return home; happiness is difficult to be found; the husbandmen have surrounded the meadow with hedges; the plain is full of brambles and briars; the spies are aproaching; Caesar has learnt from the spies that the enemy are approaching; the rising sun opens the day; they have felt the goodness of God; didst thou make thy cloak with thine own hand? I made with my own hand the cloak with which I am clothed; the healing of the sick man dispelled my fears; the captive came hither in chains; he was condemned of parricide; bad men are the sport of fortune (in Lat. are for sport to fortune); the house of the ruler of England is richly filled with good things; a good king will repair the injuries of war; the queen drank up (haurio) the cup; they bound the captive; they will come into the city; will they come into thy house? I hope they will come into my house; they have found by experience that spies are bad men; the senate has confirmed the law; the laws have been confirmed by the senate.

CONSTRUCTION AND USAGES OF AGO.

Ago is a verb used in a great variety of applications. So various are these applications that they may serve to throw light on the nature of language. Ago must be well understood by those who wish to be familiar with Latin.

Ago, agĕre, egi, actum, of the third conjugation, has for its radical or *root*-meaning the idea of setting in motion. Hence it is commonly given as denoting to *lead, drive, act*. But this is a very rough way of treating the subject. I will give the significations of the verb in the order in which they seem to have arisen.

1. *To lead*, as a shepherd :—

"Agit, ut pastor, per devia rura capellas."—*Ovid.*

2. *To lead*, as a poem leads the mind :—

"Poemata dulcia sunto et quocumque volent animum auditoris agunto."—*Horace.*

3. *To drive*, as men are driven out of a country :—

"Multis millibus armatorum actis ex eâ regione in quam missus erat."—*Livy.*

"Adulteram expellit domo maritus, ac per omnem vicum verbere agit."—*Tacitus.*

4. With the reflective pronoun *to betake yourself*, in poetic diction :—

"Quo agis te?"—*Plautus.*

5. *To march* (in the passive voice) :—

"Si citius agi vellet agmen."—*Livy.*

6. *To plunder*, lay waste (with praedas) :—

"Suā pergebat urbes, agros vastare, praedas agere."—*Sallust.*

7. *To hunt* :—

"Ut cervum ardentes agerent canes."—*Virgil.*

8. *To move lifeless objects to and fro* :—

"Celeriter vineis ad oppidum actis."—*Caesar.*

"Simul naves in adversum agmen agebantur."—*Tacitus.*

9. *To steer* (with navis) :—

"Navim agere ignarus navis timet."—*Horace.*

10. *To drive a chariot* (with currum) :—

"Non agat hos currus?"—*Ovid.*

11. *To levy a tax or tribute* (with vectigal) :—

"Publicum vectigal in Asiâ egit."—*Suetonius.*

12. *To send forth* :—

"Et spumas aget ore cruentas."—*Virgil.*

13. *To die* (with animam) :—

"Nam et agere animam et efflare dicimus."—*Cicero.*

14. *To strike root* (with radices) :—

"Robora suas radices in profundum agunt."—*Pliny.*

15. *To spring a leak, split, open* (with rimas) :—

"Tabernae rimas agunt."

The meanings already given imply a literal moving of the objects spoken of. Another series of meanings arises from the tropical or metaphorical use of the term; that is, where not the movement of sensible objects is denoted, but actions, &c., resembling those either in reality or in appearance.

16. To move, drive, or *induce* any one :—

"Agricola in gloriam praeceps agebatur."—*Tacitus.*

"Agunt eum praecipitem poenae."—*Cicero.*

17. *To pursue, persecute* :—

"Acerba fata Romanos agunt."—*Horace.*

18. *To plead* (with causam) :—

"Hanc egit causam apud judices."—*Cicero.*

19. *To take an augury* (with augurium) :—

"Augures agere auguriam dicuntur."—*Varro.*

20. *To play* (with fabulam); that is, personate a character. Hence, a distinction between facere and agere :—

"Potest aliquid facere et non agere; ut poeta facit fabulam et non agit; contra, actor agit et non facit; et sic a poetā fabula fit non agitur; ab actore agitur, non fit."—*Varro.*

21. *To do, to be active, to be engaged generally* :—

"Scipio Africanus solitus est dicere nunquam se plus agere quam quum nihil ageret."—*Cicero.*

This is explained by another version of the anecdote :—

"Nunquam se minus otiosum esse quam quum esset otiosus."—*Cicero.*

"Aliud est agendi tempus, aliud quiescendi."—*Cicero.*

22. *To effect* :—

"Nihil agis, dolor, quamvis sis molestus, nunquam te esse malum confitebor."—*Cicero.*

"Meta nobis extorquere conantur; sed nihil agunt."—*Cicero.*

23. *To carry on, perform* :—

"Delibera utrum colloqui malis, an per litteras agere, quas cogitas."—*Corn. Nepos.*

24. *To have in mind, consider* :—

"Nescio quid mens mea majus agit."—*Ovid.*

25. *To acknowledge a favour* (with gratias) :—

"Renunciate gratias regi me agere."—*Livy.*

26. *To spend time*, pass one's life, &c. :—

"Pater cum esset infirmā valetudine, hic fere aetatem egit in litteris."—*Cicero.*

So, agere custodias, *to watch*; agere triumphum, *to triumph*; res agere, *to attend to business*; agere poenitentiam, *to repent*, &c.

"Quartum annum ago et octogesimum."—*Cicero.*

27. *To make war* (with bellum):—

"Qui longe aliā ratione se reliqui Galli bellum agere instituerunt."—*Caesar.*

So agere pacem, *to be at peace*.

28. *To treat of* (with de) :—

"Recordare velim quae ego de te in senatu egerim."—*Cicero.*

"Te agente de nostrā dignitate."—*Cicero.*

29. *To plead before, treat with, deal with* (with cum) :—

"Cum populo agere est rogare quid populus suffragiis suis aut jubeat aut vetet."—*Gellius.*

"De quo praesens tecum egi diligenter."—*Cicero.*

30. *To accuse of anything* (with accusative of the person, and genitive of the thing):—

"Furti agit eos."—*Cicero.*

In the passive, it is used of the thing which is the matter at issue—"*the question* is," "the *point at issue* is."

"Non nunc pecunia sed illud agitur quomodo," &c.—*Terence.*

"Aguntur injuriae sociorum, agitur vis legum, agitur existimatio, veritasque judiciorum."—*Cicero.*

"Agitur populi Romani gloria, agitur salus sociorum."—*Cicero.*

31. *To deliver*, used of orators:—

"Quae sic ab illo acta esse constabat, oculis, voce, gestu, inimici ut lachrymas tenere non possent."—*Cicero.*

32. *To conduct yourself*, to act (with se, as, se agere):—

"Tantâ mobilitate sese Numidae agunt."—*Sallust.*

"Quanto ferocius ante se egerant, tanto cupidius insolitas voluptates hausisse."—*Tacitus.*

Agere gratias differs from referre gratias; the former signifies to feel gratitude, and the latter to manifest it. Observe that the plural gratias, not the singular gratiam, is used.

The student ought now to find no difficulty in making out the meaning of the play of words in the ensuing epigram, written by Martial, on a barrister whose activity was overflowing:—

"Semper agis causas et res agis, Attale, semper.
Est, non est quod agis, Attale, semper agis.
Si res et causae desunt, agis, Attale, malas.
Attale, ne quod agas desit, agas animam.

One or two conversational and idiomatic usages may be added:—

"Quid agis, dulcissime rerum?"—*Horace.*
How are you, my sweet fellow?
"Quid agitur?"—*Plautus.*
How is it with you?
"Hoc agite!"—*Plautus.*
Attend!
"Age, da veniam filio."—*Terence.*
Come, pardon thy daughter!
"Age, sit ita factum!"—*Cicero.*
Well, be it so!

The instances given show that ago, like our own *do*, has the widest signification, and may be applied to almost any state or action, whether internal or external, whether of the mind or of the body. Herein it differs from facere, as our *make* differs from *do*; for facere is used in the particular sense of giving existence, form, or shape to some outward object. After the same manner it differs from gerere, which is applied to the conducting of anything, as the administration of a government.

VOCABULARY.

Devius, a, um (de and via), *out of the way, by-paths*; capella, ae, *f. a she-goat*; vicus, i, m. *a street, village*; adultera, ae, *f. an adulteress*; verber, ĕris, m. *a scourge, a blow*; cito, *quickly*; agmen, agmĭnis, n. *a band, an army* (from ago); vineae, arum, *f. a cover of hurdles, &c., under which soldiers went up to the breach in a siege*; vectigal, vectigălis, n. *a tax*; spuma, ae, f. *foam, froth*; robur, robŏris, n. *an oak*; rima, ae, f. *a rift, cleft, chink*; taberna, ae, f. (E. R. *tavern*), *a booth, a house made of boards, a shop*; praeceps, precipĭtis, *headlong* (prae and caput, "*head foremost*"); tit from fio, the passive of facio, fio, fieri, factus sum, *to be made, to become*; otiosus (otium), *unoccupied, idle*; conor, conāri, conatus sum, dep. *to endeavour*; alius ac, *different from*; recordo 1, *to call to mind*; furtum, i, n. *a theft*; mula, ae, *a she mule.*

LESSONS IN FRENCH.—No. XXXIX.

By Professor LOUIS FASQUELLE, LL.D.

SECTION LXXXIX.

1. The verb tenir [2. ir.], *to hold*, often corresponds in signification to the English verb *to keep*; tenir un hôtel, *to keep a hotel*; tenir table ouverte, *to keep open table*; tenir sa chambre propre, &c., *to keep one's room clean*; tenir la porte, les fenêtres ouvertes, *to keep the door, the windows open*; tenir les yeux ouverts, fermés, *to keep one's eyes opened, shut*; tenir la tête droite, &c., *to keep one's head upright*; tenir sa parole, *to keep one's word*; tenir compagnie à quelqu'un, *to stay* or *remain with some* or *any one.*

2. Tenir un langage singulier, tenir des propos..., des discours..., would be rendered in English by *to make use of singular language, to use peculiar expressions, to advance things*, &c:—

Ce jeune homme tient des propos insensés.	*That young man says foolish things.*

3. Tenir is also used in the sense of *being attached to, to be tenacious of*:—

Je tiens à mon argent, à la vie.	*I value* (i. e. *hold to*) *my money, my life.*
Je tiens à mon opinion.	*I am tenacious of my opinion.*

4. Tenir is also used of a *colour* which is *fast* or *not*:—

Cette couleur tiendra ou ne tiendra pas.	*This colour is fast* (i. e. *holds*) *or not.*

5. Faire tenir is used in the sense of *to forward, to send*:—

Faites-lui tenir cet argent, cette lettre.	*Forward him this money, this letter.*

6. Se tenir, or s'en tenir, conjugated reflectively, may often be rendered by *to remain, to abide by, to be satisfied with*:—

Il se tient debout, assis.	*He remains standing, seated.*
Je m'en tiens à votre opinion.	*I am satisfied with your opinion.*

RÉSUMÉ OF EXAMPLES.

M. L. tient un hôtel superbe.	*Mr. L. keeps a superb hotel.*
Votre petite fille ne tient pas sa chambre bien propre.	*Your little girl does not keep her room very clean.*
Pourquoi tenez-vous les portes ouvertes?	*Why do you keep the doors open?*
Il fait si chaud que nous tenons toutes les fenêtres ouvertes.	*It is so warm that we keep all the windows open.*
Tenez la tête droite et les yeux ouverts.	*Keep your head upright and your eyes open.*
Pourquoi ne tenez-vous pas votre parole?	*Why do you not keep your word?*
Tenez compagnie à votre sœur; elle est malade.	*Stay with your sister; she is sick.*
Votre ami tient des propos bien singuliers.	*Your friend makes use of very singular expressions.*
Vous tenez des discours bien légers.	*You use very light language.*
La couleur de votre drap tiendra-t-elle?	*Is the colour of your cloth fast?*
Lui avez-vous fait tenir ce livre?	*Have you sent him that book?*
A quoi vous en tiendrez-vous?	*What will be your decision?*
Je m'en tiendrai à ce que j'ai dit.	*I shall abide by what I have said.*
Pourquoi se tient-il toujours debout?	*Why does he always remain standing?*
L'incrédule s'en tiendra-t-il au présent, qui doit finir demain?	*Will the unbeliever be satisfied with the present, which is to end to-morrow?*

MASSILLON.

EXERCISE 177.

Cocher, m. *coachman.*	Gens, pl. *people.*	Recommand-er, 1 *to recommend*
Debout, *standing.*	Indisposé, e, *indisposed.*	Regard-er, 1. *to look.*
Défend-re, 4. *to forbid.*	Insolent, e, *insolent.*	Rue, *street.*
De près, *closely.*	Lieu, *place.*	Sav-oir, 3. ir. *to know.*
En dehors, *out, outside.*	Malade, *sick.*	Vie, *life.*
S'enrhumer, 1. ref. *to get a cold.*	Parfaitement, *perfectly.*	
	Préfer-er, 1. *to prefer.*	

1. Quel hôtel votre frère tient-il? 2. Il tient l'hôtel de l'Europe, rue de... 3. Votre petit garçon se tient-il bien propre. 4. Il se tient bien propre. 5. A quoi vous en tiendrez-vous? 6. Je m'en tiendrai à ce que je vous ai dit. 7. Ne savez-vous pas à quoi vous en tenir? 8. Je sais parfaitement à quoi m'en tenir. 9. Pourquoi vous tenez-vous debout? 10. Parceque nous n'avons pas le temps de nous asseoir. 11. N'avez-vous point défendu à ces jeunes gens de tenir de tels propos? 12. Je le leur ai défendu. 13. Votre cocher n'a-t-il pas tenu un langage bien insolent? 14. N'avez-vous pas peur de vous enrhumer, en tenant les portes ouvertes? 15. Nous préférerions les tenir fermées. 16. Votre maître vous recommande-t-il de tenir la tête droite? 17. Il me recommande de tenir le pieds en dehors. 18. Pourquoi votre ami ne vous tient-il pas compagnie? 19. Sa sœur est indisposée; il est obligé de rester avec elle. 20. Votre oncle ne vous a-t-il pas tenu lieu de père? 21. Il m'a tenu lieu de père et de mère. 22. Regarderez-vous de plus près à cette affaire? 23. Non, Monsieur; je m'en tiendrai à ce que j'en sais. 24. Ce médecin ne tient-il pas à son opinion? 25. Il y tient plus qu'il ne tient à la vie de ses malades.

Exercise 178.

1. Does that gentleman keep open table? 2. He keeps a hotel in Paris. 3. Why do you keep the windows open? 4. We keep them open because we are too warm. 5. Has not your friend kept his word? 6. He has kept his word; he always keeps his word. 7. Have you not told your scholar to keep his head upright? 8. I have told him to keep his head upright and his eyes open. 9. Why do you not stay with your sister? 10. Because I have promised to go to my cousin's this morning. 11. Have you forbidden your little boy to make use of these expressions? 12. I have forbidden him. 13. Does he make use of insolent language? 14. He does not. 15. What will be your decision? 16. I will abide by what I told your father. 17. Have you forwarded that money to your friend? 18. I have not yet forwarded it to him. 19. Will you forward it to him to-morrow? 20. I will forward it to him if I have an opportunity. 21. Why do you not keep standing? 22. Because I am weary. 23. Do you think that the colour of your coat is fast? 24. I think that it is fast; it (*elle*) appears very good. 25. Will you not look closely into your brother's affairs? 26. I shall not look closely into them. 27. I will be satisfied with your opinion. 28. Are you not tenacious of your opinion? 29. I am not too tenacious of it. 30. Does not your physician adhere too tenaciously to his opinion? 31. He adheres to it. 32. Does that lady hold your mother's place? 33. She is a mother to me. 34. Our cousin is a father to us. 35. That physician does not value the life of his patient.

Section XC.

1. The verb être enters into a great many idioms besides those which we have already mentioned:—être en retard, *to be late, to tarry*; être en état, à même de, *to be able to;* être en peine de, *to be uneasy about* ; être en vie, *to be alive, to live* ; être en chemin pour, *to be on the way to*; être au fait, au courant de, *to be familiar with* ; être à la veille de, *to be on the eve of*; être de trop, *to be unnecessary, to be in the way* ; être bien avec, *to be on good terms with* ; être brouillé avec, *to be on bad terms with* ; être aux prises avec, *to be in open rupture, quarrel, or battle with*; être d'avis, *to be of opinion*, &c.

2. Etre, as already said [Sect. 46, 5], is used in the sense of appartenir, *to belong*. It is also employed in the sense of *to behove, to become*. In the latter sense, it takes generally the preposition *de* before another verb:—

Est-ce à vous *de* lui faire des reproches?	*Does it become you to cast (make) reproaches upon him?*
C'est à vous à parler.	*It is your turn to speak.*

3. Y être is often used for *to be at home, to be in*:—

Votre père y est-il?	*Is your father at home?*

Resumé of Examples.

Ne sommes-nous pas de trop ici?	*Are we not in the way here?*
Nous ne sommes pas bien avec nos parents.	*We are not on good terms with our relations.*
Nous sommes au courant de tout cela.	*We are familiar with all that.*
Je suis à même de satisfaire à sa demande.	*I am able to satisfy his demand.*
Nous sommes brouillés.	*We are not on good terms; we are at variance.*
Ma sœur est à la veille de se marier.	*My sister is on the eve of her marriage.*
Nous sommes d'avis que vous allies lui faire des excuses.	*It is our opinion that you should go and apologise to him.*
Ce n'est pas à lui de nous reprocher notre bonté.	*It does not become him to reproach us with our kindness.*
A qui est-ce à lire?	*Whose turn is it to read?*
C'est à ma sœur à lire ce matin.	*It is my sister's turn to read this morning?*
Cette maison est à lui et à moi.	*That house is his and mine.*
Elle est à moi, elle est à lui.	*It is mine, it is his.*
Ces souliers ne sont pas à nous.	*These shoes are not ours.*
Ils appartiennent à notre frère.	*They belong to our brother.*
Ils lui appartiennent.	*They belong to him.*
Monsieur* n'y est pas.	*The gentleman is not at home.*
Madame y est.	*The lady is in.*

* *Monsieur, Madame*, not followed by a name, are generally understood to mean the master and mistress of the house, the heads of the family.

Exercise 179.

Achet-er, 1. *to buy.*	Gravure, f. *engraving.*	Part-ir, 2. ir. *to start, to set out.*
Arriv-er, 1. *to arrive.*	Hôte, m. *host.*	Propriétaire, m. *landlord.*
Correspondant, *correspondent.*	Libraire, m. *bookseller.*	Punir, 2, *to punish.*
Craind-re, 4. ir. *to fear.*	Mois, m. *month.*	Veille, f. *eve, day before.*
Dev-oir, 3. *to owe, be obliged.*	Montre, f. *watch.*	
Embarqu-er, (s'), 1. ref. *to embark.*	Mort, p. p. *from* mourir, *to die.*	

1. Y a-t-il longtemps que vous êtes brouillés? 2. Il y a plus d'un mois que je suis brouillé avec lui. 3. Votre ami est-il encore en vie? 4. Non, Monsieur; il y a dix ans qu'il est mort. 5. Votre correspondant est-il en chemin pour Paris? 6. Je crois qu'il doit être arrivé. 7. Ce jeune homme n'est-il pas en retard? 8. Oui, Monsieur; il ne vient jamais à temps. 9. Ces gravures sont-elles à vous ou à votre libraire? 10. Elles sont à moi; je viens de les acheter. 11. Ne craignez-vous pas d'être de trop ici? 12. Nous sommes trop bien avec notre hôte pour craindre cela. 13. A qui est-ce à aller chercher les livres? 14. C'est à moi à les aller chercher. 15. Est-ce à vous de le punir, quand il le mérite? 16. C'est à moi de le punir, car je lui tiens lieu de père. 17. Ces maisons n'appartiennent-elles pas à notre propriétaire? 18. Elles ne lui appartiennent pas. 19. Elles sont à notre correspondant. 20. A qui sont ces lettres? 21. Elles ne sont point à moi, elles sont à ma cousine. 22. Cette montre est à lui. 23. N'êtes vous point à la veille de partir pour Londres? 24. Nous sommes à la veille de nous embarquer pour Cadix. 25. Il y a longtemps, que nous sommes aux prises.

Exercise 180.

1. Are you able to pay him? 2. I am not able to pay him; I have not received my money. 3. Are you on good terms with your bookseller? 4. I am not on good terms with him. 5. I am on bad terms with him. 6. How long have you been on bad terms with him? 7. It is more than a month. 8. Are you not able to satisfy my friend's demand? 9. I am able to satisfy it (*d'y satisfaire*). 10. Are you on your way to Naples? 11. No, Sir; I am on my way to Rome. 12. Is not your physician on the eve of starting for Montpelier? 13. He is on the eve of starting for Paris. 14. Am I in the way here? 15. No, Sir; you are not in the way. 16. Whose turn is it to speak? 17. It is my turn to speak and to read. 18. Is it my place (*à moi*) to make apologies to him? 19. It is your brother's place to apologise to him. 20. Does it become you to punish that child? 21. It behoves me to punish him. 22. Do you hold the place of a father towards him? 23. I hold the place of a father towards him. 24. Is that coat yours? 25. No, Sir, it is not mine; it is my brother's. 26. Have you broken openly with him? 27. We have been quarrelling two months. 28. Is not that large house yours? 29. No, Sir, it is not mine; it is my sister's. 30. Does it become your brother to reproach him with his kindness? 31. It does not become him to do it. 32. Whose turn is it to go and fetch the books? 33. It is my place to go and fetch them. 34. Is the gentleman in? 35. No, Sir, the gentleman is not in; but the lady (of the house) is in.

LESSONS IN GERMAN.—No. XXIX.

Section LVI.

Prepositions requiring the accusative.

The prepositions, durch, entlang,* gegen, fonbern, um, &c., (§ 113. § 114.) govern the accusative. Ex.: Sie haben mich durch Ihre Großmuth besiegt; you have vanquished me by your magnanimity. Ich ging mit ihm den Fluß entlang; I went with him along the river. Das Schicksal hat sich gegen mich empört; (the) Destiny has risen up against me. Alle Hoheit der Erde sonder herzliche Treue ist Staub; all the grandeur of the world without heart-felt love is dust. Ich habe diesen Morgen einen Spaziergang um die Stadt gemacht; I have taken (made) a promenade about the town this morning.

Exercise 60.

Un'stellen, to contrive;	Auf'opfern, to sacri-	Aus'nahme, *f.* excep-
Arznei' *f.* medicine;	fice;	tion:

Bereit', prompt, ready;
Beſitz', *m.* possession;
Beſorgniß, *f.* fear, apprehension;
Beſtra'fen, to punish;
Dazwiſch'enkunft, *f.* interposition;
Ebbe, *f* tide;
Eintreffen, to come in, arrive;
Entlang', along;
Erſchie'ßen, to shoot, (to kill by shooting);
Gefan'gen, caught, captured, (as noun, prisoner);
Kai'ſerin, *f.* empress;
Krankheit, *f.* sickness;
Küſte, *f.* shore;
Mari'e, *f.* Mary;
Mode, *f.* fashion;
Offen, open, frank;
Oeſtreich, *n.* Austria;
Richten, to direct;
Rüſtung, *f.* preparation, arming;
Schimmern, to glitter, glimmer;
Schle'ſien, *n.* Silesia;
Sondern, without;
Stück, *n.* part, piece;
Wahr'heit, *f.* truth;
Wider, against;
Zweifel, *m.* doubt.

Durch dieſe hohle Gaſſe muß er kommen. (Schiller.)	Through this hollow way must he come.
Es giebt keinen ſchö'neren Tod, als den für's Va'terland.	There is not a nobler death than that for one's country.
Ohne die Hülfe Gottes vermö'gen wir nichts zu thun.	Without the help of God we are able to do nothing.
Gegen unſer ei'genes Herz zu kämpfen iſt ſchwer.	To combat against our own heart is difficult.

1. Durch dieſen Wald iſt nicht zu kommen. 2. Dieſe Briefe erhielt ich heute Morgen durch einen guten Bekannten. 3. Den Berg entlang ſah man die ſchimmernden Rüſtungen der Feinde. 4. Für einen Freund muß man Alles aufzuopfern bereit ſein. 5. Für dieſes Betragen beſtrafte der Vater den Knaben. 6. Man richtete die Kanonen gegen die Stadt. 7. Du biſt in neuerer Zeit nicht mehr ſo offen gegen mich, als dieſes früher der Fall war. 8. Die Feinde erſchoſſen die Gefangenen alle ohne Ausnahme. 9. Ohne die Dazwiſchenkunft des Vaters hätten die Kinder ein großes Unglück anſtellen können. 10. Sonder Zweifel wird der Freund heute hier eintreffen. 11. Um die Beſorgniſſe der Mutter nicht noch mehr zu erhöhen, ſagte er ihr nicht in allen Stücken die Wahrheit. 12. Um den Beſitz Schleſiens führte Maria Thereſia, Kaiſerin von Oeſterreich, ſieben Jahre lang Krieg mit Friedrich II., König von Preußen. 13. Wider dieſe Krankheit gibt es keine Arzenei.

1. Nothing is done but through the permission of God. 2. The power of God is known throughout the world. 3. The French revolution in the last century shook the whole of Europe. 4. Several days ago, I took a walk along the Rhine from Coblenz to Lahnstein. 5. Without doubt, thou wilt ask me for my opinion. 6. This lady is dressed after the French fashion. 7. I have gained nothing by his losses. 8. They all went into the country except two. 9. The ship in which we were, had wind and tide against her. 10. I have seen all the villages about Paris. 11. He undertook the work for me. 12. He walked along the shore.

Section LVII.

PREPOSITIONS REQUIRING THE DATIVE OR ACCUSATIVE.

The prepositions auf, hinter, über, &c. (§ 115. § 116.) are construed with the dative or accusative. Ex.: Wir wohnen auf dem Lande; we reside in the country. Der Matroſe klettert auf die Spitze der Maſtbäume; the sailor climbs up the pinnacle of the mast. Obgleich er dieſe Ränke hinter meinem Rücken ſchmiedete, ſo kam ich dennoch bald hinter dieſelben und vereitelte ſie; although he fabricated (forged) this trick behind my back, I soon got (came) (Sect. 29. I.) behind it (the same) and frustrated it. Ein Gewitter hängt über der Stadt; a thunderstorm is hanging over the town. Ueber dieſen Gegenſtand möchte ich gern eine Rede halten; upon this subject I would fain make (hold) a speech.

Exercise 61.

An'ſpannen, to harness (to);
Arm, *m* arm;
Hinter, behind;
Jünger, *m.* disciple;
Knüpfen, to unite, join closely;
Lieb, dear, beloved;
Maſch'ine, *f.* machine;
Mauer, *f.* wall;
Neben, by, near;
Quelle, *f.* spring, source;
Rad, *n.* wheel;
Schlachtfeld, *n.* battlefield;
Setzen (ſich), to seat (one's self);
Spannen, (See anſpannen);
Stellen, to place, set;
Stützen, to lean, repose;
Treffen, to hit, strike;
Verſchan'zen, to entrench, fortify;
Vorfall, *m.* event, inci'dent;
Zermal'men, to bruise, crush.
Urtheilen, to judge, decide;

Nicht an den Worten, ſondern an den Thaten erkennt man den Menſchen.	Not by the words, but by the deeds we recognize the man.
Zufrie'denheit und Freu'digkeit knüpfen ſich an das Bewußt'ſein recht gehan'delt zu haben.	Contentment and joyousness unite themselves to the consciousness of having rightly acted.
Meine Schweſter iſt in der Kirche, und mein Bruder geht ſo eben in die Stadt.	My sister is at church, and my brother is just going to the city.
Zwei edle römiſche Jünglinge ſpannten ſich, in Ermang'lung der Ochſen, ſelbſt vor den Wagen, um ihre Mutter nach dem fernen Tempel der Dia'na zu fahren.	Two noble Roman youths, for the want of oxen, harnessed themselves before the wagon in order to draw their mother to the distant temple of Diana.

1. An der Quelle ſaß der Knabe. (Schiller.) 2. An dieſen Vorfall knüpfen ſich viele Ereigniſſe. 3. Auf den Bergen iſt die Luft reiner als in den Thälern. 4. Auf die Menſchen ſoll man ſich nicht zu viel ſtützen. 5. Hinter jenen Mauern verſchanzte ſich der Feind. 6. Hinter mich ſtellte ſich der Freund. 7. In dieſem Hauſe ſind viele Zimmer. 8. Ein jeder Menſch ſoll in ſein eigenes Herz ſehen. 9. Neben dem Hauſe ſteht die Scheune. 10. Die Nichte ſetzte ſich neben mich. 11. Ueber uns erblicken wir den Himmel. 12. Ueber die Vorzüge dieſes Mannes kann ich nicht urtheilen. 13. Unter allen Freunden iſt mir dieſer der liebſte. 14. Jeſus ſtellte unter ſeine Jünger ein Kind. 15. Vor meinen Freunden habe ich keine Geheimniſſe. 16. Der Kutſcher ſpannt die Pferde vor den Wagen. 17. Der Mond kommt oft zwiſchen Sonne und Erde, und die Erde zwiſchen Sonne und Mond zu ſtehen. 18. Der Arm des Unglücklichen kam zwiſchen die zermalmenden Räder der Maſchine. 19. Schwert kam auf Schwert, zum Schlachtfeld ward' die Stadt. 20. Spannet Roſſe an, und laſſet Reiter aufſitzen. (Jeremia, 46, 4.)

1. You are excellent at the lute. 2. Virtue dwells in thee. 3. I saw him in church. 4. The town lay behind me. 5. My friend was on my side. 6. My sister played on the pianoforte. 7. His speech lasted over two hours. 8. A counsellor is above an advocate. 9. He hides himself behind the tree. 10. He had done it in a passion. 11. Let us go into the house. 12. He wishes to be introduced to the family of Mr. N. 13. He got greatly into debt in a short time. 14. They went over the ice. 15. You have spilt the water over the carpet.

Section LVIII.

EXAMPLES ILLUSTRATING THE VARIOUS USES OF THE PREPOSITIONS.

An.

Im Innern Deutſchlands geſchah', was von jeher geſchah', wenn es dem Throne an einem Kaiſer, oder dem Kaiſer an einem Kai'ſerſinne fehlte. (Schiller.)	In the interior of Germany events took place which have ever occurred before, when the throne was without an Emperor, or the Emperor without an imperial soul.
Wir ſtehen weit von einan'der ab an Jahren, an geprüf'tem Werth. (Göthe.)	We stand far from each other in years, in recognized worth
Er iſt an der Auf'zehrung geſtor'ben.	He (has) died of the consumption.
Muß ich auch an deiner Liebe zweifeln? (Schiller.)	Must I likewise doubt of thy love?
Die Freunde werden irr' an dir! (Schiller.)	(The) thy friends are becoming perplexed about thee.
An die Angſt der Mutter denkſt du nicht.	Of the anxiety of the mother thou dost not think.
Er ſchrieb einem Brief an mich.	He wrote a letter to me.
(Er ſchrieb mir einen Brief.)	(He wrote [to] me a letter.)
Man kennt den Vogel an den Federn	One knows the bird by its (the) feathers.

* Entlang however sometimes requires the genitive; as. Wir hatten den ganzen Tag gejagt, entlang des Waldgebirges; (Schiller.) We had hunted the whole day along the mountainous-forest

Die Nachkommenschaft des so gefürchteten Karl V. schwebte in Gefahr, einen Theil ihrer Besitzungen an die Türken, den andern an die Protestanten zu verlieren. (Schiller.)	The descendants of the formidable Charles V. were in danger of losing one part of their territories to the Turks, and the other to the Protestants.
Halte unverbrüchlich fest an dem Glauben an Gott, den Vater unser Aller.	Hold inviolably fast to thy (the) faith in God, the Father of us all.
Auf.	
Ein Sturm, der zur Unzeit ein Schiff auf einer wenig besuchten Fahrt etwas unsanft bewillkommt, kann andern Seefahrern oft auf ein halbes Jahrhundert die Lust zu neuen Versuchen benehmen. (G. Forster.)	A storm with which a ship has been rather unseasonably visited on a rarely frequented passage, may even for half a century deprive other navigators of all wish to make new attempts.
Der Bürgermeister ist auf dem Rathhause, und sein Sohn ist auf der Universität.	The burgomaster is at the council-house, and his son is at the university.
Wir waren gestern auf der Jagd, und gehen heute auf eine Hochzeit.	We were yesterday at the chase, and are going to-day to a wedding.
Sind Sie böse auf mich?	Are you angry with me?
Auf Sonnenschein folgt Regen.	Rain follows (upon) sun-hine.
Bei.	
Es hängt von mir ab, ob er das thun darf.	It depends upon me, whether he may do that.
Bei jedem Abschied zittert mir das Herz. (Schiller.)	At every "farewell" (departure) my heart trembles.
Bei aller seiner Klugheit läßt er sich zur Thorheit verleiten.	With all his prudence he suffers himself to be beguiled into (to the) folly.
Solch ein Geist, bei solch einem verdorbenen Charakter!	Such a mind, with such a ruined character!
Gustav Adolph gewann mit seinem Leben die Schlacht bei Lützen.	Gustavus Adolphus won, with his life, the battle at Lützen.
Das ist nicht Sitte bei uns.	That is not the fashion with us.
Er nannte mich bei meinem Vornamen (or Taufnamen).	He called me by my Christian name.
Ich lese nicht gern bei einer Lampe.	I do not like to read by a lamp.
Er scheint nicht recht bei Sinnen zu sein.	He seems not to be right in mind ("in his right mind").
Er verbot es bei Lebensstrafe.	He prohibited it on pain of death
Er hat schon Geld bei Seite gelegt	He has already laid money aside (up).
Bei Menschengedenken ist kein solches Mißjahr gewesen.	There has not been such a sterile year within the memory of man.
Er trinkt nur bei Tropfen.	He drinks only by drops.
Er faßte ihn bei der Hand.	He grasped him by the hand.

LESSONS IN GEOMETRY.—No. XIII.

LECTURES ON EUCLID.

Book I. Postulates and Axioms.

POSTULATES.

I.

Let it be granted, that a straight line may be drawn from any one point to any other point. When a straight line is drawn from one point to another point, the points are said to be *joined*. The points are understood to be in the same plane.

II.

That a terminated straight line may be produced to any length in a straight line. By *terminated* here, is meant of a *definite* length; and by *produced* is meant lengthened or extended *indefinitely* in the same plane.

III.

And that a circle may be described from any centre, at any distance from that centre. By describing a circle *at any distance*, is meant drawing a circle in a plane with any given radius. Various other postulates (that is, *demands* of common sense), are tacitly assumed by Euclid; as, that one figure or angle may be applied to another, for the purpose of comparison (see Prop. IV. of this book.

AXIOMS.

I.

Things which are equal to the same thing, are equal to one another.

II.

If equals be added to equals, the wholes are equal.

III.

If equals be taken from equals, the remainders are equal.

IV.

If equals be added to unequals, the wholes are unequal.

V.

If equals be taken from unequals, the remainders are unequal.

VI.

Things which are double of the same, are equal to one another.

VII.

Things which are halves of the same, are equal to one another.

VIII.

Magnitudes which coincide with one another, that is, which exactly fill the same space, are equal to one another.

IX.

The whole is greater than its part. Dr. Thomson, in his edition of Euclid has added to this axiom another, viz., that "the whole is equal to all its parts taken together."

X.

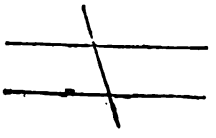
Two straight lines cannot enclose a space.

XI.

All right angles are equal to one another.

XII.

If a straight line meets two straight lines, so as to make the two interior angles on the same side of it, taken together, less than two right angles, these straight lines being continually produced, shall at length meet upon that side on which are the angles which are less than two right angles. It is admitted by Dr. Simson that this axiom is not *self-evident*, which all axioms ought to be. Accordingly he demonstrates the truth of it as a proposition in his notes, by help of *five* different propositions! Though not considered free from objection, the substitute for this axiom, given in Playfair's edition of Euclid, is to be preferred: viz., "If two straight lines intersect each other, they cannot be both parallel to the same straight line." The number of axioms is, in this book, limited to twelve; but Euclid has tacitly assumed the truth of various other axioms, which will be noticed in the sequel.



In composing these lectures on Euclid, our only object has been to convey along with his *definitions* the most accurate notions of the things defined that possibly could be conveyed to the mind of the student, in order to smooth the way for the demonstrations of the propositions. We are now arrived at what are called the *postulates* and *axioms*; and a great dispute has arisen among mathematicians whether geometry, or rather geometrical reasoning, as laid down by Euclid, is founded upon the *definitions* or upon the *postulates* and *axioms*. In the early part of our studies we were disposed to take the side of those who maintained that geometry was founded upon the *definitions only*, and we thought that though the *postulates* might be necessary, there really was no need for the *axioms*, as they appeared to be only the dictates of common sense, acknowledged by every man who was in possession of a sound mind. At first, therefore, we were disposed to reject the axioms altogether, and to proceed to the study of geometry without their formal statement, considering that they already existed in every man's mind. Nor were we without the authority of great names in this matter, for we then belonged to the metaphysical school of Dugald Stewart, who, in his elegant work, entitled "The Philosophy of the Human Mind," asserted that the certainty of mathematical reasoning arises from its depending upon *definitions*. His assertion of this opinion gave rise to a controversy which, we believe, is not yet completely settled, as may be seen in the appendix to Dr. Whewell's Mechanical Euclid, entitled, "Remarks on Mathematical Reasoning, and on the Logic of Induction," where the learned author opposes Dugald Stewart's view of the subject, and maintains "that geometry (and other sciences when treated in a method equally rigorous) depends upon *axioms* as well as *definitions*." He also says, "we shall assume this form to be a just representation of the real foundations of such sciences, till we can find a tenable

distinction between *axioms* and *definitions*, in their nature and in their use; and till we have before us a satisfactory system of geometry without axioms." In order that our readers may be able to judge for themselves of the nature of this controversy, we shall here insert a specimen of the very work required by Dr. Whewell, a work dedicated "To the Students of the University of London," by its eminent and talented author,—we mean the "*Geometry without Axioms*," by T. Perronet Thompson, of Queen's College, Cambridge, published in 1834. This specimen is taken from what the author calls an "Intercalary Book," where he demonstrates the most of Euclid's *axioms* as if they were *propositions* or *corollaries* in geometry; and in order that his language in these demonstrations may be thoroughly understood, we have prefixed to this book the definitions and explanations which he has given in what he calls his *Nomenclature*. At the same time we beg to remind our readers that the explanations of the *words* in this nomenclature are absolutely necessary for a clear understanding of geometry, even as laid down by Euclid, and still more as laid down by any other author.

NOMENCLATURE.

I. After a thing, or class of things, has been rendered obvious to the senses, and either by speech, writing, pictorial representation, or examination in its proper substance, has been made sufficiently the subject of knowledge to be distinguished from other things; the word appointed to signify it in future, is called its *name*. The giving of names for the purposes of science, is called *Nomenclature*. [Lat. nomenclatura, *a calling by name*.] Any particular head or article on Nomenclature is moreover in the sequel termed a *Nomenclature*, and referred to by numbers, as Nom. 14, Nom. 26, &c.; as has been the case with Definitions.*

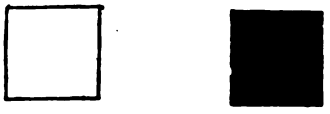
II. Anything that can be made the object of touch, is called a *body*.

III. A body which resists all change of form (that is to say, whose particles are immoveable among themselves, at least by any force there is question of employing), is called a *hard* body.

IV. That which has length, breadth, and thickness, is called a *solid*. A solid may either be presented by the external parts of some body, or by the internal. The first may be called a *substantial* solid; the other, a *hollow* one. Thus a block of marble in the form of a die, is a substantial cube; a room or apartment of corresponding form, is a hollow cube. If nothing else be specified, the solid is understood to be *substantial*.

V. That which bounds a solid, is called a *surface*. A surface, consequently, has length and breadth, but not thickness. For if it had thickness, it would not be the boundary, but part of the solid.

VI. That which bounds a surface, is called a *line*. A line, consequently, has length, but not thickness or breadth. For the surface itself has no thickness; wherefore its boundary can have



none. And if the so-called boundary had breadth, it would not be the boundary but part of the surface. Thus the boundaries of the black surface above, are lines; which manifestly have neither breadth nor thickness. And if to save trouble the same surface is designated by black scrawls instead, it is in strictness not the scrawl, but the edge of the scrawl, that is the line.†

VII. The extremity of a line is called a *point*. A point, consequently, has position, but not dimensions of any kind. For the line itself has neither thickness nor breadth; wherefore its extremity can have neither. And if the so-called extremity had length, it would not be the extremity, but part of the line. Thus the extremity of a line in the black surface above, is a point; which manifestly has no dimensions of any kind. And if the lines are represented by black scrawls, the point is in strictness the extremity of one of their edges. When a point is directed to be taken in some part of a line which is not the extremity, it may be imagined to be determined by causing the line to terminate at that point.‡

VIII. Anything that has boundaries which are fixed, is called a *figure*. Figures are *solid*, *superficial*, or *linear*, according as the subject is a solid, surface, or line. To which may hereafter be added *angular*, or those of which the subject is an angle. Figures of all kinds, lines, and points, will always be considered as exhibited on a hard body of some kind, which causes the position of the several parts or points to be fixed with relation to one another; and will, on occasion, be supposed to be turned about an assigned point or points, in any manner that can be shown to be practicable with the hard body on which they are understood to be represented. Nevertheless, the application of one object to another will, when required, be imagined to take place without bar of corporeal substance;—that is to say, without impediment from the existence of other parts than those it is desired to compare. Which, though avowedly only an act of the imagination, is sufficient for obtaining the results the geometer desires. It is not essential to a figure that it should inclose a space or be bounded on all sides. Parabolas, hyperbolas, and spirals, are figures; but they do not inclose a space. Figures of this kind may be adduced as specimens of *linear* figures, as distinguished from *superficial*.

IX. Things which occupy the same place, are said to *coincide*. The only way in which coincidence can actually be brought to pass, is when the objects in question are capable of being applied one to another. Thus there is coincidence between the surface of a cast and the surface of the mould which contains it. And in like manner two lines or points may actually be applied to one another and coincide. But besides this, there is an imaginary coincidence frequently appealed to by geometers; which is, when it can be shown that coincidence *would* take place, if the objects in question could be applied to one another without bar of corporeal substance as intimated above, or in other words, were penetrable one or both, though still without change of form. And in the same manner that *two* objects may be thus imagined to coincide, may *three*, or any other number.‖

X. Points which do not coincide, are said to be *distant*.

XI. Two points A and B are said to be *equally distant with* two others C and D, or to be *at a distance equal to* the distance of C and D; when if A and C were applied to one another, B and D might also be applied to one another at the same time.

XII. Two or more points, as B, C, D, are said to be *equidistant* from another point A, when B and A, C and A, D and A, are equally distant each pair with the other.

XIII. Figures in general, as being things capable of being compared in point of greatness with objects of their own kind, [*that is to say, solids with solids, surfaces with surfaces*, &c.], are called *magnitudes*.

XIV. Magnitudes which if their boundaries were applied to one another, would coincide; or might be made capable of doing so by a different arrangement of parts; are called *equal*. Equal magnitudes may be divided into—1. Those whose boundaries can actually be applied together in every part at once; as a cast to its mould, a stamp to its impression, or one side of an indenture to the other. Which are called *reciprocals*. [Lat. reciprocus, *that returns by the same way*.] 2. Those whose boundaries it can be shown *would* coincide, if they could be applied to one another without bar of corporeal substance,—though they cannot be actually applied by reason of such bar. Which are called *fac-similes* [from Lat. *make-likes*]. 3. Such as might be reduced to reciprocals or fac-similes, by a different arrangement of parts. Which are called *equivalents* [from Lat. *of equal value*].

XV. A magnitude is said to be *greater* than another by a certain magnitude, when this last-mentioned magnitude being taken from the first, the remainder is equal to the second. And a magnitude is said to be *less* than another by a certain magnitude, when this last-mentioned magnitude being added to the first, the sum is equal to the second.§

XVI. Magnitudes are said to be *given*, when equals to them can be assigned.§

XVII. The science which treats of the relations and properties of magnitudes, is named *geometry*.

XVII. An assertion which it is proposed to show to be true, is

* "The way to improve our knowledge, is not, I am sure, blindly, and with an implicit faith, to receive and swallow principles; but is, I think, to get and fix in our minds clear, distinct, and complete ideas, as far as they are to be had, and annex to them proper and constant names."—*Locke on the Human Understanding*. iv 12, 6.

† It may occur here, that for some purposes requiring extreme accuracy of division, as for instance on the nonius and scales of astronomical instruments, the divisions might be constituted by alternate layers of two metals of different colours, so as to leave a visible line absolutely without breadth. The same result might in a certain degree be obtained, by painting or staining the alternate intervals of different colours. It is not known whether this has ever been put in practice.

‡ The definitions of a point and a line, as given by the ancients, might be supposed intended to perplex beginners. The definition of the first, in particular, appears to approach as nearly as possible to a definition of "*nothing*." The difficulty is traceable to a love for enigmatical forms; and vanishes on explanation.

‖ The only example of geometrical solids actually capable of the mutual penetration supposed, would appear to be in the case of some of the phenomena producible on the principles of optics. It would be an interesting experiment which should produce a blue, a red, and a yellow *spectrum* of a solid, capable of being made to coincide all three together by mutual penetration, the total or partial coincidence being indicated by the change of colours.

§ From Euclid's Book of Data, with slight alterations. It is remarkable that Euclid never anywhere defines equality at all. He appears to have

called a *theorem*. [Gr. theorēma, *a view*.] An operation which it is proposed to show how to perform, called a *problem*. [Gr. problēma, *anything put forward*.] And both are called by the title of *propositions*. [Lat. propositio, *idea or statement*.]

XIX. A proposition dependent on some other that has been previously established; but which, by reason of the simplicity of the steps required to connect it with the former, or other causes, it is convenient to state without the formalities of a separate proposition; is called a *corollary*. [Lat. corollarium, *anything over and above what is required*.] ¶

XX. A proposition of which the establishment is necessary to the establishment of some other; but which, by reason of its being taken from a different branch of science, or other causes, it is convenient to distinguish by a separate title, rather than to number among the propositions in the ordinary way; is called a *lemma*. [Gr. lēmma, *anything taken or received*.]**

XXI. A remark or observation connected with something that has gone before, is called a *scholium*. [Gr. scholion, *a remark*.]

XXII. When a thing is said to be so and so *by the hypothesis*, the meaning is, that its being so and so, makes part of the original supposition or statement of the question in hand. Thus, if the proposition is, that if two magnitudes be equal, some particular result shall follow, as, for instance, that the sum of them shall be equal to some third magnitude; one of these magnitudes may at any period of the operation in hand be avouched to be equal to the other *by the hypothesis* [from the Gr. *a placing under, a foundation*]. For that they are equal, is the original supposition or groundwork on which the whole question proceeds.

XXIII. When a thing is said to be so and so *by construction*, the meaning is, that it has at some previous period of the operations in hand, been made to be what it is said to be. Thus, if in the course of the operations in hand, some magnitude has been cut off equal to another magnitude; these two magnitudes may at any time afterwards be avouched to be equal *by construction*. For one of them has been specially constituted and constructed equal to the other.

XXIV. When a thing is said to be so and so *by parity*, [Lat. paritas, *equality*] *of reasoning*, the meaning is, that what has been shown to be true in some previous instance, may by taking the same steps be shown to be true in this. Thus, if it has been shown that because two particular magnitudes are each equal to a third magnitude they are equal to one another, and if the same manner of proof can be applied in any other instance; it may be avouched that *by parity of reasoning* any other two magnitudes which are equal to a third, are equal to one another. For it is open to be demonstrated by the same steps. When the parity of reasoning is extended to all instances to which the proposition is capable of being applied [or in other words, to all which come under its terms], the proposition is said to be established *universally*. And a proposition so established is called a *universal* proposition.

XXV. A conclusion the truth of which is shown to be so connected with the truth of some preceding position or statement, that the preceding cannot be true, without the other being true also; is called a *consequence*.

XXVI. When such preceding position is not known to be true, but is only assumed to be true for the purpose of trying its truth or falsehood by examination of the consequences, it is called an *assumption*. And because the assumption cannot be true without the consequence being true also; if the assumption is found to involve a false or impossible consequence, the assumption cannot be true. This is the *rationale* [or reasonable principle] of the mode of proof improperly called *reductio ad absurdum* "reduction to an absurdity."††

XXVII. The establishment of some universal proposition, is called a *demonstration*. The peculiar object of a demonstration, is to display the reasons which make a certain proposition necessarily true in *all* the instances that can by possibility come under its terms; in contradistinction to such propositions as are only known to be true in the instances in which experiment has actually been made. For example: a cooper knows that in every instance where he has tried it, the distance that went exactly round the rim of his cask at six times, was the distance to be taken in his compasses in order to describe the head that would fit. But he does not know the reasons why this will necessarily be the case, not only in the instances which he *has* tried, but in all which he *has not* tried also. And to supply these reasons, is the object of Euclid's 15th Proposition of the Fourth Book.

XXVIII. The conduct of a regularly-ordered demonstration in geometry, divides itself into five parts, which succeed one another, and are named as follows:—The *first* conveys a statement of the universal proposition to be finally established. Which is called the *enunciation*. [Lat. enunciatio, *a saying out*.] The *second* presents to the eye, or to the imagination, a particular instance, in respect of which the truth of the proposition is to be established; with an understanding always, that nothing shall be done in respect of this particular instance, which could not equally be applied to any other particular instance that could be substituted. Which is called the *specification* [from Fr. *particular mention*]. The *third* performs, or supposes to be performed, such operations [*as, for example, drawing or dividing lines, describing figures*, &c.] as are to be made use of in the further progress of the demonstration. Which is called the *construction*. Sometimes the construction, or part of it, precedes the specification. And sometimes no construction is required. The *fourth* derives from all that has preceded, the establishment of the proposition in the instance presented in the specification. Which is called the *proof* [*or demonstration*]. The *fifth* extends the conclusion to all instances that come under the terms conveyed in the enunciation. Which is called the *generalisation* [and which agrees with the *enunciation*.]

XXIX. When all the instances to which a proposition may be applied, cannot be included under *one specification* or *one construction*, the proposition is said to divide itself into two or more cases; which may in fact be considered as so many distinct propositions, each of which has, or is capable of having, its separate enunciation, specification, construction, &c., all which, taken together, amount to the establishment of the universal proposition.

XXX. What is called the *converse* [Lat. conversus, *a turning round*] of a proposition is, when the premises and conclusion are made to change places, and the proposition so arising is presented as a new proposition. For example: if the original proposition is, that magnitudes which are equal to the same, are equal to one another; the converse of this proposition is, that magnitudes which are equal to one another, are equal to the same.

XXXI. What is called the *connegative* [from Lat. con and negative] of a proposition is, when a negation is inserted both in the premises and the conclusion, and the proposition so arising is presented as a new proposition. For example: if the original proposition is, that if of equals one be greater than something else, the rest are severally greater than the same; the connegative of this proposition is, that if of equals one be *not* greater than something else, the rest are severally *not* greater than the same.

XXXII. What is called the *contrary* of a proposition is, when both the premises and conclusion are altered, not merely by the insertion of a negation, but by being changed into something of a positively contrary kind. For example: if the original proposition is as in the last article; the contrary of this proposition is, that if of equals one be *less* than something else, the rest are severally *less* than the same.

SCHOLIUM.—Neither the *converse*, the *connegative*, nor the *contrary* of any proposition, is to be admitted to be true, till it has been demonstrated as a distinct proposition. For till this be done, it is impossible to know whether it is true or not. For example: it is shown in the sequel, that if one angle of a triangle is greater than a right angle, the other two are necessarily less than right angles. The *converse* of which is, that if two angles of a triangle are less than right angles, the other is necessarily greater than a right

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thought the idea of it was innate. After previously using the term above twenty times, he says in an axiom, that "magnitudes which coincide with one another, are equal to one another;" but this is no more a definition of equality, than the assertion that the sides opposite to equal angles are equal, is a definition of an isosceles triangle. Euclid sometimes appeals to it as a proof that certain things are equal; and so he does to the other. But the great majority of his proofs of equality are derived from appeals to axioms preceding the axiom on coincidence.

¶ The term corollary by no means implies the non-necessity of demonstration, as has been sometimes represented. On the contrary, there must be an assignable reason for corollaries, as for everything else. It is true the reason may sometimes be one that can hardly fail to present itself though not given; and sometimes corollaries are little more than recapitulations of truths which have been evolved in the course of demonstrating some ulterior truth. But with the express view of opposing the notion that corollaries are of the nature of the imaginary things styled "self-evident truths," it has been determined to insert no corollary without its being followed by a statement of the reason; which is a demonstration in little.

Those who will will pursue this plan, will be surprised to find how often they have considerable difficulty in making out a clear statement of the reason of a corollary, which at first sight seemed perfectly obvious and inevitable. The cause of which appears to be, that in all people the habit of judging by a sort of guess-work, useful enough for many of the purposes of common life, but incompetent to the severe distinguishing of truth from falsehood, has greatly outrun the habit and power of rigid demonstration.

The practical use of inserting subsidiary propositions under the form of corollaries, is, first, to save room, and secondly, to render the connexion more visible between what may be called the leading propositions. If every corollary in the first book of Euclid were presented as a distinct proposition, it is easy to see how the connexion would be obscured.

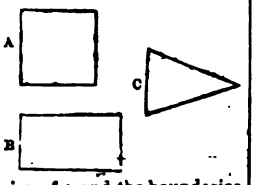
** In an elementary science like geometry it would appear to be unnecessary to call anything a lemma. The term, however, is used by Euclid; and frequently employed in the progress of the sciences. For example, in practical astronomy, if the chain of argument is interrupted to introduce some preliminary proposition from geometry or algebra; such interloping proposition is usefully distinguished as a "lemma."

†† As a help to clearness, the use of the word "must" should be confined to the tracing of false or impossible consequences in the manner here described.

angle. The *converse* is, that if one angle of a triangle is *not* greater than a right angle, the other two are *not* less that right angles. The *contrary* is, that if one angle of a triangle is *less* than a right angle, the other two are *greater* than right angles. Every one of these three is totally and absolutely false.

PROPOSITION I.

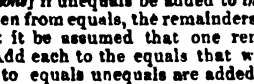
THEOREM.—*Magnitudes which are equal to the same, are equal to one another.*



Let A and B be two magnitudes, each of which is equal to C. A and B are equal to one another. Because A is equal (I. Nomenclature 14) to C, if the boundaries of A were applied to the boundaries of C, A would coincide with C, or might be made to do so by a different arrangement of the parts of A. And because B is equal to C, in like manner might B be made to coincide with C. Let, then, the boundaries of A and the boundaries of B be made to be applied to the boundaries of C at one and the same time; and because A and B then and there coincide with one another, they are (I. Nom. 14) equal. And in the same manner if the magnitudes equal to C were more than two. And by parity of reasoning, the like may be proved in every other instance. Wherefore, universally, magnitudes which are equal to the same, are equal to one another. Which was to be demonstrated.‡‡

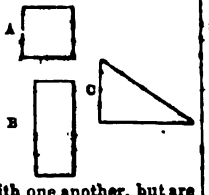
COROLLARY 1.—If of equals, one be equal to something else, the rest are severally equal to the same. Let A and B be equal, and let B be equal to C. A should also be equal to C. For A is equal to B, and C is equal to B; therefore (by Prop. I. above) A and C are equal.

COR. 2.—If of equals, one be greater, or less, than something else; the rest are severally greater, or less, than the same. Or, if something be greater, or less, than one; it is greater, or less, than each of the others also. Let A and B be equal, and let B be greater than C. A shall also be greater than C. For, since B is greater (I. Nom. 15) than C, a certain magnitude may be taken from B, and the remainder be equal to C; or B is equal to the sum of the magnitude equal to C, and of a certain magnitude besides. But because A and B are equal, A (by Cor. 1) is also equal to the sum of the magnitude equal to C, and of the certain magnitude besides. Therefore a certain magnitude may be taken from A, and the remainder be equal to C; or A is greater (I. Nom. 15) than C. And in a similar manner if one were *less*. Or if C is less than B, it is less than A also. For B is greater than C; therefore (as has been proved above) A also is greater than C, that is, C is less than A. And in a similar manner if C were *greater* than B.

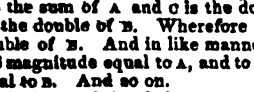


COR. 3.—Magnitudes which are equal to equals, are equal to one another. Let A be equal to B, and C to D; and let B and D be equal. A and C shall also be equal. For A is equal to B, and D is equal to B; therefore (by Prop. I.) A is equal to D. But C, is also equal to D; therefore (by Prop. I.) A and C are equal.

COR. 4.—Of magnitudes, if to equals be added the same, the sums are equal. Let A and B be equal magnitudes, to each of which, one after the other, is added another magnitude C. The sum of A and C is equal to the sum of B and C. *First case:* If A and B are such that on their boundaries being applied to one another they would coincide, and C be added to each in such manner as would then and there likewise coincide; the whole magnitude which is the sum of A and C, if its boundaries were applied to those of the magnitude which is the sum of B and C, would coincide with it, and therefore is equal (I. Nom. 14) to it. *Second case:* If either C be added in some other manner than as above; or if A and B would not coincide with one another, but are only such as by a different arrangement of parts might be made to do so; the magnitudes which are the sums, may be made capable of coinciding by merely altering the arrangement of parts, and therefore they are equal (I. Nom. 14).



COR. 5.—If equals be added to equals, the sums are equal. Let A be equal to B, and C to D. The sum of A and C is equal to the sum of B and D. For because A is equal to B, the sum of A and C (by Cor. 4) is equal to the sum of B and C. And because C is equal to D, the sum of B and C (by Cor. 4) is equal to the sum of B and D. Therefore by (Cor. 1) the sum of A and C is equal to the sum of B and D. And in like manner if other equal magnitudes be added to these.



COR. 6.—If unequals be added to equals, the sums are unequal. And that sum is greatest, in which the unequal was greatest. For, of the unequals, one is greatest, that is, it is equal to the other and a certain magnitude besides. But if to the equals were added *equals*, the sums (by Cor. 5) would be equal; therefore because to one is added a certain magnitude besides, that sum is made greater. So also [*with slight verbal alterations*] if unequals be added to *the same*.

COR. 7.—If equals be taken from equals, the remainders are equal. For, if this be disputed, let it be assumed that one remainder is greater than the other. Add each to the equals that were before taken away; and because to equals unequals are added, that sum in which the unequal was greatest (by Cor. 6), must be greater than the other. Which is impossible; for the things by the hypothesis were equal to begin with. The assumption (I. Nom. 26), therefore, which involves this impossible consequence, cannot be true; or one remainder cannot be greater than the other. And because one is not greater than the other, they are equal. So also [*with slight verbal alterations*] if equals be taken from *the same*, or *the same* from equals.

COR. 8.—If equals be taken from unequals, the remainders are unequal. And that remainder is greatest, in which the unequal was greatest. For, of the unequals, one is equal to the other and a certain magnitude besides. But if the equals were taken from *equals*, the remainders (by Cor. 7) would be equal; therefore, because to one of the objects from which subtraction is made, is added a certain magnitude besides, that remainder is made greater. So also [*with slight verbal alterations*] if from unequals be taken *the same*.

COR. 9.—If unequals be taken from equals, the remainders are unequal. And that remainder is least, in which the unequal was greatest. For if, instead of the unequals, magnitudes equal to the *smallest* of them were taken from the equals, the remainders (by Cor. 7) would be equal. But because from one is taken a certain magnitude besides, that remainder is made less. So also [*with slight verbal alterations*] if unequals be taken from *the same*.

COR. 10.—Magnitudes which are *double* of the same or of equal magnitudes, are equal to one another. And so if, instead of the *double*, they are *treble*, *quadruple*, or any other equimultiples. Let A and B be equal magnitudes. The double of A is equal to the double of B. For, to take the double of A, is to add to it a magnitude C that is equal to A; and to take the double of B, is to add to it a magnitude D that is equal to B. But because A and B are equal to one another (by Cor. 3), C and D are equal to one another. Therefore (by Cor. 5) the sum of A and C is equal to the sum of B and D. And in like manner, if to the sum of A and C be added another magnitude equal to A, and to the sum of B and D another magnitude equal to B. And so on.

COR. 11.—The *double* of a greater magnitude is greater than the *double* of a less. And so of any other equimultiples. If A be greater than B, the double of A is greater than the double of B. For let there be taken a magnitude C, equal to A; and a magnitude D, equal to B. If to C and D severally, be added B, the sum of B and C (by Cor. 6) shall be greater than the sum of B and D. And if to A and B severally, be added C, the sum of A and C shall (by Cor. 6) be greater than the sum of B and C; still more shall it be greater than the sum of B and D. But the sum of A and C is the double of A; and the sum of B and D is the double of B. Wherefore the double of A is greater than the double of B. And in like manner if to the double of A be added a *third* magnitude equal to A, and to the double of B a *third* magnitude equal to B. And so on.

COR. 12.—Magnitudes which are *half* of the same or of equal magnitudes, are equal to one another. And so if, instead of the *half*, they are the *third*, *fourth*, or any other equipartites. For, if this be disputed, let it be assumed that one is greater than the other. But if it be greater, its *double* must (by Cor. 11) be greater than the *double* of the other; which is impossible, for it is equal. The assumption (I. Nom. 26) therefore cannot be true; or the one magnitude that was doubled, is not greater than the other; and because one is not greater than the other, they are equal. And in like manner in respect of magnitudes which are the *third*, *fourth*, &c.

COR. 13.—The *half* of a greater magnitude is greater than the *half* of a less. And so of any other equipartites. For, if it be not greater, it must be either equal or less. It cannot be equal, for then (by Cor. 10) its *double* would be equal to the *double* of the other; and its *double* is not equal, for it is greater. And it cannot be less, for then (by Cor. 11) its *double* would be less than the *double* of the other; and its *double* is not less, for it is greater. But because it is neither equal nor less, it is greater. And in like manner in respect of the *third*, *fourth*, &c.

COR. 14.—If the *doubles* of two or more magnitudes be added together, the amount is *double* of the sum of the magnitudes. And

‡‡ Apollonius of Perga made an effort to demonstrate this proposition, which if the account of Proculus may be depended on, fails for want of distinctly making the three magnitudes all coincide with one another at once. It appears from Proclus, that Apollonius proceeded to demonstrate the axioms generally; which he highly disapproves.

so of any equimultiples. Let A and B be two magnitudes. The *double* of A, added to the *double* of B, is *double* of the sum of A and B.

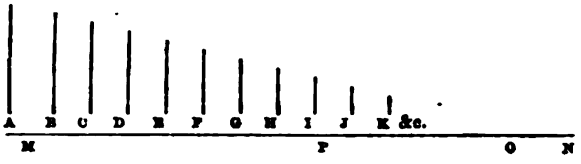
A —— C ——
B —— D ——

For, let C be another magnitude equal to A, and D to B. Because A is equal to C, the sum of A and C is equal to the *double* of A; and for the like reason, the sum of B and D is equal to the *double* of B. Therefore (by Cor. 5), the double of A, added to the *double* of B, is equal to the sum of A, B, C, and D. But (by Cor. 5), the sum of A and B is equal to the sum of C and D; therefore the sum of A, B, C, and D, is equal to *double* the sum of A and B. Wherefore (by Cor. 1), the *double* of A, added to the *double* of B, is equal to *double* the sum of A and B. If the magnitudes are more than two, then to each of them is to be taken an equal, as before. If the same is to be proved of the *trebles, quadruples*, &c., then to each magnitude are to be taken *two, three*, &c. magnitudes, equal to it.‖‖

Cor. 15.—If there be two unequal magnitudes, and from the *double* of the greater be taken the *double* of the less; the remainder is *double* of the less; the remainder is *double* of the difference of the magnitudes. And so of any other equimultiples. Let A and B be two magnitudes; of which A is the greater. If from the *double* of A be taken the *double* of B, the remainder is *double* the difference of A and B. For A the greater, is equal to the sum of B the less, and of the difference between A and B. Therefore (by cor. 14) the *double* of A is equal to the *double* of B, added to the *double* of the difference between A and B. And if from each of these equals be taken the *double* of B (by cor. 17) the *double* of A diminished by the *double* of B, is equal to the *double* of the difference between A and B. And, in like manner if instead of the *doubles*, were taken the *trebles, quadruples*, &c ‖‖

A ——
B ——

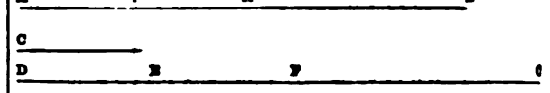
Cor. 16.—If there be magnitudes which, being added together to any number however great, cannot surpass a given magnitude; these magnitudes cannot be all equal to one another.

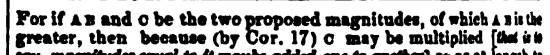


For, let A, B, C, D, E, F, G, H, I, &c., be magnitudes which being added one to another to any number however great, cannot surpass a given magnitude M N. But if so, either M N is the smallest magnitude which they cannot pass, or it is not. And if it is not, then there is some magnitude which may be cut off from it, and the remainder be a magnitude which they cannot pass. Wherefore there will be some remainder M O such, that it is a limit which they cannot pass, but if any smaller magnitude be substituted they shall pass it; for if they would not pass such smaller magnitude, the difference might be cut off. And because A, B, C, D, E, F, G, H, I, &c. may be taken till they surpass any magnitude that is smaller than M O, they may be taken till they surpass the half of M O. Let, then, a certain number (as for instance, A, B, C, D, and E) be the magnitudes which are together greater than half M O; or of which the sum M P is greater than P O the remainder of M O. Because A, B, C, D and E are together greater than P O, they are together greater than the sum of all the remaining magnitudes F, G, H, I, &c., however many, that may be taken afterwards; still more are they greater than the sum of only an equal number of those magnitudes. But if the magnitudes were all equal to one another, the magnitudes A, B, C, D, and E must (by Cor. 10) be together equal to the sum of an equal number of the magnitudes which should be taken afterwards; and they are not equal to this for they are greater. The assumption (I. Nom. 26) therefore cannot be true; or the magnitudes A, B, C, D, E, F, G, H, I, &c. cannot be all equal to one another.‖‖

Cor. 17.—Any given number may be multiplied [*that is to say, magnitudes equal to it may be added one to another*], so as at length to become greater than any other given magnitude of the same kind which shall have been specified. For if not, let it be assumed that there is a magnitude which they cannot pass. Wherefore (by Cor. 16) the magnitudes are not all equal to one another. Which cannot be, for they are equal. The assumption (I. Nom. 26) therefore cannot be true; or there is not a magnitude which they cannot pass. That is, they may be added one to another so as at length to become greater than any other given magnitude of the same kind which shall have been specified.

Cor. 18.—If from the greater of two proposed magnitudes be taken not less than its half, and from the remainder not less than its half, and so on; there shall at length remain a magnitude less than the least of the proposed magnitudes.





For if A B and C be the two proposed magnitudes, of which A B is the greater, then because (by Cor. 17) C may be multiplied [*that is to say, magnitudes equal to it may be added one to another*] so as at length to become greater than A B, C may be doubled successively [*that is to say, over and over*] so as at length to become greater than A B; for on each doubling is added a portion as great or greater than the portion added by the simple addition of C. Let C be doubled successively till the result, as D G, is greater than A B. If then from A B be taken its half B H, and from the remainder H A be taken its half H I, and so on till the half be taken successively as many times as C was doubled successively to make D G; the last remainder A I will be less than C. For as many times as C is contained in D G, so many times is A I contained in A B; but A B is less than D G; therefore A I (by Cor. 13) is less than C. And if from A B or any of the remainders, were taken more than the half; only the more would the last remainder A I be less than C.¶¶

‖‖ Cor. 14 and 15. The substance of these two corollaries is demonstrated by Euclid in propositions I. and V. of the fifth Book; but is previously assumed by him without proof, in the proposition called by Simson the twentieth of the third Book, the object of which is to show that the angle at the centre of a circle is double of the angle at the circumference.

‖‖ Cor. 16. If evidence is demanded of the existence of magnitudes which, being added together to any number however great, cannot surpass a given magnitude, the simplest instance that can be given is in the magnitudes in the series $\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\frac{1}{16}+$ &c. Suppose there is first given to a person the *half of* some particular thing; then the *fourth* (which is the half of what was left); then the *eighth* (which is the half of what was left, again); then the *sixteenth*; and so on. It is plain that what this person has received, is increased every time. But it is also plain that it can never amount to the whole thing, or 1; for there will always be a piece left. Still less can it ever amount to more than one, as for instance to two. And if each successive magnitude, instead of being *one half* of the preceding, was in any other constant diminished proportion (as for instance $\frac{999}{1000}$ths), it would be equally true (though not so easily proved) that the sum would never surpass some given magnitude.

Hence to have shown that a magnitude receives perpetual additions, is never evidence that it will arrive at a certain specified amount. Both mathematicians and political economists have fallen into snares for want of attention to this.

It will be observed that this corollary is purely subsidiary to the one which next follows it.

¶¶ Cor. 18. This (with the substitution only of equipartites for proportes) is the second of the two proofs given in the tenth book of the Greek Euclid. It is preferable to the other (which is what is given by Simson at the beginning of the twelfth book); because that establishes the fact on a magnitude smaller than there is any necessity for, and thereby destroys the simplicity of connexion. For example, if C should require to be multiplied *sixteen* times in order to be greater than A B, the proof instead of establishing that the *sixteenth* part of A B is less than C, establishes it of the 32768th part, being 2048 times less than necessary, and destructive of the just connexion besides.

LITERARY NOTICES.

The Illustrated Exhibitor and Magazine of Art.—A new and improved Series of this work, under the title of the Illustrated Magazine of Art, has just commenced. Each Number will in future be enclosed in a neat wrapper, price 3d. In addition to numerous Engravings in the text, it will contain a fine Engraving, worked on Plate Paper. With Number I. is presented, gratis, a splendid View of the Interior of St. Paul's Cathedral, during the Interment of the late Duke of Wellington; printed upon fine Plate Paper, measuring eighteen inches by thirteen. This Engraving alone is worth four times the cost of the Number of the Magazine of Art.

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LESSONS IN NATURAL HISTORY.—No. XVI.

THE WALRUS, OR MORSE.

(ORDER *Carnivora*.)

THE walrus is a huge animal, its length often extending to twenty feet, and being ordinarily from twelve to sixteen feet. Its body, superior to that of the largest ox, is clothed with short stiff hair. Its head is round, but instead of terminating in a snout, it presents two swollen protuberances, forming a sort of tumid muzzle, divided by a longitudinal furrow, above which the nostrils open on what appears the middle of the face. It has no external ears; but a small orifice outwardly denotes the situation of these organs.

The great singularity of this creature consists in the structure of the skull. There are neither incisor nor canine teeth in the lower jaw, but this is compressed laterally to fit in between two enormous tusks inserted in the upper jaw, and projecting from its singularly-shaped muzzle, which is covered with thick wiry bristles. The skull appears, therefore as if it were concealed behind two large mounds of bone. The tusks, like those of the elephant, have open roots; they are directed downwards, curve gently backwards, and are compressed at the sides. They vary in length from eighteen inches to two feet, and are of a proportionate stoutness.

It is stated by Sir Everard Home, that the walrus is gifted with a power which we should not have expected such a huge animal to possess. This is an ability to adhere tenaciously to the slippery surface of the ice, along which it can shuffle, or up which it scrambles, in order that it may have a fixed point from which to propel itself, or on which to rest. For this, he says, the hind flappers are provided with suckers, which act on the principle of the cupping-glass, and from which the internal air is withdrawn, while the external air, pressing upon them, holds them firmly down. As, however, the cupping-glass has, happily, fallen into disuse, we have a more familiar example of the same kind of action in the school-boy's sucker, by the adhesion of which, owing to the exclusion of the air, he can easily carry a large stone a considerable distance.

In early times the walrus was known in England under the name of the *horse-whale*. Hakluyt states, that in the reign of King Alfred, about one thousand years ago, a voyage was made beyond the North Cape by Oether, the Norwegian, "for the mere commoditie of fishing of horse-whales, which have in their teeth bones of great price and excellence; whereof he brought some on his returne unto that King." The same collector of voyages also says, that the skins of horse-whales were converted into cables of sixty ells in length by the natives of northern Europe.

The walrus is found in the polar regions, living in troops, which visit the shore or extensive fields of ice, where they have an abode. In climbing the precipitous borders of an ice-bound coast, or the far steeper icebergs of the deep, the walrus also employs its tusks to prevent its body from slipping; striking them into the glassy surface, or lodging them in any fissures or pits of the craggy mass. With these instruments it also tears up the submarine vegetables, which form its principal food, but to which fish, and the shelly or molluscous creatures, are added. Nor should it be overlooked that the tusks are weapons of defence, rendering the walrus no inconsiderable service.

THE WALRUS.

Our celebrated circumnavigator, Captain Cook, met with multitudes of these creatures off the northern cost of America. He says: "They lie in herds of many hundreds upon the ice, huddling over one another like swine, and roar and bray so very loud, that, in the night or in foggy weather, they gave us notice of the approach of ice before we could see it. We never found the whole herd asleep, some were always on the watch. These, on the approach of the boat, would awake those next to them, and the alarm, being thus gradually com-

municated, the whole herd would be presently awake; but they were seldom in a hurry to get away till after they had been once fired at,—they would then tumble over one another into the sea in the utmost confusion; and if we did not at the first discharge kill those we fired at, we generally lost them, though mortally wounded."

In the year 1766, a vessel which had gone to the North Seas, to trade with the Esquimaux, had a boat out with a part of the crew. They were attacked, it is said, by a great number of walruses, and, notwithstanding every effort to keep them at bay, a small one contrived to get over the stern of the boat; he looked at the men for a time, and then plunged into the water to rejoin his companions. Immediately after, another walrus of enormous bulk made a similar attempt to get over the bow, which, had he succeeded, would have upset the boat; but after trying every effort in vain to keep him off, he was killed by the gun of the boatswain, when the whole herd immediately withdrew, but soon followed the boat, which, happily, reached the ship in safety.

We are not told the cause of the first attack on the boat; but it appears that it is only when wounded, or when required to defend its mate, or its young, that the walrus becomes furious. The parents, and especially the females, display great affection towards their offspring, and defend them to the last extremity.

Captain Cook says of those which he saw: "They did not appear to us to be that dangerous animal which some authors have described,—not even when attacked. They are more so in appearance, than in reality. Vast numbers of them would follow and come close up to the boats, but the flash of the musket in the pan, or even the bare pointing of one at them, would send them down in an instant. The female will defend her young to the very last, and at the expense of her own life, whether in the water or upon the ice. Nor will the young quit the dam, though dead; so that if one is killed the other is a certain prey. The dam, when in the water, holds the young one between her fore arms."

Though the walrus is abundant near Spitsbergen, it was formerly much more so, and was found in vast herds on the land. The whaling vessels which annually visit this shore have, however, so terrified them, that they have retired to abodes more remote. At one time these animals used to assemble, in almost incredible multitudes, in the Gulf of St. Lawrence, at the setting in of the spring, and take possession of the Magdalene Islands, which they still visit, though now in small numbers. The shores of these islands having a gentle slope, with but few precipitous rocks, are very accessible; and here, it is said, that the walruses remain for many days, without food, as long as the weather is fine; but they hasten to the sea on the slightest appearance of rain. The traffic in the oil and skin of these creatures, carried on by the Americans, have both tended to diminish their numbers, and to drive the remnant to other places of refuge. The fishermen are accustomed to kill them by torch-light, by the glare of which the animals are bewildered, and during the darkness of the night become an easy prey.

The walrus has a formidable enemy besides man in the polar bear, with which it is said to have frequent conflicts, and to suffer total defeat. The polar bear also preys on seals, which it catches with much keenness and certainty as they ascend to the surface of the ocean to breathe; its principal subsistence, however, is obtained from the floating carcasses of whales, and it seems to prefer finding a dead walrus to an attack on a living one.

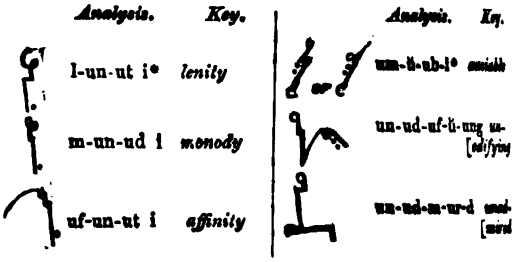
To man, the walrus is useful not only for its tusks, which yield the finest and most valuable ivory, but oil in great abundance. This, in the form of fat, is plentiful in all the marine mammalia of the northern seas. Immediately beneath the skin, a thick layer of this substance envelopes the body. And why is this? It is because fat being a bad conductor of caloric, keeps in, so to speak, the vital heat of the animal. This is one of the innumerable instances of the wise and beneficent arrangements which we observe in the animal kingdom, and which redound to the glory of the great Creator of all. "O Lord, how manifold are thy works! in wisdom hast thou made them all: the earth is full of thy riches; so is this great and wide sea, wherein are things creeping innumerable, both small and great beasts."—Psalm civ. 24.

LESSONS IN PHONETIC SHORT-HAND.—No. II.

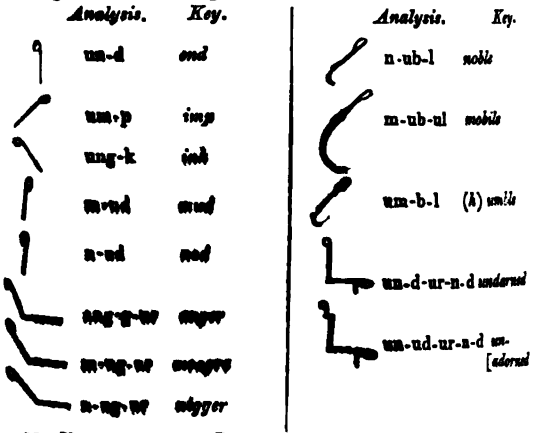
By Alex. Melville Bell, F.R.S.S.A.

Professor of Elocution and Vocal Physiology, Member of the British Phonetic Council, Author of the "Principles of Speech and Elocution"—"The Elocutionary Manual"—"Steno-phonography," &c.

23. When a full-sized ring-letter comes before its correspondent *straight line*, also full size (as *um* before *up* or *ub*, *un* before *ut* or *ud*, *ung* before *uk* or *ug*), a slight angle should be made between the end of the ring-letter and the beginning of the straight line, thus:



24. The following examples illustrate the various combinations of ring-letters with straight lines:—



25. Variable and Compound Articulations.

C has a "hard" sound, the same as K, as in *cat*; and a "soft" sound, the same as S, as in *city*; it sometimes has the sound of Sh, as in *special*.

G has two sounds: its "hard" sound, as in *gig*, is the voice correspondent of K; and its "soft" sound, as in *George*, is a compound articulation consisting of *d* and *zh*.

J is a compound—identical with the "soft" G.

N (the nasal correspondent of D) is pronounced *ng* before K in the same syllable, as in *ink*; or when the next syllable begins with K or with G, as in *anker*, *anger*, &c. The letters *ng* as in *sing* represent a simple articulation, the nasal correspondent of G.

Q sounds K; it is invariably combined with *u*, in English orthography, as in *queen*, and the combination sounds *kw*.

S is very frequently sounded Z at the end of a word, as in *rose*, or between two vowel sounds as in *rosy*; it takes the sound of Z *regularly after voice articulations in the same syllable*, as in *tube*, *deeds*, *eggs*, *lives*, &c., except (in a few words only) after *l* and *n*, as in *else*, *dense*, &c., and (once only) after *m*, in *temse*. S sometimes, also, sounds *sh* or *zh*, as in *mission*, *adhesion*, &c.

W is an articulation, only at the *beginning of a syllable*, as in *twin*, *twice*, *quick*, &c. At the end of a syllable it is merely a vowel sign.

X is a variable compound articulation, sometimes sounding *ks* as in *expect*, and sometimes *gz*, as in *exact*.

Y, like W, is an articulation only at the *beginning of a syllable*; at the end of a syllable it is merely a vowel sign.

* A *dot* is used as a *general vowel mark* for any final vowel; and *two dots* (:) any *two vowels* in combination.

CH is sometimes a compound and sometimes a simple articulation. As a *compound* it is the breath correspondent of J, or "soft" G—having the sound of *tsh*, as in *chair*; as a *simple* it sounds *k*, in words derived from the Greek, as in *chasm*; and *sh*, in words derived from French, as in *chaise*.

26. DOUBLE LETTERS, as in *pepper*, *motto*, *pillow*, &c. are sounded as *one* only; except in such compound words as *mean-ness*, *foul-ly*, *soul-less*, &c., where both are pronounced.

REPEATER.

27. A short line drawn *across the middle* of any articulation, or *through the ring* of a nasal character, denotes a *repetition of the same articulation* with preceding vowel. This is called the REPEATER MARK. Its use is indicated in the following examples:—

			Analysis.	Key.
instead of		w.ite	t-(ut)-l	*title*
" "		"	p-(up)-ur	*paper*
" "		"	p-ut-(ut)-ŭ	*potatoe*
" "		"	p-r-ub-(ub)-l	*probable*
" "		"	y-un-(un)-um-us	*unanimous*

28. When the repeated articulation is the *voice* form, the repeater-mark is *heavy*; and when it is the *breath* form, the repeater is *light*. Thus *t* may be repeated on *t* or *d*; *d* on *d* or *t*; *f* on *f* or *v*; *v* on *v* or *f*, &c., as in the following examples:

Analysis.	Key.	Analysis.	Key.
p-(up)-l	*people*	d-(ut)	*debt*
p-(ub)-l-uk	*public*	ud-(ut)	*audit*
k-up-(ub)-l	*capable*	un-t-(ud) ŭ	*untidy*
b-(up)-t-us	*baptise*	un-t-(ut) l	*entitle*
t-(ud)-r ŭ	*tawdry*	un-d-(ut)	*indict*
d-(ut)-ur	*daughter*	un-(un)-ut ŭ	*inanity*
l-(ul)	*hull*		
h--ul (ul)-ŭ	*holily*		
f-(uv)-ur	*favour*	um-(um)-ur-ŭ-ul	*immemorial*

29. The REPEATER may be applied in the same way to *combinations*, by being drawn *across the point of junction*, thus:

		Analysis.
propriety may be written		p-r-(up-r) ŭ-ut-ŭ
appropriate " "		up-r up-r) ŭ-ut*
opprobrious " "		up-r (ub-r) ŭ-us
distaste " "		d-us-t (us-t)

* The repeater *across the point of junction* has been omitted in this example by the engraver.—ED.

30. Combinations which contain *ring letters* have the repeater drawn, not through, but *close under the ring, to repeat the combination*, thus:

Analysis.	Key.	Analysis.	Key.
un-t-(un-t)	*intent.*	un-t-(un-d)	*intend*

31. The *position* of the repeater in combinations containing ring letters, will then indicate the following varieties:—

(1.) Drawn *through the ring* it repeats the *nasal* element.

(2.) Drawn *through the lower half of the straight line*, it repeats the *obstructive*; and

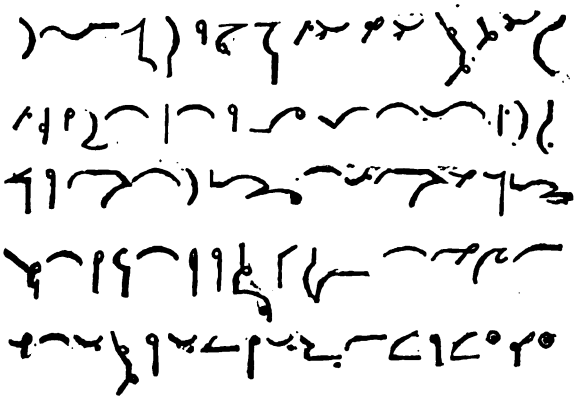
(3.) Drawn *immediately below the ring*, it repeats the *combination*, as in the following illustrations:

Analysis.	Key.	Analysis.	Key.
(1)		(2)	
un-(un)-t	*anoint*	h-un-t-(ud)	*hunted*
un-(um)-um-us	*anonymous*	uk-s-t-un-d-(ud)	*extended*
l-ung-(ung)-lŭ	*longingly*	m-un-d-(ut)-ur-ŭ	*mandatory*

Analysis.	Key.
m-un-(un-d)	*maintained*
un-t (un-d)-(un-t)	*intendant*
un-t (un-d)-(ud)	*intended*

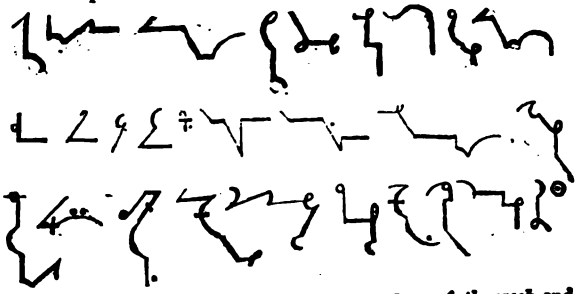
32. EXAMPLE OF UNCONTRACTED SHORT-HAND

The Lord's Prayer.



33. EXERCISES, to which a key will be given in the next lesson

I. Decipher the following words:



II. Write in short-hand the names of the *days of the week* and the *months of the year*, and the *books of the Bible*.

LESSONS IN ENGLISH.—No. XXX.

By JOHN R. BEARD, D.D.

THE LATIN ELEMENT.

I PASS on to the Latin element in the English language. That element can by the ordinary student be appreciated and acquired but imperfectly. I will, however, do what I can to aid him. Had I had the direction of his studies from the first, I would have done my best to make him at the beginning master of the Latin language. As it is, I must content myself with offering to his diligent attention the chief Latin roots which enter into the body of our tongue. Possessed of these, together with their signification, he will in general be at no loss, even without the aid of a dictionary, for the meaning of a word of Latin parentage. Seldom, however, do the words in English which may be traced back to the Latin, come into our tongue directly from the Roman soil. They have generally passed through intermediate countries.

From the Latin are formed several modern languages, namely, the French, the Italian, the Portuguese, and the Spanish. These are called the Romance languages, because they are essentially Roman in their origin. Some say they received the name because in them the first romances were written; more probably is it, that the fictions so called were denominated from the languages in which they appeared.

It is not immediately from the pure Latin of the Latin classics, such as Livy, Cicero, Virgil, Horace, and Tacitus, that the Romance languages are derived, but rather from these so far as they were found in the vernacular tongue, the spoken language of the population in the great centres of intercourse and in rural districts. This vernacular tongue would be regarded by the Roman purists as a corrupted form of the Latin. Corrupt, doubtless, it was, for it contained many words of merely local prevalence, of low origin, and of no authority. Nevertheless, in it were preserved both terms and forms which, being of a very early origin, like our English dialects, belonged to the very substance of the language.

Already in the bloom of the Roman power, the Latin language had received a very large infusion of foreign elements from the several nations which lay around it as a centre, and over which it had established its sway—the countries which we now term France, Italy, Spain, and Portugal. Though the original population of these wide districts had in common with the Romans, a Celtic basis for their language, yet, from locality and diverse culture, they had each for themselves formed a different tongue, and these diversities, when the Roman authority became supreme, and the Roman language was introduced under the wing of that authority, readily blended themselves with the more refined diction of the metropolis and of the great Roman writers. Causes of diversity did not fail to appear on the establishment, in a land, of the Roman despotism. Those causes went on in their operation. At last a new cause, a cause of tremendous power, came into play—the invasion of the northern Barbarians. The blow broke the Roman empire in pieces. Out of the consequent ruins arose new forms of government—the forms of our present European kingdoms. With the formation of new centres of political power and social influences, new languages were formed; the French, the Italian, the Spanish, the Portuguese; at least, these are the main branches that shot forth from the old trunk and grew, until in separate literatures they each produced fruit. Our English was not without an influence from the general shock; but chiefly from the Romance languages, when they had received each its individual form and character, did the Saxon basis of the English tongue receive additions and incorporate elements. Latin came to us in the conquering train of William of Normandy. His Norman-French, a Romance tongue, like his bold barons, and generally his superior culture, made war on the old Saxon element of our land, defeated it, took it prisoner, and went far to make it do its own bidding. So overpowering was the influence of the court, and so imperious was the sway of fashion, that the first accents of our English literature were compelled to take a Gallic shape and tone, retaining their mother Saxon as best they might, and uttering the native sounds "with bated breath."

The Italian branch of the Romance language inoculated our English through the medium of the Catholic church, whose Latin, of universal prevalence, was a sort of medium, and as a medium, so a stepping-stone, between the classic purity of the old Latin language, and the new languages of mediæval Europe; and whose forms, ceremonies, officers, laws, and courts, combined to infuse into English a copious and pervading Latin element.

As the Spaniards and Portuguese made their conquests in foreign climes, and, becoming masters of the ocean, held commerce in their hands, so they, in conducting their maritime and commercial transactions, gave to all modern languages words belonging to their own tongue, and the names by which, with more or less accuracy, they denominated the articles of foreign produce which formed the staple of their trade.

At later periods, too, the Romance languages have exerted an influence over the English, and left bequests which remained after the source of that influence had ceased to exist. I may instance the reign of the profligate Charles II., when, with a Portuguese princess for his queen, that monarch, dependent on French bounty, allowed French writers and French tailors to set the fashion in England, and the language of high life, and partly of books, became a mongrel of bad French and worse English.

Abbreviation is one of the forms through which languages pass in their natural development. By abbreviation has the Latin passed into the Romance languages. The abbreviation has not been in the structure of sentences; for in the structure of sentences expansion has taken place, and fulness ensued, so that it is difficult to render by the same number of words a passage from a Latin classic into a Romance tongue. The abbreviation has been in the forms of the words; the inflexions have been curtailed; case-endings and person-endings, even to some extent tense and mood-endings, have been diminished or done away. The words thus set free from bonds have followed new impulses of development, and given birth to new modes of utterance conformably with the progress of our modern civilisation; and even produced new languages, any one of which would not suffer in comparison with classic Latin.

I have already intimated that the Saxon did not receive any very large inheritance immediately from the confused mass of words and tongues which ensued from the social collision of the North and the South. Yet do we owe to the Romance languages so much, that I am not at liberty to pass on until I have given some particulars, the rather that without the facts that ensue, a knowledge of the English lacks an important element.

Out of an original Latin term two or more English words were formed, either by some change in the body of the word, or some change in its termination; of these newly-coined words, one will be found to bear a close resemblance to its original; another will have departed from it in form and in meaning to a greater or less extent: the former is the older, probably the more scholar-like; the latter is the more recent and the more popular. I subjoin a few instances, annexing contractions to show whence the terms have come to us, thus: *Fr.* shows that the word is derived directly from the French; *It.* from the Italian; and *Sp.* from the Spanish. When the English word seems to come to us immediately from the Latin, the contraction *Lat.* is prefixed:—

blasphemare, *to revile*	Fr. to blaspheme, blame
calx, *limestone*	Fr. to calcine, calcination
calculus, *a pebble*	Fr. to calculate, calculous
campus, *a plain*	Fr. camp, champaign
canalis, *a pipe*	Fr. canal, channel, kennel
cantus, *a song*	Fr chant, enchant, canticle
caput, *a head*	Fr. chap. chapter, cap, captain, capital, chief
causa, *a cause*	Fr. cause, causation, accuse
charta, *paper*	Fr. chart, charter
clamare, *to shout*	Fr. claim, exclaim, reclaim
commendare, *to entrust*	Sp. commend, recommend
comparare, *to get together*	Sp. compare, prepare
consuetudo, *custom*	Fr. costume, custom
divinus, *divine*	Fr. divine, a divine, a diviner
dominus, *a master*	Sp. don, duenna; Fr. dominate, dominion
dubitare, *to doubt*	It. doubt; Fr. dubitation
dubius, *uncertain*	Lat. dubious, dubiety
donum, *a gift*	Sp. donation; Fr. donative
ducatus, *a leading*; Med. Lat. *a duchy*	Fr. duchy; It. duke, doge
factio, *a making*	Fr. faction, fashion
fragilis, *easily broken*	Fr. fragile, frail
gravis, *heavy*	Fr. grave, gravity, gravita
hospes, *a host*	Fr. hospital, spital, hospitable
implicare, *to fold in*	It. implicate; Fr. imply, implicit

ingenium, *genius*	Sp. ingenious Fr. engine
magister, *master*	Sp. mister, mistress, master
major, *greater*	Fr. major, majority, mayor
opera, *work*	Fr. operate, operator, operation It. opera
pietas, *piety*	Fr. piety, pity
potio, *drink*	Fr. potion, poison
redimo, *to buy off*	Fr. redeemed, redemption
Romanus, *Roman*	Fr. Roman, Romance
securitas, *security*	Fr. security, surety
senior, *older*	Fr. sire, sir
salvo, *I save*	Fr. save, safe, salutary
separo, *I put apart*	Fr. separate, sever
servio, *I serve*	Fr. serve, servant, serf
species, *a kind*	Sp. specie, species; Fr. special, especially
superfices, *a surface*	Fr. surface, superficies, superficial

This list pretends to nothing more than to give instances in which two or more words accrued from one Latin term. In some instances it is not easy to determine whether our English word came immediately from the Latin, or through some one of the Romance languages. If, however, the facts above set forth are correct in the main, then we learn how much our language has been enriched by the Romance tongues, and that we are chiefly under obligations to the French.

Were this the place to enter into a statement and comparison of the words and forms in the Romance languages borrowed from the Latin, we should be able to do much to enforce on our pupils the study of the Latin as the mother tongue, and as the key to the French, the Italian, the Spanish, and the Portuguese; nor do we doubt that the knowledge of comparative philology which, thanks to German scholarship, is now rapidly spreading over the civilised world, will ere long lead to what may be termed *the genealogical study of languages*. Instead of spending many years in learning some little Latin and less Greek, after the tedious and almost futile plan of our ancient grammar-schools, the young will be led to study languages in their natural groups: the Indo-European group; the Shemitic group; the Celtic group; and in subordinate classes, the Greek, the Latin, and the German group. With a good knowledge of Latin, which ought not to cost a boy above three years, a student, if rightly directed, could acquire the French, the Italian, the Spanish, and the Portuguese within two years, and at the same time receive great aid toward a minute and accurate knowledge of the English, especially if at the same time he was studying German together with its cognate tongues. The commercial prospects which are opening out in South America, and the dawn of civil liberty which seems rising in the south of Europe, will probably aid in accelerating the time when this new and effectual method of linguistical study shall supersede the present empirical, piecemeal, and uninstructive plans.

COMPOSITION.

Form each of the ensuing words into a sentence.

Words with their proper Prepositions.

	F. R.
To call on, at, for, on a person; at a house,	Lat. cal, *to call*
Capable of,	Lat. cap, *to receive*
Care for, Careful of, for, Careless of,	Sax. car, *solicitude*
Carp at,	Lat. carp, *to pluck*
Catch at, up,	Dut. ketz, *to catch*
Caution against,	Lat. caut, *to guard against*
Certify of,	Lat. certus, *certain*
Change for, with,	Fr. change, *to change*
Charge on, or against a person; with a thing,	Fr. charge, *to load*

Report the following anecdote.

A Pardon at the Right Moment.

On the 29th of May, the whole garrison was paraded on the Castle-hill, at Edinburgh, and formed in three sides of a hollow square, facing inwards. With drums muffled and rolling, while the band played a solemn dead-march, three of the Highland recruits, each stepping slowly behind his open coffin, were brought by an armed escort down the winding pathway from the citadel, and placed in the vacant space of the square, opposite a numerous firing party under the orders of the provost-marshal. It was a bright and beautiful summer morning, but there was a dark cloud on every face, for no ceremony is more impressive and terrible than a military execution—and on that morning three soldiers were to die. They were desired to kneel down beside their open coffins, while the following paper was read by the adjutant-general:—

"*Garrison Orders.*

"Head-Quarters, 6th May, 1779.

"At a general court-martial, held in Edinburgh Castle, on Thursday the 6th May, and two following days, whereof Lieut.-Colonel Dundas, of the 11th Dragoons, was president, for the trial of Charles Williamson and Archibald Mac-Ivor, soldiers of the 42nd regiment, and Robert Budge, soldier of the 71st regiment, accused of mutiny, at Leith, on the 20th April, and instigating others to do the same, the court unanimously found the prisoners guilty of mutiny, being a breach of the 1st, 2nd, 3rd, 4th, and 5th articles of war; and having duly considered the evil tendency of mutiny and sedition, especially when carried to such enormous lengths as in the present case, do adjudge you the aforesaid Charles Williamson, Archibald Mac-Ivor, and Robert Budge, *to be shot to death!*"

The poor prisoners remained on their knees while a Highland officer translated the foregoing into Gaelic. They were all pale and composed but the last, who was suffering from severe wounds received at Leith; his countenance was emaciated and ghastly, and he was sinking from excessive debility. Their eyes were bound up; the officer retired; the provost-marshal approached, and ordered his party to load. They were in the act of taking aim at the prisoners, who were praying intently in Gaelic, when Sir Adolphus Oughton stepped forward, and, displaying three pardons, commanded them to "recover arms." "Soldiers!" said he, "in consequence of the distinguished valour of the Royal Highlanders, to which two of these unfortunate men belong, his Majesty has been graciously pleased to forgive them all. Prisoners! rise, resume your arms, and rejoin your companies." An officer repeated these words in Gaelic. The scene and the whole proceedings were so solemn and affecting that the prisoners were incapable of speech. Raising their bonnets they endeavoured to express their gratitude by a faint cheer, but their voices utterly failed them; and, overcome by weakness and a revulsion of feeling, the soldier of the 71st sank prostrate on the ground between the coffins.—"*Memorials of the Castle of Edinburgh,*' p. 257-259.

UNIVERSITY OF LONDON.—No. II.

In our last article on the University of London, we brought before the notice of our readers the important fact, that all *self-taught* students may Matriculate, that is, become members of this University; and that it is *not* necessary to attend any institution, such as a college or a school, in order to prepare for this Examination, provided they have made themselves masters of the subjects required, and have complied with the regulations set forth in our extracts from the Calendar. In order to satisfy the inquiries of a great number of our students who have written to us on the subject, we proceed to give the University Regulations for taking the Degree of Bachelor of Arts; and we hope that some of them will *also* aspire to this honour, especially such as have it in their power to comply with that part of the regulations which requires certificates from the authorities of the Institutions in connexion with the University.

BACHELOR OF ARTS.

PASS EXAMINATION.

The Examination for the Degree of Bachelor of Arts shall take place once a year, and commence on the fourth Monday in October.

No Candidate shall be admitted to the Examination for the degree of B.A. within Two academical Years of the time of his passing the Matriculation Examination.

No Candidate shall be admitted to this Examination unless he have produced Certificates to the following effect from the authorities of one of the Institutions from which this University is authorised to receive Certificates:—

1. Of having been a Student during Two Years at one of such Institutions.

2. And of Good Conduct, so far as their opportunities of knowledge have extended.

Every person who has completed an Undergraduate's Course of Education at any of the four Universities of Oxford, Cambridge, Dublin, and Durham, and is desirous of being admitted as a Candidate for the Degree of B.A. in this University, shall, on his presenting himself before this University, be so admitted, exempt

from the customary pre-requisite of having Matriculate in this University. He shall be required to satisfy the Senate of his good conduct at the University or College from which he proceeds.

The Certificates shall be transmitted to the Registrar at least fourteen days before the Examination begins.

The Fee for the Degree of B.A. shall be Ten Pounds. No Candidate shall be admitted to the Examination unless he have previously paid this Fee to the Registrar. If a Candidate fail to pass the Examination, the Fee shall not be returned to him, but he shall be admissible to any subsequent Examination for the same Degree without the payment of any additional Fee.

The Examination shall be conducted by means of Printed Papers; but the Examiners shall not be precluded from putting, for the purpose of ascertaining the competence of the Candidates to pass, *viva voce* questions to any Candidate in the subjects in which they are appointed to examine.

Candidates for the Degree of Bachelor of Arts shall be examined in the following subjects:—

MATHEMATICS AND NATURAL PHILOSOPHY.

Arithmetic and Algebra.

The ordinary rules of Arithmetic.
Vulgar and Decimal Fractions.
Extraction of the Square Root.
Addition, Subtraction, Multiplication, and Division of Algebraical Quantities.
Algebraical Proportion and Variation.
Permutations and Combinations.
Arithmetical and Geometrical Progression.
Simple and Compound Interest; Discount and Annuities for terms of years.
Simple and Quadratic Equations, and questions producing them.
The nature and use of Logarithms

Geometry.

The First Book of Euclid.
The principal properties of Triangles, Squares, and Parallelograms, treated geometrically.
The principal properties of the Circle treated geometrically.
The relations of similar figures.
The Eleventh Book of Euclid to Prop. 21.
The equation to the Straight Line and the equation to the Circle referred to rectangular co-ordinates.
The equations to the Conic Sections referred to rectangular co-ordinates.

Plane Trigonometry.

Plane Trigonometry so far as to enable the Candidate to solve all the cases of Plane Triangles.

The following propositions:—

$$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$$

$$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$

$$\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$

The expression for the area of a triangle in terms of its sides.

Mechanics.

The Composition and Resolution of Forces.
The Mechanical Powers.
The Centre of Gravity.
The General laws of Motion.
The Motion of Falling Bodies in free space and down inclined planes.

Hydrostatics, Hydraulics, and Pneumatics.

The pressure of fluids is equally diffused and varies as the depth.
The surface of a fluid at rest is horizontal.
Specific Gravity.
A floating body displaces exactly its weight of the fluid, and is supported as if by a force equal to its weight pressing upwards at the centre of gravity of the displaced fluid.
The Common Pump and the Forcing-Pump.
The Barometer.
The Air-Pump.
The Steam-Engine.

Astronomy.

The apparent motion of the heavens round the earth.
The apparent motion of the sun through the fixed stars
The phenomena of Eclipses.
The Regression of the Planets.
Proofs of the Copernican System.

ANIMAL PHYSIOLOGY.

The mechanical, chemical, and vital properties of the several elementary Animal Textures.
General principles of Animal Mechanics.
Outline of the processes subservient to the Nutrition of the body; and general plan of structure of the Organs of Assimilation. Nature of Digestion; course of the Lacteal Absorbents. Structure of the Organs of Circulation.
Principal varieties in the plan of circulation in the great divisions of the animal kingdom, viz., Mammalia, Birds, Reptiles, Fishes, Mollusca, Articulated, and Radiated Animals.
Mechanism of Respiration in the several classes of animals; chemical effects of respiration in the several classes of animals.
Chemical properties of the Secretion; structure of secreting organs.
Functions of the Nervous System.
The Sensorial Functions, comprehending the physiology of the external senses, especially Vision and Hearing.

CLASSICS.

The Greek and Latin Languages.

One Greek and one Latin book, to be selected two years previously by the Senate from the works of the under-mentioned authors:*

Homer ..... Six Books.
Sophocles .... One Play.
Euripides .... One Play.
Herodotus .... One Book.
Thucydides .. One Book.
Xenophon .... Two Books, from any of his larger works.
Demosthenes .. One of the longer, or three of the shorter public Orations; or two of the private Orations.
Plato ..... Apology of Socrates, and Crito.
Virgil ..... The Eclogues, and six Books of the Æneid; or the Georgics, and the Sixth Book of the Æneid.
Horace ..... The Odes and Ars Poetica, and either the Satires or the Epistles.
Cæsar ..... The Civil Wars, and the Fifth and Sixth Books of the Gallic War.
Cicero ..... The Somnium Scipionis, and two of the shorter and one of the longer Orations.
Livy ..... Three Books.
Tacitus ..... The Agricola, Germania, and one Book either of the Annals or of the Histories.

History.

History of Greece to the death of Alexander.
History of Rome to the death of Augustus.
History of England to the end of the Seventeenth Century.

The papers in Classics shall consist of passages to be translated, accompanied by questions in Grammar, History, and Geography.

The French or the German Language.

Translation into English.
Translation from English into French or German.

LOGIC AND MORAL PHILOSOPHY.

Logic.

Whately's Elements of Logic, fifth Edition, the Introduction 1st Book, and the 2nd Book to the end of Chap. III.

Moral Philosophy.

The First, Third, and Fourth Books of Paley's Principles of Moral and Political Philosophy, and Butler's Three Sermons on Human Nature.

Candidates shall not be approved by the Examiners unless they show a competent knowledge in the four branches of examination:

1. Mathematics and Natural Philosophy;
2. Animal Physiology;
3. Classics, including French or German.
4. Logic and Moral Philosophy.

In the first week the Examinations shall be conducted in the following order:—

Morning, 10 *to* 1.

Monday ....Mathematics and Natural Philosophy
Tuesday ....Classics.
Wednesday ..Mathematics and Natural Philosophy.
Thursday....Classics.

* The Classical Subjects for 1853 and 1854 are as follows:—1853, *Demosthenes:* De Coronâ. *Horace:* Odes, Epistles, and Ars Poetica. 1854, *Euripides:* The Iphigenia in Aulis. *Cicero:* The Somnium Scipionis, and the Orations for the Manilian Law, for Marcellus, and for Archias.

Afternoon, 3 to 6.

Monday ....Animal Physiology.
Tuesday ....Logic and Moral Philosophy.
Wednesday ..History.
Thursday....French, 3 to 5. German, 5 to 7.

On Tuesday Morning at Nine o'clock in the following week the Examiners shall arrange in Two Divisions, each in alphabetical order, such of the Candidates as have passed.

EXAMINATION FOR HONOURS.

Any Candidate who has passed [the preceding examination] may be examined for Honours in Mathematics and Natural Philosophy, Classics, Chemistry, Animal Physiology, and Vegetable Physiology and Structural Botany. But in case any Candidate should delay proceeding to the Examination for the Degree of B.A. [for a period] of more than Three academical Years from the date of his passing the Matriculation Examination, he cannot become a Candidate for the Scholarships, or be admitted to the Examination for Honours, unless he show evidence to the satisfaction of the Examiners that he has been prevented up to that time from proceeding to the Examination for the Degree of B.A.

Candidates for Honours in MATHEMATICS AND NATURAL PHILOSOPHY shall be examined in the following subjects:—

ALGEBRA, INCLUDING THE THEORY OF EQUATIONS.
ANALYTICAL GEOMETRY.
THE DIFFERENTIAL AND INTEGRAL CALCULUS.
CALCULUS OF FINITE DIFFERENCES.
THEORY OF PROBABILITY.
STATICS AND DYNAMICS.
HYDROSTATICS.
HYDRAULICS AND PNEUMATICS.
HEAT.
OPTICS.
ASTRONOMY.

This Examination shall take place on Tuesday, Wednesday, and Thursday, in the week following the Examination for the Degree of B.A.; in the Morning from Ten to One, and in the Afternoon from Three to Six.

In determining the relative position of Candidates, the Examiners shall have regard to the proficiency in Mathematics and Natural Philosophy evinced by the Candidates at the B.A. Examination.

The Examiners shall publish in the course of the ensuing week a list of the Candidates who acquit themselves to their satisfaction, in the order of proficiency; and Candidates shall be bracketed together unless the Examiners are of opinion that there is a clear difference between them.

Candidates for Honours in CLASSICS shall be examined in the following subjects:—

THE GREEK AND LATIN LANGUAGES.

Homer.
Æschylus....Eumenides, and Agamemnon.
Sophocles....Œdipus Tyrannus, Œdipus Coloneus.
Aristophanes The Birds, the Frogs.
Euripides....Iphigenia in Tauris, and Alcestis.
Thucydides.
Herodotus.
Plato .....Phædo, Protagoras, and Gorgias.
Aristotle ....The Ethics, and the Poetics.
Æschines and *Demosthenes*.. } De Coronâ, and the Midias of Demosthenes.
Virgil.
Horace.
Juvenal.....Satt. 1, 3, 8, 10, 13, 14.
Persius.....Satt. 2 and 5.
Plautus.....Aulularia, Capteivei, Trinummus.
Terence.....Andria, Heautontimoroumenos, Adelphi.
Lucretius....The Fifth and Sixth Books.
Cicero .....De Naturâ Deorum, Tuscul. Disput., De Officiis, De Oratore, and the Letters to Atticus.
Tacitus.....The Annals and the Histories.

COMPOSITION IN GREEK, LATIN, AND ENGLISH.

Greek Prose. Translation; retranslation.
Latin Prose. Translation; retranslation.
English Prose. Analysis of any of the subjects selected for examination; original composition upon questions arising out of the classical authors selected for examination.

The papers in Classics shall consist of passages to be translated, accompanied by questions in Grammar, History, and Geography.

This Examination shall take place on Tuesday, Wednesday, and Thursday, in the week following the Examination for Honours in Mathematics and Natural Philosophy; in the Morning from Ten to One, and in the Afternoon from Three to Six.

In determining the relative position of Candidates, the Examiners shall also have regard to the proficiency in Classics, Logic, and Moral Philosophy evinced by the Candidates at the B.A. Examination.

The Examiners shall publish in the course of the ensuing week list of the Candidates who acquit themselves to their satisfaction, in the order of proficiency; and Candidates shall be bracketed together unless the Examiners are of opinion that there is a clear difference between them.

The Examinations for Honours in CHEMISTRY, ANIMAL PHYSIOLOGY, and VEGETABLE PHYSIOLOGY AND STRUCTURAL BOTANY,* shall take place in the week immediately following the Examination for Honours in Classics; that in Chemistry, on Wednesday, in the Morning from Ten to One; that in Animal Physiology, on Thursday, in the Morning from Ten to One, and in the Afternoon from Three to Six; and that in Vegetable Physiology and Structural Botany, on Friday, in the Morning from Ten to One.

The examiners shall publish in the course of the ensuing week a list of the Candidates who acquit themselves to their satisfaction, in the order of proficiency in each subject.

If in the opinion of the Examiners any Candidate shall possess sufficient merit, the Candidate who shall distinguish himself the most in Mathematics and Natural Philosophy, and the Candidate who shall distinguish himself the most in Classics, shall each receive Fifty Pounds per annum for the next Three Years, with the style of UNIVERSITY SCHOLARS. Under the same circumstances, the Candidate who shall distinguish himself the most in Chemistry, the Candidate who shall distinguish himself the most in Animal Physiology, and the Candidate who shall distinguish himself the most in Vegetable Physiology and Structural Botany, shall each receive a Prize in Books to the value of Five Pounds.

N.B.—The classical subjects for the Matriculation Examination for 1854, will be—*Xenophon*, Anabasis, Book III. *Virgil*, Georgics, Book I.

We could have wished, for the sake of many of our *self-taught* students, for whom, from their letters to us, we have formed the highest esteem, that by the regulation of the University, the taking of the Bachelor's degree had been as FREE AND OPEN to them as the Matriculation; but it is not so at present. What may be the consequences of suggestions and applications on their behalf, we cannot presume to say; but we are of opinion that a number of applications from *self-taught* students for permission to *Graduate*—that is, to be examined for the degree of Bachelor of Arts, and then for that of Master of Arts, without attending any of the institutions connected with the University, or without passing the usual term of two years study at the subjects proposed for examination between Matriculation and taking the former degree, or between taking the former degree and taking the latter—would induce the authorities of the University to apply for an extension of their charter to meet the cases under consideration. If a student feels able to pass all three examinations within one or two years at most, we can see no valid reason why he should not be permitted to try, and allowed to pass without the present University restrictions. Still we admit that the second clause of these restrictions, which relates to the *Good Conduct* of the Candidate, is one of primary importance, and one which should never be overlooked in the bestowment of degrees of any kind, whether academical or otherwise. This difficulty, however, might be met by a certificate from the minister of the parish in which he resides, from the pastor of the congregation to which he belongs, or even from the master whom he has served during the whole period of his studies previous to the date when he offers himself as a Candidate at the University. Some may, perhaps, think that there is no necessity for a certificate of Good Conduct on the part of one who is to have the honour of a degree conferred on him by the University, and

* N.B.—The Candidates for Honours at all Examinations in Botany shall be required:
1st. To define any of the technical terms in a list given in the Calendar.
2nd. To describe Phanerogamous Plants according to the above Scheme, with the following additions in lieu of Question (*o*):—
(*o.*) FRUIT. General Character.
(*p.*) ——. Dehiscence.
(*q.*) ——. Placentation.
(*r.*) ——. Arrangement of Embryo in the Seed.
(*s.*) ——. Reasons for referring it to a particular Order to which it may belong, or seem to approximate.
(*t.*) ——. The "Regions" and "Stations" usually affected by the species of that Order.
3rd. To answer questions on Botanical Physiology

that the very fact of his having acquired the necessary learning and knowledge which enables him to procure it, is a sufficient guarantee for his general character. On this point, however, we would beg to differ from them; we are all aware that "knowledge is power;" and it is plain that this knowledge would become a dreadful instrument of mischief in the hands of a wicked man. In fact, it might be turned by such a one against the general interests of society, the stability of constitutional government, and the influence of morality and religion. We, ourselves, have no respect for learning or academical degrees in any individual, when they are coupled with wickedness or flagrant offences against God and man; and we feel that it is the duty of those who have the power, to refuse the bestowment of such honours upon any one whose character will not stand the test in these respects. Thus, academical honours will become truly valuable; for they will be a proof not only of a certain amount of ability and talent, but also of respectability and character: they will likewise be a passport to the possessors not only for admission into good society, but for election to situations and offices suited to their wishes and their capabilities.

In our next article we shall give some account of the origin and present state of the University, a list of the different institutions connected with it in various parts of the United Kingdom, as well as in the metropolis; and a few additional hints to *self-taught* and *other* students on the subject of their application for degrees. We look upon an institution of this kind as a powerful moral lever in the hands of the community and of the government, for the elevation of the middle and the lower classes to that rank as members of society, which will keep them from the gross and degrading pursuits and vices which tend to deteriorate the population of the country, to fill our gaols and unions with the produce of crime, to engender the seeds of discontent and civil disorganisation, and to increase the oppression and taxation of the industrious and the virtuous for the support and multiplication of the idle and the vicious.

LESSONS IN GERMAN.—No. XXX.

EXAMPLES ILLUSTRATING THE VARIOUS USES OF THE PREPOSITIONS. *(Continued.)*

Bis.

Bis dieſen Au'genblick.	Till this moment.
Wir bleiben bis Abend.	We remain till evening.
Bis dieſe Stunde weiß ich nicht, wie es ihm möglich gewe'ſen iſt ſo zu leben, wie er lebte.	To this hour I do not know, how it was possible for him to live as he did (live).
Er geht bis nach* Wien.	He goes as far as (to) Vienna.
Das Waſſer reichte bis an den Hals.	The water reached up to the neck.
Bis auf einen Punkt ſind ſie einig.	Up to a point they are agreed.
Er geht nicht eher, als bis er ſeine Geſchäfte been'digt hat.	He does not go sooner than he has finished his business.

Nach.

Der Vater reiſt nach Amerika.	The father is going (journeying) to America.
Der Ritter greift nach ſeinem Schwerte.	The knight grasps (after) his sword.
Die armen Waiſen ſchreien nach Brod.	The poor orphans cry for bread.
Umſonſt ſpäh' ich nach einem Auge das empfin'det. (Schiller).	In vain I look for an eye that feels.
Laßt uns tagen nach den alten Bräuchen des Landes. (Schiller.)	Let us meet according to the ancient custom of the land.
Thu', was vor dir kein Weib gethan', nach dir kein Weib mehr thun wird. (Schiller.)	Do what before thee no woman has done;—after thee no woman will do.

Seit.

Seit der Ankunft ſeines Vaters ſcheint er zufrie'den zu ſein.	Since the arrival of his father he appears to be contented.
Er iſt ſeit einer Woche hier.	He has been (is) here a week.
Seit geſtern habe ich ihn nicht geſe'hen.	Since yesterday I have not seen him.

Ueber.

Der Faule ſtirbt über ſeinen Wünſchen.	The sluggard dies over his wishes.
Das geht über meinen Verſtand'.	That is (goes) beyond my comprehension.
Sie ſind ſchon über ein Jahr hier.	You are (have been) here already more than a year.
Er erhält' Brief über Brief.	He receives letter upon letter.
Sie zog den Schleier über das Geſicht.	She drew the veil over her (the) face.
Er war über dieſe Antwort ganz entrüſtet.	He was perfectly indignant at this reply.
Er hat über dieſen Punkt noch nicht entſchie'den.	He has not yet decided concerning this point.
Cook's Begleiter ſchweigen von den Minera'lien Neuholl'lands, und ſcheinen über den Reizen der dorti'gen Flora vergeſſen zu haben, daß auch der Boden, über den ſie hineilten, die Blicke des Kenners verdiente. (G. Forſter.)	Cook's companions were silent respecting the minerals of New Holland, and appear, amidst the charms of the Flora of that country, to have forgotten, that the soil over which they hurried, was likewise deserving of the scrutiny of the philosopher.
Laß den Herbſt in ſchwarzen Wettern hoch über unſerm Haupte ziehn.	Let the autumn in dark storms sweep high above our heads.

Um.

Um ſein Leben zu retten, verrieth er ſeinen Freund.	In order to save his life he betrayed his friend.
Die Ritter ſetzten ſich um den runden Tiſch.	The knights seated themselves about the round table.
Der Sieger hatte einen Kranz um das Haupt.	The victor had a wreath around the head.
Der Feind la'gerte ſich um die Stadt herum'.	The enemy encamped (himself) around the city.
Sie rennen um die Wette.	They run for a wager.
Was thut man nicht um Geld?	What does one not, [do] for
Die Zeit iſt um. (adverb.)	The time is up. [money?
Er iſt um halb zwei angekommen.	He arrived at half past one.
Man hat ihn um ſein Vermö'gen (um ſein Geld) gebracht'.	They have deprived him of ("got away") his property.
Es muß um einen Zoll länger ſein.	It must be about an inch longer.
Der Baum iſt um'gefallen.	The tree has fallen down.
Sie kümmern ſich mehr um den Krug, als um den Krieg. (Schiller.)	They concern themselves more about the wine (jug) than the war.

Unter.

Die Soldaten ſtehen unter Waffen.	The soldiers are under arms.
Das ganze Land ſteht unter Waſſer.	The whole land is (stands) under water.
Es iſt unter ſeiner Würde, ſo zu handeln.	It is beneath his dignity so to act.
Er iſt unter einem andern Namen zu uns gekommen.	He came (Sect. 18. VIII.) to us under another name.
Iſt keiner unter uns, der dieſe Schmach räche?	Is there no one among us, who may avenge this outrage?
Es iſt unter uns kein Geheim'niß.	There is no secret among us.

Vor.

Sie gehen vor ihn.	You go before him.
Der Frühling iſt vor der Thür.	The spring is at (before) the door (at hand).
Ich will mich nicht vor dir verbergen.	I will not conceal myself from thee.
Vor ihr habe ich keine Geheim'niſſe.	Before her I have no secrecies
Er iſt ganz außer ſich vor Zorn.	He is perfectly beside himself with rage.
Das Schiff liegt vor Anker.	The ship is lying at anchor.
Er iſt vor drei Wochen angekommen.	He arrived three weeks ago. (Sect. 32. I.)
Er hat ihm vor den Kopf geſchoſſen.	He has shot him in the head.

Zu

Er reiſet zu Lande, und ich zu Waſſer.	He travels by land, and *I* by water.

* Bis is often placed before the prepositions auf &c., as, bis auf, bis nach, bis zu, &c. The pupil will observe that some of the prepositions are employed in this section as adverbs.

Er liegt noch zu Bette.	He is still (lying) in bed.
Ich stehe Ihnen zur Seite.	I (will) stand at your side (i. e. to aid).
Ich möchte diesen Mann nicht zum Nachbar haben.	I should not like (to have) this man as a neighbour.
Er nimmt meinen Rock zum Muster.	He takes my coat as a pattern.
Er ist in dieser Sache viel zu weit gegangen.	He has gone quite too far in this matter.
Wir haben Abraham zum Vater.	We have Abraham to (our) father.
Gehen Sie doch zu meinem Bruder.	Pray, go to my brother.
Deines Grames Zeugen werden auf zum Himmel gehn. (Bürger.)	The witnesses of thy grief will rise to heaven.

Section LIX.

Stehen, when referring to articles of dress, answers to our words "*become*" or "*suit;*" as, Der Hut steht ihm nicht; the hat does not *become* him; whereas passen signifies, more properly, "to *fit*" or "*set;*" as, Diese Stiefeln stehen ihm sehr gut, allein sie passen ihm nicht; sie sind zu klein, these boots *become* him very well, but they do not *fit* him; they are too small. Anpassen (as also anprobiren) signifies "to try on;" as, er paßt (or probirt) den Rock an; he is "*trying on*" the coat.

I. Sein is sometimes used instead of gehören, to *belong*. Ex.: Wem ist dieses Buch? to whom belongs (is) this book?

II. „Reihe," when employed to denote the order in which anything is to be obtained or done, answers to our word "*turn;*" as, an wem ist die Reihe? (on whom is the turn?) whose turn is it?

III. Tag für Tag = day by day; as, Tag für Tag rühmen wir Dich; day by day we praise Thee.

Exercise 62.

Aehn'lichkeit, *f.* resemblance, similarity;	Gestalt', *f.* figure, form, stature;	Passen, to fit;
Betrübt', sorrowful, desolate;	Kappe, *f.* cap;	Pisto'le, *f.* pistol;
Doctor, *m.* doctor;	Kleidung, *f.* suit, dress;	Platz, *m.* room, space, place, square;
Entwe'der-oder, either-or;	Mantel, *m.* cloak;	Portrait, *n.* portrait, picture;
Farbe, *f.* colour, paint;	Markus, *m.* Mark;	Saal, *m.* assembly-room, saloon;
Festung, *f.* fortress, fort;	Maulthier, *n.* mule;	Schleier, *m.* veil;
Gazel'le, *f.* gazelle, antelope;	Medici'ner, *m.* physician, medical student;	Stricken, to knit;
Gemse, *f.* goat of the Alps;	Nähen, to sew;	Verstorben, deceased;
	Pantoff'eln, *m.* slipper;	Weste, *f.* vest;
		Wogen, to wave, float;
		Zierlich, elegant, neat.

Wilhelm paßt so eben einen Rock bei dem Schneider an.	William is just *trying on* a coat at the tailor's.
Der Rock steht ihm sehr gut, allein er paßt ihm nicht ganz; er ist ihm ein wenig zu klein.	The coat *becomes* him very well, but it does not quite fit him; it is a little too small for him.
Wem ist dieses Pferd?	To whom does this horse belong.
Ein auf'merksamer Schüler weiß, wenn die Reihe an ihm ist zu lesen.	An attentive scholar knows when it is his turn to read.
Der Mensch wird Tag für Tag älter.	Man becomes day by day older.
Die Geizigen sind den Eseln gleich, welche Gold tragen und Disteln fressen.	(The) misers are like the donkeys that carry gold and eat thistles.
Der Sohn gleicht dem Vater wie ein Ei dem andern.	The son resembles the father as one egg (the other) another.
Der Bruder sieht seiner Schwester sehr ähnlich.	The brother looks very much like his sister.

1. Diesem Manne paßt sein Rock nicht. 2. Ich und mein Bruder, der Mediciner, gehen Tag für Tag an den Fluß. 3. Diese beiden (Sect. 33.) Schwestern nähen und stricken Tag für Tag 4. Dieses Bild gehörte meinem verstorbenen Freunde. 5. Diese Farbe ist dem Maler. 6. Diese Stadt hat große Aehnlichkeit mit einer Festung. 7. Finden Sie in diesem Portrait keine Aehnlichkeit mit meinem Vater? 8. Nein, es gleicht mehr Ihrem Vetter. 9. Wie kommt es, mein Freund daß du heute so betrübt bist? 10. Dieser Mantel steht mir besser, als der meinige. 11. Ein Mantel braucht nicht gut zu stehen, wenn er nur warm hält. 12. Wie steht mir dieser Rock? 13. Die Weste steht Ihnen besser, als der Rock. 14. Ich denke diese Handschuhe passen Ihnen nicht. 15. Diese hier werden mir besser passen, denn sie sind etwas größer. 16. Diese Kleidung paßt dem Knaben sehr gut. 17. Steht mir diese oder jene Kappe besser? 18. Es scheint, deine Pantoffeln passen dir nicht gut. 19. Sie kaufen nur Kleider, welche Ihnen gut stehen. 20. Wem gehört dieses Haus? 21. Es gehört entweder ihr oder ihm. 22. Wem sind jene Handschuhe? 23. Sie gehören dieser Frau. 24. Welchem Mädchen gehört dieser Schleier? 25. Zu welchem Schiffe gehören diese Matrosen? 26. Wessen Maulthiere sind diese? 27. Sie gehören mir. 28. Wessen Hut ist dieser auf dem Tische? 29. Es ist entweder der meinige oder der seinige.

1. Whose coat is this on the wall? 2. It is either mine or thine. 3. Those gentlemen go every day to bathe. 4. Can you tell me to whom those pistols belong? 5. So far (Sect. 35 IV.) as I know, they belong to the doctor. 6. Whose turn is it this night to watch? 7. It is my turn. 8. The turn falls now to me. 9. The St. Mark's square in Venice is so clean and elegant, that it resembles a large assembly-room. 10. The antelope has a figure and height resembling the goat of the Alps. 11. The life of a man is like a ship, which goes upon the rolling sea. 12. To whom belong all those beautiful pictures. 13. They belong to my friend the painter

Section LX.

Wie befinden Sie sich? (literally, how do you find yourself?) answer to our phrase, how do you do?

Sich befinden is also applied to inanimate objects, and is then well rendered by "to be." Ex.: Das Buch befindet sich in meinem Zimmer, the book is in my room.

The adjective befindlich is frequently best translated by a relative clause. Ex.: Das Haus und die darin befindlichen Leute; the house and the people who were in it (literally, the house and the therein being people.)

I. Statt finden = to take place. Ex.: Wann fand die Revolution in Baden Statt? When did the revolution in Baden take (find) place?

II. Schuld sein = to be in fault; as, Ich bin Schuld daran; I am to blame for it, it is my fault.

Exercise 63.

Also, thus, therefore;	Daran, thereat, about it;	Redner, *m.* orator, public-speaker;
An'kündigen, to announce;	Darum, for that cause;	Reif, *m.* hoop;
Antwort, *f.* answer, reply;	Demuth, *f.* humility;	Reizend, charming;
Auf'geklärt, intelligent, enlightened;	Denkmal, *n.* monument;	Scharen, to flock together, to form into bands;
Auf'pflanzen, to plant, set up;	Deßwe'gen, for that reason;	Schöpfer, *m.* Creator;
Ausgezeichnet, remarkably;	Durchnässen, to wet through;	Spitze, *f.* summit, height;
Befin'den, to find, to be;	Erfinder, *m.* inventor;	Stattfinden, to take place;
Begeisterung, *f.* enthusiasm;	Ergreifen, to seize, lay hold of;	Streben, to strive;
Beginnen, to begin;	Fahne, *f.* standard, flag, colours;	Ueberwinden, to overcome, surmount;
Beklagen, to complain;	Gebrauchen, to use;	Unternehmung, *f.* undertaking;
Buchdruckerkunst, *f.* art of printing;	Gegend, *f.* region;	Verschieben, to postpone;
Daher', thence, therefore;	Kriegerisch, warlike, martial;	Vorstellung, *f.* remonstrance.
	Laufbahn, *f* career;	
	Oberst, *m.* colonel;	

Es fand bei Frankfurt am Main eine große Volks'versammlung Statt.	A large popular assembly took place at Frankfort on the Maine.
Von nun an floß die übrige Zeit seines Lebens ruhig dahin.	From this time forth the remaining time (portion) of his life passed tranquilly away.
Daher kommt es, daß so viele Deutsche und Ungarn nach Amerika auswandern.	Thence it comes, that so many Germans and Hungarians emigrate to America.

Pourvu qu'il le fasse, n'impo
comment.
Apportez-moi quelque chose, n
porte quoi.
J'en mourrai ; n'importe.
Il n'est pas satisfait ; qu'impo

Il refuse nos présents ; qu'imp

Que nous importe cette affair
Que vous importe son arrivée
Vous viendrez ; n'est ce pas
N'est-ce pas que vous viendr
Est-ce que cela me regarde ?

Cela ne regarde personne.

Il en veut à nos biens.
Il en veut à nos amis.
Cela vous regarde t-il ?

Accord-er, 1. *to grant.*
Approuv-er, 1. *to approve.*
Auteur, m. *author.*
Bien, *very.*
Condamn-er, 1. *to condemn.*
Demande, *f. request.*

1. Que vous app
ce que vous pourr
d'apporter du velo
de quelle qualité.
qui. 6. Que m'ir
damne ? (Boileau
8. Il refuse ; qu'i
vous avez faits ?
11. Il n'a pas vo
importent les pla
s'en moque ? (I
sang vil soit ver
ce-pas ? 15. C
que moi. 17.
daient pas ; n
pas ?—N'impo
n'en voulons à
22. Vous m'e
la vie de votr
m'en veut ;
vouloir à sa v

1. Whicl
comes to-m
write to yo
no matter.
book do y
bring you
no matte
That doe
refuse to
does it m
Your br
to speak
to speak

two circles of any convenient, but of the same size, and draw in each two diameters 0, 0, and *North Pole* and *South Pole*, at right angles to each other, (Eucl. B. I. Prop. XI.); then divide each quadrant of these two circles and each radius or half of the two diameters into nine equal parts. Mark the divisions of the quadrants between 0 and *North Pole*, and between 0 and *South Pole*, with the numbers 10, 20, 30, 40, 50, 60, 70, and 80; then it will be *understood* that at the point 0, the mark is 0 degrees, and at *North* or *South Pole*, the mark is 90 degrees. Next, mark the diameters of the two circles which are drawn across the page from 0 to 0 with the word *Equator;* the centre of the *Eastern Hemisphere* with 70; and the centre of the *Western Hemisphere* with 110; then, in the Eastern Hemisphere, mark to the left of 70, the numbers 60, 50, 40, 30, 20, 10, 0, 10, and 20; and, to the right of 70, the numbers 80, 90, 100, 110, 120, 130, 140, 150, and 160; these are to denote the degrees of longitude, the first meridian being that marked 0, and the others at 10 degrees distance from each other; the meridians *to the right* of that marked 0, being in *east longitude*, and those *to the left* being in *west longitude*. Now, in the *Western Hemisphere*, mark *to the right* of 110, the numbers 100, 90, 80, 70, 60, 50, 40, 30, and 20; and *to the left*, the numbers 120, 130, 140, 150, 160, 170, 180, 170, and 160; but here it is necessary to remark, that in this Hemisphere, all the numbers are degrees in *west longitude*, except *the last-mentioned two*, 170, and 160, which are in *east longitude*, because these are the continuation of the degrees in the Eastern Hemisphere, *to the right*, which stopped at that point, viz., 160. The *degrees of longitude* whether *east* or *west*, must be limited by 180, because this number extends over *one half* of the globe either way, and the meridian marked 180, is the continuation of the meridian of Greenwich, that is, the circle which passes through 0°, 180°, and the two poles, in the meridian of Greenwich; there are some, however, who call the *semicircle* which extends from pole to pole, through any given place, the meridian of that place; and the *opposite semicircle*, the *antimeridian;* but it is better to consider the meridian as a *complete circle*. Lastly, mark the semidiameters or radii of each circle or hemisphere which are at right angles to the diameters marked *equator*, with the numbers 10, 20, 30, 40, 50, 60, 70, and 80, from the centre of each to the poles *north* and *south*.

Now, draw arcs, or portions of circles through the two points marked 80, on the north quadrants, and the point marked 80 on the north radii of both circles, and this will give the projection of the parallel of north latitude of 80° in the northern Hemisphere; do the same in the south quadrants and south radii of both circles, and this will give the projection of the parallel of south latitude of 80, in the southern hemisphere. Next, draw arcs, or portions of circles through the two points marked 70 on the north quadrants, and the point marked 70 on the north radii of both circles, and this will give the projection of the parallel of north latitude of 70°, in the northern hemisphere; do the same in the south quadrants and south radii of both circles, and this will give the projection of the parallel of 70° in the southern hemisphere. Proceed in the same manner until you have projected on the Map all the parallels of latitude in both hemispheres, from 80 to 10 inclusive.

To draw the meridians in the eastern hemisphere, describe arcs of circles through the north and south poles as two points, and through each of the degrees marked 0, 10, 20, 30, &c., of *longitude*, whether *east* or *west*, as the third or middle point, and this will give the meridian of each point so marked, at *every ten* degrees from 0° to 180°, *east* or *west;* these meridians will serve as a guide to the determination of other meridians, and enable the geographer to approximate to the true position of those places which he may wish to lay down on the Map, of which, he has thus drawn the skeleton. By the combined help of the parallels of latitude and the meridians, he may fill up this skeleton Map from a table of latitudes and longitudes, with the names of all the most important places in the world; he may also draw a pretty correct outline of the coast of each continent, by laying down the latitudes and longitudes of as many coasting points as possible from such a table, and drawing a curve through them, as like other Maps of the world as he can; the accuracy of the Map increasing with the number of points laid down according to their latitudes and longitudes. In Norie's Navigation, Table LVI, are given the latitudes and longitudes of the principal ports, harbours, capes, shoals, rocks, &c., in the world, founded on thousands of observations made by the most eminent Astronomers and Navigators; and this table will enable a true student of Geography to lay down the outline of the coasts of almost all the continents, islands, and peninsulas in the Map of the World, to any scale or size which he chooses to adopt. He may then fill up the interior of these with the positions of the most important places of the world, from the tables of latitudes and longitudes usually attached to the ordinary Atlases used in colleges and schools. We shall give, in the course of our own lessons, as correct and extended a list of this kind as our limits will admit. In the meantime we earnestly recommend our students to endeavour to acquire a perfect knowledge of this subject, the *Geographical positions of places*, that is, their *latitudes* and *longitudes;* for if they fail in this point, their knowledge of the world, with regard to the position of its continents, islands, peninsulas, capes, and promontories, as well as with regard to the position of its oceans, seas, gulfs, bays, and lakes, will always be obscure, indefinite, and incorrect; neither will they be able to form any proper notion of the relative distances of important places from one another, or from a central point, such as London or Paris. The doctrine of the Globe is as plain to the well-instructed mariner or geographer, as the knowledge of London is to the inhabitant of 50 years' standing in that city. Were it not so, the safety of our commercial relations with our own colonies, as well as with foreign ports and countries in all parts of the world, would rest on a very insecure basis. But thanks to the progress of knowledge in Mathematical and Astronomical science, and thanks to the spirit of activity and mercantile enterprise, not to speak of the desire to explore unknown regions which has wonderfully manifested itself in the present century, the world is now better known than ever it was in any past age, not excepting even the palmy days of Solomon the Great, whose ships went to *Ophir*, that is, *Africa*, for gold, and in whose time silver was made as plentiful even as stones in Jerusalem.

Before concluding this lesson, it may be proper to remark that there are four small circles on the globe, placed among the parallels of latitude, which serve to divide the earth into five zones (from Gr. zonē, *a belt*) between the two poles. The two smaller circles, which are of the same size, are called the *polar circles;* the one, the *arctic*, or *north polar circle;* and the other, the *antarctic*, or *south polar circle*. The two larger circles, which are also of the same size, are called the *tropics;* the one, the *tropic of Cancer;* and the other, the *tropic of Capricorn*. The polar circles are each 23° 28′ distant from the poles, when that distance is measured on a meridian; and, consequently, the one, the *arctic circle*, is the parallel of latitude at 66° 32′ N.; and the other, the *antarctic circle*, is the parallel of latitude at 66° 32′ S.; because the poles being 90° distant from the equator, we have 90° − 23° 28′ = 66° 32′.

The *tropics* are each 23° 28′ distant from the equator when that distance is measured on a meridian; and consequently the one, the *tropic of Cancer*, is the parallel of latitude at 23° 28′ N.; and the other, the *tropic of Capricorn*, is the parallel of latitude at 23° 28′ S.; each being at the distance of 66° 32′ from the poles, because, as before, 90° − 66° 32′ = 23° 28′. The origin of these circles was explained in Lesson XIV., page 89, vol. II., and by referring to the diagram on that page you will see that they arise from the different positions of the earth in her orbit or path which she describes in a year in her motion round the sun. The constant inclination of the earth's axis to the plane of the orbit, or the parallelism of that axis to itself in all positions, occasions all the space around the poles to the extent of 23° 28′ from each, to be alternately illuminated by the *oblique rays* of the sun for six months of the year, and alternately darkened by the absence of those rays for the same period. It also occasions all the space between the tropics and the equator, to the extent of 23° 28′ on each side of the equator, to receive the *direct rays* of the sun in succession, that is, to have the sun successively vertical to the inhabitants in every latitude, from 0° to 23° 28′ N., and from 0° to 23° 28′ S., for a period of six months alternately.

It is plain, therefore, that the spaces between the tropics and the polar circles, can never have the rays of the sun vertical to them; but these rays will be more or less oblique to them in the course of a year—in the former case constituting winter,

with its precedent autumn; and in the latter summer, with its precedent spring.

The mathematical notion of the manner in which these circles are generated, is the following:—Suppose the plane of the ecliptic (the *real path* of the earth in the heavens, and the *apparent path* of the sun in the heavens,) to cut the globe, it must pass through the centre o, (see the diagram, p. 88, vol. II.), as the ecliptic is the path of the centre, and forms the circle whose radius is o R; this circle intersects the equator R Q at an angle R O A of 23° 28′, called the obliquity of the ecliptic, and its two opposite points remotest from the equator (called *solstitial* points),† generate by the revolution of the earth on its axis the two tropics seen on opposite sides of R Q, the equator, the one being P R 23° 28′ north of it, and the other at the same distance south of it. The extremities of the diameter of the globe at right angles to the circle of the ecliptic whose radius is o R, generate, by the same revolution, the two polar circles seen at equal distances, 23° 28′, from N. and S., the north and south poles, and touching the dotted perpendicular which is the said diameter produced.

The space or belt between the *two tropics* (from Gr. tropicos, *turning*) is called the *torrid (burning) zone*, because it is *parched* by the *direct* rays of the sun falling on every latitude in succession during the year; its breadth is twice 23° 28′, that is 46° 56′, measured on a meridian. The space between the *tropic of Cancer* (so called, because when the sun appears to enter this constellation in the heavens, at *midsummer*, he seems to *turn* again and move towards the equator) and the *arctic circle*, is called the *north temperate zone*, because the sun's rays fall neither so *directly* as to produce *great heat*, nor so obliquely as to produce *great cold*, although on the limits of the zone both will be felt in a very considerable degree, its breadth is 43° 4′ measured on a meridian. The space between the *tropic of Capricorn* (so called, because when the sun appears to enter this constellation in the heavens, at *mid-winter*, he seems to turn again and move towards the equator) and the *antarctic circle*, is called the *south temperate zone*, for the same reasons as stated respecting the *north temperate zone*, and its breadth is the same, being 43° 4′, measured on a meridian. The space between the *arctic* (from Gr. arktos, *a bear* because the constellation in the heavens called the *great bear*, always points to the *north*) *circle* and the *north pole*, is called the *north frigid zone*, because it is always *frigid (cold)* in this space or portion of the globe, owing to the *great obliquity* of the sun's rays; its breadth is 23° 28′, measured on a meridian. Lastly, the space between the *antarctic* (from Gr. anti, *over against*, or opposite to, and *arctic*) *circle* and the *south pole*, is called the *south frigid zone*; and its breadth is the same, being 23° 28′, measured on a meridian.

The following table contains the breadth of each of the zones in degrees and British miles, their surfaces in square miles, the middle latitude of each zone, and the length of the parallel in that latitude in miles:—

ZONES.	Breadths in degrees	Breadths in miles.	Surfaces in square miles	Mid. Latitude	Length of parallel in mid. Lat.
North Frigid.....	23° 28′	1,620	8,132,807	78°16′N	5,055
North Temperate..	43 4	2,794	51,041,534	45 0 N	17,576
Torrid.....	46 56	3,240	78,314,214	0 0	24,856
South Temperate..	43 4	2,974	51,041,534	45 0 S	17,576
South Frigid.....	23 28	1,620	8,132,807	78 16 S	5,055
	180 0	12,428	196,662,896		

The determination of the numbers in the second and third columns of the preceding table depends on the length of the *mean diameter of the earth*, which, according to Laplace, as we have seen before, is about 7,912 British miles. Hence, the *circumference of the earth* is about 24,856 miles, and the mean length of a degree on its surface about 69·045 miles. Consequently, we find that the extent of the *surface of the globe*, including both land and water, and taking no account of the elevations and depressions of either, is about 196,662,896 square miles; and that its capacity, or solid content, is about 259,332,805,664 cubic miles.

† The term *solstitial* means literally *sun-standing* (from Lat. sol, *the sun*, and sto, *I stand*); it is applied to the apparent motion of the sun at these points, which seems to be so very slow that this luminary may be said to all appearance, for a few days, to be stationary.

KEY TO THE EXERCISES IN THE LATIN LESSONS.

(Continued from page 12, vol. II.)

By JOHN R. BEARD, D.D.

Page 214, col. 1, vol. I.—ENGLISH-LATIN.

Estne aliquando venenum pro remedio? in Graeciâ pugnat Xerxes; in senectute visus et auditus hebescunt; paritne (*brings forth*) in alienis nidis coccyx? soror tua coram multis canat; ab ortu solis occasum properant; Graeciâ proficiscens exercitus in Italiam properat; Metellus cum multis militibus est in Britanniâ; filius meus sine dentibus est natus; estne exercitus sine elephantis? elephanti in triumpho a duce ducuntur; dulcene est pro patriâ mori? quid sine Dei ope sunt mortales? omnesne aves in arboribus nidificant? clam patre est puer in domo; infantes in gremio matris felices est dulce videre; tecumne est soror tua? sine patre nihil potest puer; mecum est filia mea; quot liberi tecum sunt? quot homines sunt in Britanniâ?

Page 254, col. 1, vol. I.—LATIN-ENGLISH.

God is present in all places; arms are of little avail abroad, unless there is deliberation at home; those are despised, who benefit neither themselves nor another; as the laws preside over the magistrates, so the magistrates (preside over) the people; reason and speech unite men to one another, and in nothing are we farther from the nature of wild beasts; I am joyful, thou art sad; if you are contented with your lot, you are happy; while we were in the school, our sisters were in the garden; when Charles was at our house yesterday, I was abroad; as long as you and your brother were at our house, you were joyful, but your brother was sad; as long as you were absent, I was sad; why were you not in school yesterday? because I was abroad with my father; how long have you and your father been absent from home? we have been absent six months; why were not our soldiers (*milites*) present at the fight? because they were too far away; where had you been yesterday when I was at your house?

Page 254, col. 1, vol. I.—ENGLISH-LATIN.

Ego prosum tibi; tu prodes mihi; pueri matribus non prosunt; cur puellae patribus non prosunt? quum tu aberas, ego eram tristis; quamdiu pater tuus abfuit? Carolus pugnae interfuit; erasne heri domi nostrae? ero hodie tuae domi; nisi domi es beatus, non es laetus foris.

Page 203, col. 1, vol. I.—LATIN-ENGLISH.

Father Pay attention, my son! write on your slate this example: if you have 10 apples, 3 plums, 1 pear, 6 cherries; and to these (*his*) are added, 2 apples, 4 plums, 7 pears, 8 cherries; next, 5 apples, 9 plums, 16 pears, 11 cherries; then, 12 apples, 15 plums, 13 pears, 14 cherries; further, 20 apples, 19 plums, 18 pears, 17 cherries; finally, 24 apples, 21 plums, 22 pears, 23 cherries; how many apples are there? how many plums? how many pears? how many cherries?

Charles: Wait a little, my father! the answer is now ready; there are 73 apples; 71 plums; 77 pears; 79 cherries.

F. Right, my Charles! now lay down your slate, and answer me by heart; how many months has one year? *C.* 12. *F.* How many weeks (hebdomades) has one month? *C.* 4. *F.* How many days has one year? *C.* 365. *F.* How many hours has one day? *C.* 24. *F.* How many days have three years? *C.* 1,095. *F.* How many hours has one year? *C.* 8,760. *F.* If you put (reckon) three nuts four times, how much is the total amount? *C.* 12. *F.* If you put (reckon) 5 pebbles 3,657 times? *C.* 18,285.

Page 204, col. 1, vol. I.—ENGLISH-LATIN.

Pater: Carole! in Latinâ linguâ quid est octo? quid duodeviginti? quid duodetriginta? quid undequadraginta? quid quinginti? quid ducenti quinquaginta? Scribe in codicillos tuos hoc exemplum. Si habes viginti mala, sex pruna duo pira, duodecim cerasa; et his adduntur, quatuor mala, octo pruna, quatuordecim pira, sedecim cerasa; deinde, decem mala, duodeviginti pruna, duo et triginta pira, duo et viginti cerasa; tum, quatuor et viginti mala, triginta pruna, sex et viginti pira, octo et viginti cerasa; porro, quadraginta mala, octo et triginta pruna, sex et triginta pira, quatuor et trigiata cerasa; denique, octo et quadraginta mala, duo et quadraginta pruna, quatuor et quadraginta pira, sex et quadraginta cerasa: quot sunt mala? quot pruna? quot pira? quot cerasa?

Carolus: Expecta paulisper, mi pater! jam responsio est in promptu. Sunt centum quadraginta sex mala; centum quadraginta duo pruna; centum quinquaginta quatuor pira; centum quinquaginta octo cerasa. *Pater:* Recte, mi Carole.

Page 204, col. 1, vol. I.—LATIN-ENGLISH.

What o'clock is it? it is ten o'clock; is it six o'clock? it is five

o'clock; the year in which we now live (vivimus) is the one thousand eight hundred and fifty-second since the birth of Christ; my father is in his 64th year; your sister is in her 63rd year; my mother is in her 56th year; your father is in his 58th year; the elder brother is in his 33rd year; the younger brother is in his 22nd year; the elder sister is in her 28th year; the younger sister is in her 20th year; there are a thousand soldiers in the city; two thousand enemies besiege the city; one thing (aliud) pleases one person, another (thing pleases) another; one thing displeases one person, another (thing displeases) another; the soldiers of each army are very brave; each is a vice, both to believe everything, and nothing; the perfidious man reposes confidence in scarcely any one; the friendship of one faithful man has more worth than the society of many unfaithful; the true power of virtue is known to the wise man only: the inhabitants of the whole city are joyful concerning the victory of the army; the life of no man is in every respect happy; I have two friends, and I love both greatly; my friend has two sons and two daughters.

Page 204, col. 1, vol. I.—ENGLISH-LATIN.

Decem milia milites hostium in patriam irrumpunt; mille milites urbem defendunt; urbs a duobus millibus quingentis militum defenditur; duodetriginta millia equitum, et tredecim millia quingenti peditum patriam defendunt; pater mens agit annum quintum et septuagesimum; mater mea agit annum sexagesimum tertium; frater meus major natu agit annum septum et tricesimum, frater meus minor natu agit annum tricesimum; soror mea major natu agit annum tricesimum quartum, et soror mea minor natu agit annum duodevicesimum; quota hora est? undecima; quid annum agis? ago annum alterum et quinquagesimum; habemus fidem neutri, neque infido neque assentatori; nullius vita est beatior quam sapientis; pater ambulat cum duobus filiis et duabus filiabus; duo fidi amici sunt una anima in duobus corporibus; alia aliis placent; aliud alii placet; Deus totius vitae est moderator.

Page 254, col. 1, vol. I.—LATIN-ENGLISH.

So long as you are (shall be) happy you will have many friends; the fight was most frightful, because the soldiers of each army were very brave; we had been in the city before the beginning of the war; there were many great and illustrious orators in the age of Demosthenes, and had been before, nor did they fail afterwards; this thing was not useful to us, but injured (us); if any one is (shall be) endued with virtue, he will always be happy; so long as I am (shall be) contented with my lot, I shall be happy; the action will not be right, unless the will has (shall have) been right; if we have (shall have) been good, the praise of men will not fail; scholars, be attentive; let men be mindful of death; be ye contented with your lot; O my son, be always mindful of the precepts of virtue! the prudent man not only takes care of the present, but also in mind seeks again the past, and foresees the future from the past; good men endeavour to be useful to the good.

Page 254, col. 2, vol. I.—ENGLISH-LATIN.

Milites nostri in pugnâ fortissimi fuerunt; cur milites nostri fuerunt in pugnâ fortiores quam vestri; quamdiu felix eris, non deerunt amici; miseris amici desunt; ante belli initium in urbe fueram; fortes fortibus semper proderunt; inimici mihi obsunt; si eritis virtutis compotes, felices eritis; quamdiu sorte meâ contentus ero, felix ero; discipuli, in scholâ attenti este! illi student esse fortissimi; mi fili, fortis este! prudentes futura ex praeteritis providebant.

Page 254, col. 2, vol. I.*—LATIN-ENGLISH.

I am not ignorant of what your disposition is toward us; I know what your feeling has always been toward us; I am not ignorant of what your disposition, both was before, and now is, toward us; I was not ignorant of what your feeling was toward us; I know how uncertain are the minds of men; think how short is life! of what kind the mind is, the mind itself knows not; think how much good examples are useful to us; I am uncertain where my brother is now; I am uncertain where my friend both has been and now is; I am uncertain where you were yesterday; tell us (narrate), where you were yesterday.

Page 254, col. 2, vol. I.—ENGLISH-LATIN.

Narra mihi ubi sis; narra mihi ubi tui pater et mater sint; nescio ubi soror mea sit; scisne quantum boni pueri suis parentibus prosint? scio ubi filius sit; mi fili, ubi es? sciebam ubi filius esset; incertus sum ubi hostes sint; estne dux nescius ubi exercitus sit? scio quâ mente tu in regem sis.

Page 325, col. 2, vol. I.—LATIN-ENGLISH.

I was praised, thou wast blamed; the city was attacked; I shall be praised, thou wilt be blamed; the city will be attacked; when the city was taken by the enemies, the minds of all the citizens were occupied with great fear; the citizens were greatly disturbed by the enemies; when the fight was most frightful, the sun was darkened by clouds; the wicked after death will be punished with just punishment; the city was attacked by the enemies; the minds of all the citizens were occupied with great terror; if we have (shall have) cultivated learning diligently we shall be presented with beautiful rewards by our parents; when the city was (had been) taken by the enemies, all the citizens were tortured with the most bitter grief; if your children have been well educated by you, you will be praised (laudabimini); let the industrious scholar be praised, let the idle (scholar) be blamed; let the divine laws be conscientiously (sancte) observed by men; be ye entreated, O my (mi) parents (parentes); O my boy, take delight in the study of letters! be entreated, O judge! let the soldiers on a certain day be collected into the city; let not the citizens be contaminated by shameful deeds; a certain peace is better than the hope of (a hoped) victory; the changing of the country (the changed country) does not change the character; grief borne patiently is less bitter; a good man ought to be praised; good parents take care that the manners of their children are amended; take care that in everything a pure conscience is preserved; thou art loved by me, that I may be loved again by thee; I walked yesterday, that my sad mind might be gladdened; our soldiers fought very vigorously that the city might be preserved from ruin; see that you are not blamed by the teachers; a good citizen takes care that the laws are not violated by him; I doubt not that my friend will be released from sickness; no one doubted that peace had been regained; I know not wherefore peace has been disturbed.

Page 326, col. 1, vol. I.—ENGLISH-LATIN.

Pax recuperata est; pax recuperabitur; pax recuperabatur; non dubito quin illi pacem recuperaturi sint; pax turbata est; estne pax turbata? nonne pax turbata est? pax turbabitur; pax non turbanda est; ego laudaber, ille vituperabitur; ille vituperandus est; ille vituperatus est; urbs non expugnata est; O mi pater, ab supplice filiâ exorare! mater exorabatur; sol nube obscuratur; sol heri nubibus obscurabatur; care fili, animus tuus terrore occupatur; meus animus dolore occupabatur; omnium civium animi timore et dolore occupabuntur; adolescentes, ne flagitiis contaminamini! ego te amo, ut ego a te redâmer; pater amandus est; malus puer castigandus est; civitatis leges ab omnibus civibus sancte observantur; divinae leges ab sanctis hominibus observantur; virtutisne praecepta ab urbis adolescentibus observata sunt?

(To be continued.)

* Line 24, for *I am* read *I am not*.

CORRESPONDENCE.

PROFESSOR JAMES THOMSON, L.L.D.

SIR,—In the geometrical department, page 80, vol. 1 of your truly valuable, and widely-spread work, the POPULAR EDUCATOR, you make honourable mention of Irish talent in general, and of Dr. Thomson's in particular, and you "*wonder much, that no memoir of this eminent man has reached you.*" Six months have nearly elapsed since you wrote the above quotation, and yet no pen has sent you an account of Thomson's indefatigable exertions! I am, indeed, surprised! Are we ungrateful for, or unmindful of, the beneficial results of Thomson's noble, and successful labours? No, no, I hope we are not. The vicinity of the spirited town of Ballynahinch, in County Down, was the place of his humble birth, and the scene of his early literary exertions. I am sure, Mr. Editor, you have many talented readers *there*, whose love of native genius will stimulate them to send you a correct and interesting memoir of his life.

Well, sir, I will wait six months longer, full of ardent hope that the POPULAR EDUCATOR will be graced by the name of this great mathematician, whose manly and unceasing perseverance must be a strong stimulant to many of your humble but aspiring students.

Should no memoir reach you before the expiration of that time, I will undertake the task (however imperfectly performed) of placing his name in the literary galaxy produced by such master-minds as those of Franklin, Murray, and Ferguson. On Thomson's account, I hope you will insert this, in the earliest number of the POPULAR EDUCATOR, so that some of your readers—more competent than I am—may at once undertake the pleasing duty of sending you a memoir of this justly-distinguished and truly great man, who, by his steady application and shining talents, graduated from the hearth of the humble cottage to the dignified position of professorship in college-halls, and whose works are an honour to his country and his name. I am, Mr. Editor, one of your most devoted students,

H. H. ULIDIA.

Katesbridge, 15th November, 1852.

PLAN FOR EXTENDING OUR CIRCULATION.

After reading the announcement in the 33rd number of your journal, I determined upon the following plan:—I belong to a society entitled

"The Franklin Society," and I determined to read your announcement publicly. After I had read it, I orally exhorted all who did not take in the POPULAR EDUCATOR to begin to do so, and not only this, but to purchase the *first volume*, and the numbers of the second volume which had been hitherto issued.

I think that if this plan were adopted by all those who attend such institutions as that to which I belong, the circulation of the POPULAR EDUCATOR would not only be largely increased, but its utility would be increased in the same ratio. I hope, therefore, that all your readers and students will exert themselves on its behalf, considering the great amount of talent required to write the articles in the manner in which they are written. I am, Sir, &c.,

J. E.

Broadway-lane, Oldham, 14th Nov., 1853.

ANSWERS TO CORRESPONDENTS.

A. B. (Glasgow): We do not see that drawing includes photography.—JOHN BULL (London): See vol. I., p. 288, col. 2, line 49.—J. D. L.: See p. 411, vol. I., col. 2, line 2 from bottom.—W. RUTHERFORD (Easton): Wrong.—J. SMITH (London): *Up* and *down* partake of the character both of adverbs and prepositions. Copy-books at twopence each for *large-hand*, *middle-hand*, and *small-hand*, may be had at any stationer's in London.—D. S. T. (near Liverpool) should do all that Dr. Beard recommends in his lessons; he cannot do too much: "*work, work, work!*"—EXETER: Bagster's edition of Gesenius' Hebrew Grammar is the best.—I. L. (Duke-street): No.—JACQUES ROUSSELLE (King's Cavil): Bravo!—A SINCERE ADMIRER (Edinburgh): We shall *warn* our drawing-master about the human figure.—JAMES JOHN (Lambeth): Under consideration.—T. M. T. S. (Todmorden): Omissions *will* happen in the most carefully written and printed articles.—G. R. LOCKYER (Brighton): It will be done.—HOMO, &c. (Dundee): Right; have patience.—A. RICHARDS (Crowhurst) may have Cassell's Shilling Euclid sent to his address by post, by sending an order inclosing 1s. 6d. worth of stamps to this office.—X. Y. Z: 1. The Natural History is postponed for a time. 2. The "White Slave" will *not* be published at this office. 3. The "Illustrated Magazine of Art" will be called vol. I. (New Series).—E. S. R. (Belfast): Thanks for his excellent hints.—ONE WHO RISES EARLY (Grimsby): 1. Will be explained in a lesson. 2. Not if you have time. 3. No. 4. Yes. 5. No.—A LADY FRIEND (Walworth): The difference between the OF of the genitive and VON is similar to the difference between *mens's* and *of man*, but VON has other meanings besides *of*.—WYMONDHAM: Certainly health is before every other consideration; we mean health both of mind and body; but remember "that the soul be without knowledge is not good." Do a little by degrees; let no day pass without a line or even a word being newly acquired.—C. M'K. (Paisley): The problem cannot be worked on a plane surface by construction.—QUINTUS (Gloucester) should keep a table of rates ready calculated always beside him to which he can refer; as to other inquiries, he should keep a note-book alphabetically arranged, such as the index to a ledger, in which he should insert the proper answer to each inquiry, so as to be able to refer to the book in a moment and give the answer when required. The poetry is under consideration. We rejoice in his escape.—G. O. (London) will find some instructions such as he wants in the Lessons in Drawing.—E. E. T. (Greenwich): We shall be glad to see the drawings he speaks of.—IGNORANT (Preston) should stick to mathematics, beginning with Cassell's Euclid, and not leaving it off till he has mastered it.—SUFFOLK LORD (Castle-street): The passages to which he refers are not in Dr. Beard's Lessons; let him begin to study at page 150, and as he proceeds, his difficulties will vanish.—A. W. GARRETT (London): In p. 73, vol. I., liber in the gen. is a misprint for liberæ.—DAWSON (Knaresborough): His ingenious communications have been received, and will be noticed ere long.—CONSTANT ADMIRER (Torquay): To query 1. Yes. 2. Most likely. 3. No. Latin being a cognate language, aids the study of Greek.—A. C——R (London): Thanks for her letter.—A YOUNG PUPIL (Wolverhampton): The words "on their behalf" are more correct than "in their behalf;" and "he intends to deliver," than "he intends delivering."—H. WOOD (Mossley): See vol. I., p. 288, col. 2, line 49.—A. F. I. (Hereford): The little finger should be under the hand in writing, and not extended; but the tip of it should be right below the pen.

ROBERT DAWSON (Bathgate): We thank him for his "Taylor's Stenography Improved, with a New System of Phonography founded on it."—INQUIRENDO (Carlisle): We fear that the law is as he has been told.—X. Y. Z. (Manchester): See vol. I., p. 287, col. 1, line 35.—AMANS LITERARUM (Aberchider): We recommend strongly to the attention of our readers a *list* entitled "Bibliotheca Scriptorum Græcorum et Romanorum," or a "New Collection of Greek and Latin Classics," published by B. G. Teubner, Leipsic, and to be had of Mr. D. Nutt, 270, Strand, London; they are the cheapest we have seen, and as Mr. Nutt is the agent, they may be easily had by order from him. Homer's works, the "Iliad" and "Odyssey," may be had in 4 parts at 1s. each. Virgil for 1s. 6d. Horace for 1s. Livy, in 6 parts, at 1s. 4d. each, &c., but *write* for the list to the agent.

W. JAMES (Russell-square): The sentence with *sussi* is evidently according to rule. Whenever the educational movement is revived, we shall be glad to enlist him in the cause.—T. BOYLE (Crayford) wishes to know the value, as an old coin, of a silver penny of Queen Anne, dated 1700.—STUDENT (Droxford) has written L.S.D.; we know of no degree answering to these letters.—H. LONG (T——e): Cobbett is wrong in his derivation of orthography.—C. BATEMAN (Clonakilty): Right on penholding, and on R. C. Typo's problem; the demonstration is wanted.—A LEAGUE OF SUBSCRIBERS (Willenhall) will oblige us by a more distinct statement of their wishes.—R. B. (Taunton): See vol. I., p. 320, last two lines, second column.—X. Y. Z. (Brierley-hill): There is nothing to hinder you from matriculating in 1854, if you have a mind; see No. 36, Dec. 4.—D. MALLINSON (Wike): We shall give a solution as soon as possible.—A SCHOLAR (Banff): See vol. II., p. 196, col. 1, beginning of seventh paragraph.—M. E. S. (St. Austell): Not *perfectly* useless, because the French exercises have a certain connexion with the English exercises; and if carefully studied they assist each other.—YANKEE (Cottingham) recommends the following recipe for taking ink spots out of paper, having often tried it: Mix half an ounce of nitric acid with the same quantity of oxalic acid, in half a pint of rain water, and apply the mixture with a camel's hair pencil; the paper must be washed with clean water after every application of the solution; but beware of the poison. The "Uncle Tom's Almanac" must be treated as a periodical.—Mathematical solutions have been received from T. BOCOCK (Great Marlow); E. L. JONES (Pembroke); OMEGA (Dalbeattie); E. C. HUGHES (Islington); E. J. BREMNER (Carlisle); T. MORLEY (Bromley); W. P. RANKIN (Seekamore); AGRICOLA (Belfast); H. RICHARDSON (Manchester); G. W. C.; J. SIFTON jun.; J. H. EASTWOOD (Middleton).

C. GARTON (Derby): Not decided.—J. H. TONGUE: You would infringe on copyright.—LEBA GNIMELF (Broughton-in-Furness): Q. E. D. in Euclid means Quod Erat Demonstrandum, *Which was to be Demonstrated*. When we said that Webster's large dictionary is a dead bargain at 16s., we meant, of course, the large dictionary in two volumes quarto. We see that it is republished in this country at 31s. 6d., and that an abridgement of it is published at 16s.—J. B. CRABTREE (London): We asked Mr. Killick's shopman what was the meaning of *anaphalon*, as applied to a new shirt manufactured by him, he told us that it meant *a new fit!* Of course, the Greek termination *on* makes the whole good English, thus, *a-new-fit-on*, that is, *anaphalon!!* Probably, the inventor of the term derived it from the Greek anuphaino, *I weave anew*. As to the History of England, there are introductory works such as Keightley's and Cassell's. There is also an abridgement of Alison's History of Europe by himself.

J. SUMNER (Stratford): Yes—1839; there is no rule for the pronunciation of proper names, except the usage of good society.—DOUGLAS (Glasgow): His questions will be answered in lessons to come.

GERMAN.—J. DUGUID (Aberdeen): The rules laid down are so plain that they will answer all your queries by reading them attentively; in reference to ö and ü, pronounce ö as u in skull; ü as u in fusilier, vue; äu and eu, only the ear not the eye can learn those sounds, and they can only be observed by a very correct pronunciation from a German. **C c** is sounded everywhere, where it occurs, except **ie**, which makes the i long, and is pronounced ee, as, lieber, pronounced leeber; **Briefe**, deeses. **Stahl** and **Stahl** both are right. **G** before **h** is sounded as in the English word chorus. In the beginning of a word **Ch**, whether followed by a consonant or a vowel, is pronounced like *k*, as **Christ**, Christ. Few words beginning with **Ch** are strictly German, and many retain the pronunciation of their original language. If **ch** is followed by the consonant **s**, it is pronounced like *x*, as, **Fuchs**, pronounced axel; **Ochs**, ox; **Flachs**, flax; **sechs**, sex. We strongly recommend all our German pupils to read the rules more carefully, and their difficulties will gradually disappear.—UNCLE TOM is right; see erratum.—F. KRÜGER.

ERRATUM.

No. 35. Vol. II. p. 136, line 24, for **machen** read **manchen**.

LITERARY NOTICES.

THE ILLUSTRATED EXHIBITOR AND MAGAZINE OF ART—A new and improved Series of this work, under the title of the ILLUSTRATED MAGAZINE OF ART, has just commenced. Each Number will in future be enclosed in a neat wrapper, price 3d. In addition to numerous Engravings in the text, it will contain a fine Engraving, worked on Plate Paper. With Number 1, is presented, gratis, a splendid View of the Interior of St. Paul's Cathedral, during the Interment of the late Duke of Wellington; printed upon fine Plate Paper, measuring eighteen inches by thirteen. This Engraving alone is worth four times the cost of the Number of the MAGAZINE OF ART.—No. 2 contains a splendid Portrait of W. Dargan, Esq.; a View of the Exhibition Building, Dublin; a splendid Engraving of the Schoolboy, from a Painting by Sir Joshua Reynolds, &c., &c.

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The PATHWAY, a Religious Magazine, price 2d. each Number, enclosed in a neat wrapper. The Fourth Volume has just commenced—Vols. I. II. and III., price 2s. 3d. each, neatly bound, are now ready.

Printed and Published by JOHN CASSELL, La Belle Sauvage Yard, Ludgate-hill, London.—January 8, 1853.

LESSONS IN DRAWING.—No. III.

ELEMENTARY FORMS, AND LINEAR DRAWING.

The greatest impediment to the progress of many a pupil is most likely to arise from his impatient desire to arrive, without a moment's delay, at the power of making a drawing. Irregular and misdirected efforts in copying drawings of cottages and stumps of trees, appear to be a much more pleasant task than the performance of exercises so arranged as to lead the student from the knowledge of one principle to an acquaintance with another; nevertheless, the latter is essential to him who wishes to be master of drawing. The training of the hand and the eye which such exercises are calculated to impart, will make the copying of a large number of simple figures as easy as it is to make alphabetical characters by the conjunction of "straight strokes, pot-hooks, and hangers." The simple figures we are setting before you in these early lessons constitute in fact the alphabet of drawing, and with these, if you would make yourself a sound draughtsman, you must become well acquainted; for just as the combination of letters, syllables, and words, forms in the printer's hands either a poem or an auctioner's catalogue, so does the application of the elements of linear drawing constitute, in the hands of the artist, an historical picture, a portrait, a landscape, a design for an ornamental framework, or the plan and elevation of a building. Unacquainted with these elements, how much industry, and even talent, has many a youth thrown away! Let us take an instance of such a youth. He makes his earliest essays, it may be, at copying some finished production, or some elaborate engraving. He tries his best to produce a neat and accurate copy; and he endeavours to give the details of his original with a praiseworthy degree of patient labour—but when all is done that he is able to do, his copy proves to be a failure in some essential points. It is out of proportion; the perspective lines are not given correctly; the curve-lines may not be zig-zag, but they want the easy sweep of his exemplar; they are full of *shoulders* and joints; and the perpendiculars are not upright, nor are the horizontal lines at right-angles to them. When the first ardour of execution has abated, he perhaps discovers these faults himself; and if he makes the common mistake of supposing that the *art* of drawing is a *gift*, and that the pencil is a magician's wand, manifesting its powers only in the hand of some rightful owner, he may then lose heart, and think that his faculties are not adapted for the pursuit of this noble art. If any of our readers have unfortunately stopped at this point of their studies, let them recover their confidence, and prosecute their favourite pursuit under our guidance. The good method of practice, and the intelligible principles which we propose to explain and set before them, will so lead their hand and their eye, that ultimately they will accomplish all their desire.

Well directed application does wonders in other arts, and why not in drawing? What exercises does not a musician or a singer go through, before he gets command of his voice or fingers? Who expects to arrive at that dazzling rapidity of motion visible in the touch of the violin player, certain and instantaneous though it be, by any other method than that of hard and constant practice? Would not he who should begin to learn the use of any instrument by attempting complete airs, and always turning aside from the exercises which a master prescribes, be sure to end where he began, and become no player? Think what an amount of labour is necessarily expended in *fingering* by the young pianoforte player. Greatly less labour than is necessary in prosecuting many other arts, will make an able draughtsman, fit him for the performance of many useful works, and imbue him with those principles of drawing which are applicable throughout the whole range of this art.

Having laid these considerations before you, we proceed to complete our view of the elementary forms on which outline is founded. There now remains to describe a few of the principal curves. The definition of a curve is, that it is *a line of which no part is a straight line*, or it is a line which is continually changing its direction. The most important curves are derived from the sections of a cone.

A cone is a solid figure in geometry having its form very similar to that of a "sugar-loaf." Take any right-angled triangle and turn it round on one of the two sides which contain the right angle until the other has described a complete circle—and imagine every point in the triangle to become solid at every instant as it moves round—you will then be able to see, by fig. 31, that this

Fig. 31.

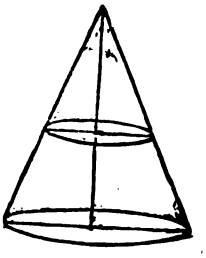
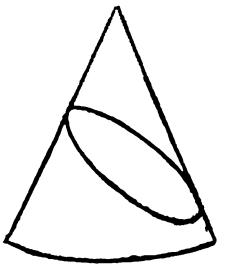


Fig. 32.



movement may be conceived to *generate* a solid. The term *generate* will be understood by supposing that the points of the solid start into existence as the triangle moves round. This solid is called a cone; and because the side of the triangle on which it turns, which is called the *axis* of the cone, is at right angles to the circle described by the other side, this solid is called a right cone. The pointed extremity of the cone is called the *vertex*, and the circle on which it stands is called the *base*.

Now, suppose this solid to be cut through at a point in one side between the vertex and the base by a plane parallel to the base, as in fig. 31, the section will be a circle; with this curve you are already acquainted. Now suppose the cone to be cut through at the same point by a plane still passing through both sides, but not parallel to the base, as in fig. 32; the curve forming the outline of this section is called an *ellipse* (pronounced *el-lip's*). Like the circle, this curve encloses a certain *area*, or superficial space; and it may be roughly described as a kind of circular figure with unequal diameters. An easy method of describing the ellipse is shown in fig. 33. Take a thread, and fasten its extremities to two fixed points F′ and F on a board; then, keeping the thread always stretched by a pencil placed as at M, move the pencil round and round, and you will describe the curve or ellipse. The two diameters drawn at right angles to each other, and passing through the central point of the figure, are called—the longest, the *major* axis, and the shortest, the *minor* axis.

Fig. 33.

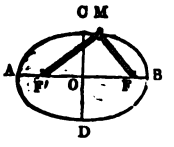
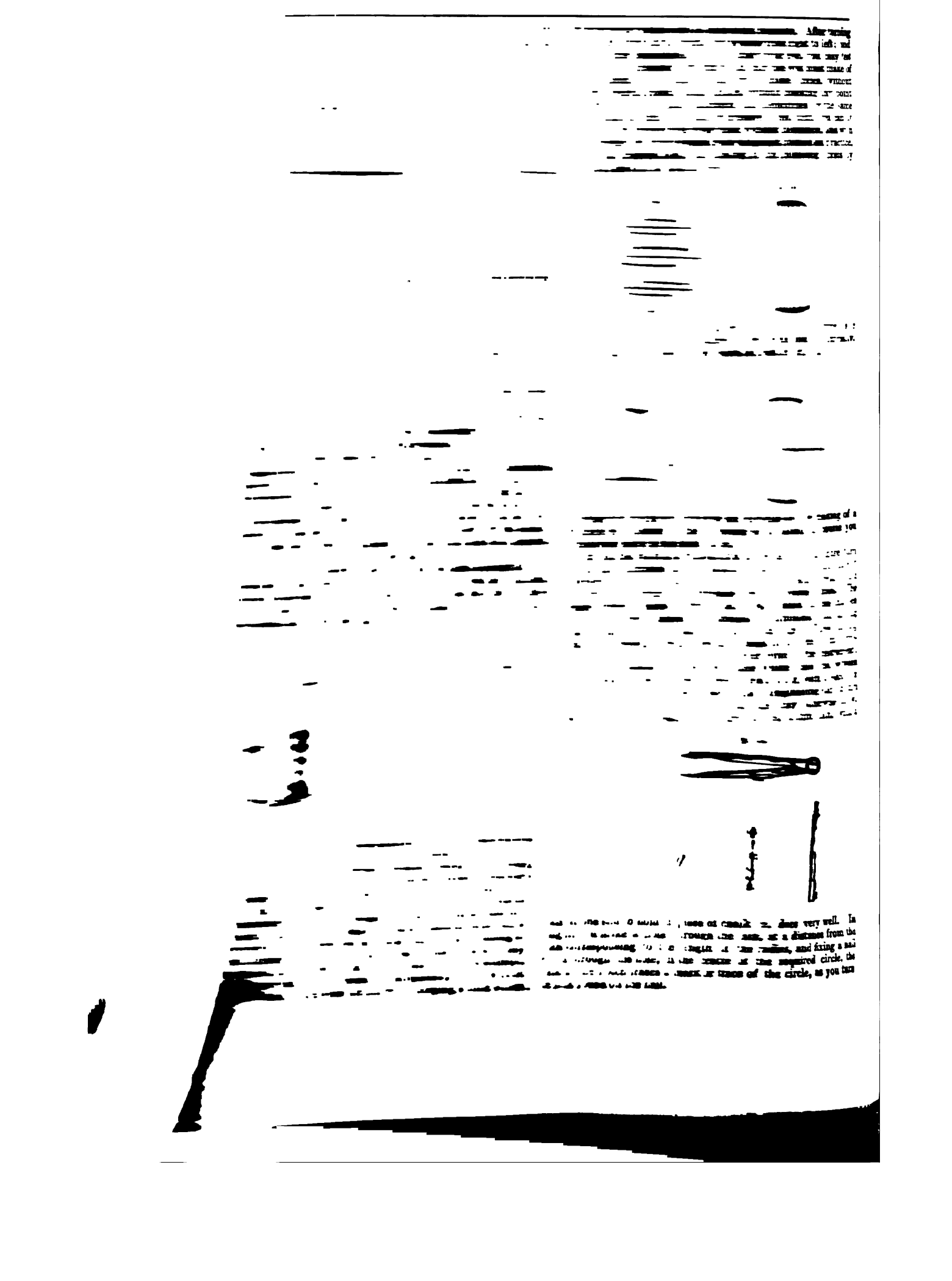


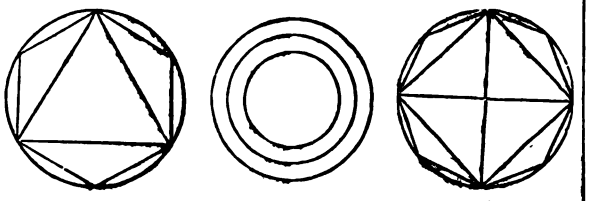
Fig. 34.

Next, suppose the cone to be cut through the same point as before, by a plane parallel to one of the sides of the cone, as in fig. 34. The curve thus formed is called a *parabola* (pronounced *pa-rab'-o-la*). This curve does not enclose a space. When divided by what is called its principal diameter, as A x in fig. 35, it is seen to have two similar and equal branches A M, and A M′ of an extent only limited by the cone of which it is a section. The point F is called the *focus*, and the straight line L L′ the *directrix* of the parabola.



Draw parallel circles, and the regular polygons mentioned in last lesson, with circles touching all the angles, see fig. 44.

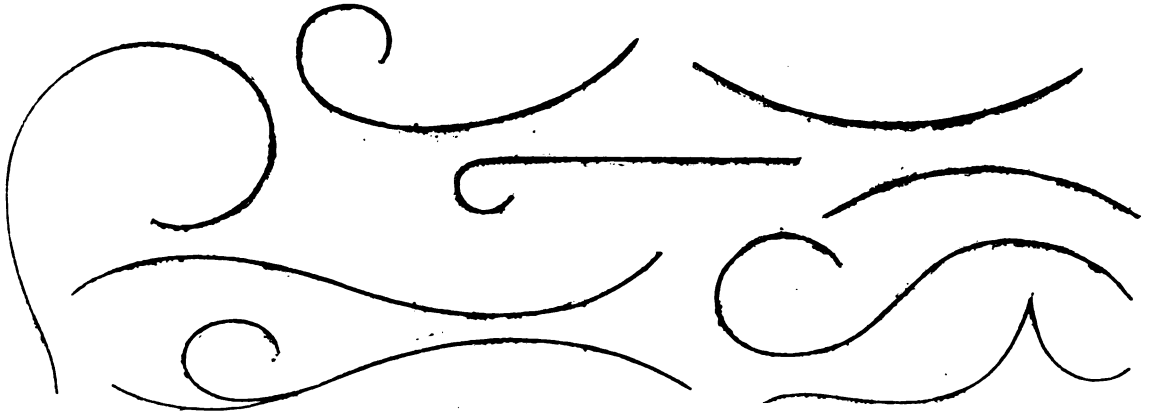
Fig. 44.



Draw, also, lines composed of parts of circles. Then draw *sweeps*, and straight lines joining on to circular curves. In the curve lines, the component arcs of circles or other curves may be equal or unequal, as seen in fig. 45.

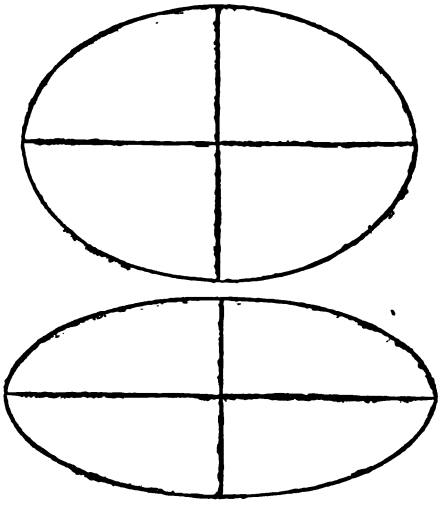
These lines must be drawn at once, no piecing or joining being allowed; you may make them of any length you please, and you should draw them in all directions, horizontally, perpendicularly, and at all angles of inclination. Careful practice of this nature will be especially useful to those pupils who have an inclination to ornamental design.

Fig. 45.



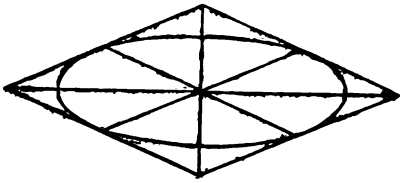
The circle is a curve of uniform character, a small circle being a correct miniature of a large one. It is not so, however, with the ellipse; the varieties of its form are infinite, all depending on the proportions of the *major* and *minor* axes, see fig. 46.

Fig. 46.



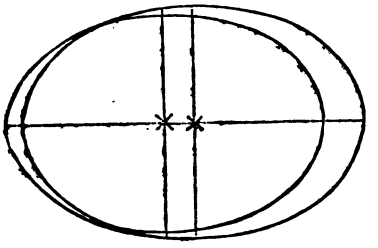
The proper lengths of these axes being determined, you will see by the preceding figures that they divide the curve into four equal and similar parts. An ellipse may be drawn by hand by a careful attention to this property. Draw the diameters in the first place, and then if you mark points, as in the case of the circle, you will not find it very difficult to produce a neat curve. In a rhombus, which is, as you know from the last lesson, a figure with four equal sides in parallel pairs, draw lines joining the angles, and bisect (that is, halve each side), joining the bisecting points. You will then get a figure in which it is easy to describe an elliptical curve. When a square is treated in this manner the curve becomes a circle, see fig. 47.

Fig. 47.



Curves of an elliptical shape are perhaps more prevalent in natural forms than those of any other kind. The three classes of form—the bell-shaped, the horn-shaped, and the egg-shaped or oval (from Lat. ovum, *an egg*)—take in a vast number, and the variable form of the ellipse renders the varieties of these shapes inexhaustible. Fig. 48 will show how the egg-shape or oval tapering at one end is formed from two ellipses sweeping into each other.

Fig. 48.

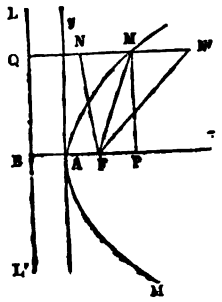


This form is seen also in the general outline of the human face.

Exercises on linear drawing will be continued in the next lesson. And at this point it will be proper to say a few words on the materials used in these lessons, for it is absolutely necessary that you should practise the drawing of the same forms again and again, until you have mastered them. It is, therefore, recommended to all to use, instead of paper and pencil, *the black-board and a piece of chalk*. The board may be made of deal from a third of an inch to half an inch in thickness, two feet in width, and two and a half feet in length. It should be *squared*, that is, the sides should be made truly at right angles to each other at all the corners. You

Again, suppose the cone
a plane which is neither

Fig. 35.



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Latin words.	*Stems.*	*English words.*
clino, *I bend, lie*	*clin*	*clinical*, re*cline*
clivus, *a slope*	*cliv*	de*clivity*, ac*clivity*
coelum, *heaven*	*cel*	*celestial*
colo, *I cultivate, inhabit*	*col*	colony
comes, (comitis), *a com-* [*panion*	*comit*	con*comitant*
copia, *plenty*	*copi*	*copious*
coquo, *I cook*	*coc*	*co(o)k*, *to cocker*
coctus, *cooked*	*coct*	de*coction*
cor (cordis), *the heart*	*cord*	*cordial*, con*cord*
cornu, *a horn*	*corn*	uni*corn*, *cornet*
corpus (corpŏris), *the body*	*corpus*, *corpu*, *corpor*	*corpus*, *corpuscle*, *corpulent*, incor*porate*
cras, *to-morrow*	*cras*	pro*cras*tinate
credo, *I believe, trust*	*cred*	*cre(e)d*, *cred*ulous, *cred*ible, *credit*
cremo, *I burn*	*crem*	*cremation*
crux (crucis), *a cross*	*cruc*	*crucify*
cubo (cumbo), *I lie*	*cub*, *cumb*	incubation, incumbent
culpa, *a fault*	*culp*	*culpable*, *culprit*
cura, *care, cure*	*cura*, *cur*	*curator*, sine*cure*

The meaning of many of the words given as examples the student will either know already or may deduce from the etymology. In other cases some additional aid may be required. That aid I shall supply in quotations and in such remarks as the several topics may seem to require.

"Those milks (in certain plants) have all an *acrimony*, though one would think they should be lenitive."—*Bacon*, "Nat. Hist."

"Most satyrists are indeed a public scourge,
Their mildest physic is a farrier's purge,
Their *acrid* temper turns, as soon as stirred,
The milk of their good purpose all to curd." *Cowper.*

Acer is properly that which is sharp as the point of a spear, or the edge of a sword, that which pricks or cuts; whereas acerbus (*acerbity*) denotes that which is bitter to the taste.

According to its derivation, edification is *house-building*. The spiritual house is intended, the metaphor being borrowed from the diction of the New Testament. Consult 1 Cor. iii. 9; xiv. 3; Ephes. ii. 21; iv. 12, 16.

"So that it is by the *equilibre* of the muscles, by the aid of a considerable and equipollent (equally powerful) muscular force in constant exertion, that the head maintains its erect posture."—*Paley*, "Nat. Hist."

"Government has coercion (*restraint*) and animadversion upon such as neglect their duty."—*South.*

Articulation is properly the making of articles, that is, small limbs or joints; hence dividing a flow of sound so as to produce separate and distinct sounds, that is letters and syllables. This power belongs only to man. Accordingly, Homer, that great master of distinctive and descriptive epithets, gives as the characteristic of the human race that they *articulate*.

"The first of these, at least, I thought denied
To beast, whom God on their creation-day
Created mute to all *articulate* sound."
Milton, "Paradise Lost."

"The former (*fore*) legs of this animal (the elephant) appear when he standeth, like pillars of flesh without any evidence of *articulation*."—*Brown*, "Vulgar Errors."

"Père Bougeant's third volume will give you the best idea of the treaty of Munster, and open to you several views of the *belligerent* and contracting parties."—*Chesterfield.*

Derivatively considered, *to combine* is to put things together in pairs, but it is employed without this restriction to signify to put together generally.

"The impediments were—first, the negligence of the pastors; secondly, *combinations*, that is, double benefices, when men having two cures could not sufficiently attend both."—*Hales.*

"Few painters have obliged us with finer scenes, or have possessed the art of *combining* woods, lakes, and rocks into more agreeable pictures, than G. Poussin."—*Hurd.*

It is curious to see in *incubation*, the act of the hen in setting on her eggs, and *incumbency*, the condition of a clergyman as occupant of a living, how the same stem, and very nearly the same letters, may come to signify things so very unlike.

Cadaverous comes immediately from cadaver, *a corpse*, and denotes the colour or complexion of a corpse. Cadaver, *a corpse*, by its etymology points out the fact which denotes death, namely, *falling*, from cado, *I fall*. A dead body cannot stand.

"The subject of the present chapter will be the offence of *homicide*, or destroying the life of man, in its several stages of guilt, arising from the particular circumstances of mitigation or aggravation which attend it."—*Blackstone*, "Commentaries."

Homicide, that is, in its corresponding Saxon term, *manslaughter*, denotes the general act of man-killing, leaving it to be decided whether the killing was or was not murder, that is, premeditated killing. Unpremeditated man-killing is generally termed manslaughter, as contradistinguished from murder. It deserves attention, that not one of these words, homicide, manslaughter, man-killing, murder (Ger. mord, *murder*; Fr. mort, *death*; Lat. mort, and Gr. moros, *death*), conveys in itself the idea of "malice aforethought."

Clinical is a scientific word, and like most of our scientific words may have come to us from the Greek; for the Greek *klino* is the root of the Latin *clino*, and is similar to it in import. A clinical lecture is a discourse on a disease, delivered by the bedside of the patient. A clinical convert is one that is converted on his deathbed. In the early history of the churches, those were called *clinici* or *clinical*, who, wishing to have all their sins washed away at once, postponed baptism till their dying hour. See Gibson's remarks on the delay of baptism by Constantine, miscalled the great.

"Horror stalks around
Wild staring, and his sad *concomitant*
Despair, of abject look." *Philip.*

"I persuaded her to take as hot as she could well drink it, every morning, a full draught of the *decoction* of centaury boiled in beer or ale."—*Bayle.*

Cordial, of Latin origin, has a corresonding word from the Saxon, that is, *hearty*. This is by no means a solitary case, as will appear from the ensuing list:—

Latin.	*Saxon.*
timid	fearful
velocity	swiftness
effeminate	womanish
edifice	building
paucity	fewness
altitude	height
annual	yearly
aqueous	watery
auditor	hearer

In *incorporate*, *animadvert*, and other words, the student is expected to make use of the information which he has already had supplied to him regarding prepositions in combination, as well as regarding prefixes and suffixes.

"Cremation, *burning*, is applied particularly to the ancient custom of destroying corpses by fire. The Chinois, without *cremation* or urnal interment of their bodies, make use of trees and much burning, while they plant a pine-tree by their grave."—*Brown*, "Urn Burial."

Capillary signifies that which is *like hair*; hence it is applied to the small vessels of the body, as the ramifications (branches) of the arteries, "the capillaries;" also to tubes; and attraction in tubes as fine as hair, is called "capillary attraction."

"A strict and succinct style is that where you can take away nothing without losse, and that losse to be manifest."—*B. Jonson.*

"To translate him line for line is impossible, because the Latin is naturally a more succinct language than either the Italian, Spanish, French, or even the English; which by reason of its monosyllables, is far the most compendious of them."—*Dryden.*

The idea in succinct, *girded*, is taken from the custom prevalent among the ancient Greeks and Romans of gathering up and binding around the waist their long flowing robes, when they were about to apply to any manual occupation. Compare Is. viii. 9; John xiii. 4, 5.

Exercises for Parsing.

Some have termed the "Songs of Solomon, or the Canticles," a Hebrew Epithalamium. The rage for autographs seems to have in a measure subsided. The autographs of the writers of the New Testament are not known to exist. The word apology sometimes signifies defence rather than excuse. The former is the older meaning of the term. The monuments of Egypt are covered with hieroglyphics. The hieroglyphics of Egypt have for the most part been at length deciphered. Exodus is the name borne by the second book in the Bible. This name was given to the book because it recounts the departure of the children of Israel out of the land of Egypt.

COMPOSITION.

Words with their proper Prepositions to be formed into sentences.

Words.	F. R.
Clear of,	clarus, *bright, distinct*
Coalesce with,	coalesco, *I grow together*
Coincide with,	cum, in, cado, *I fall in with*
Commune with,	communis, *common*
Commit to	cum, mitto, *I send with*
Communicate to,	communico, *I communicate*
Compare to (in respect to quality), Compare with (by way of illustration),	compare, *I compare, match*

CONVERSATIONS ON ENGLISH GRAMMAR.—No. IV.

English Dictionaries.

"I find the study of those Greek stems difficult."—"Every study is difficult at the first, and often is a study the more difficult the more valuable it is, both for the information it contains and for the mental discipline which it gives. Pursue the course which the Lessons in English take, exactly in the order in which it is presented, and master each lesson in succession."—"If by mastering you mean that I should thoroughly comprehend and retain in mind every part, I must candidly tell you that I am unable to do so."—"Why? every word likely to cause difficulty is explained, and an example of its import and use is given; the etymology of the words is, too, so set forth, that I should have thought you would, from that alone, have been led to the several meanings."—"Well, I have, I believe, made out the meanings of some of the words from a knowledge of their constituent elements."—"Doubtless you have, and with practice you will succeed in thus making yourself acquainted with them all; it is by this means that I have learnt the import of thousands of the words with which I am familiar."—"O you have had good dictionaries."—"True, I possess good dictionaries, but the best dictionaries will not suffice to give anyone even a verbal knowledge of a language; and I assure you it is very possible for a dictionary to be so used as to be a hindrance to a real, and thorough, and exact acquaintance with a language. A dictionary is a very good servant, but a very bad master. A slavish use of a dictionary retards and obstructs even a verbal knowledge of a language. You should aim to become your own dictionary; and to a great extent your own dictionary you may become, if you take the trouble to make yourself familiar with the roots of the English. Do you think you would ever acquire a knowledge of the steam-engine, so as to be able to make an engine yourself, if you confined your inspection to its exterior? The way to know how to put a steam-engine together is first to take it to pieces, and then carefully to examine the structure and use of every part."—"Yes, brother, there is sense in that; I had a proof last week: I took my watch to be repaired, and as I stood there at the counter chatting with the watchmaker he began to take my watch to pieces; my curiosity was excited, I watched every step, and when he had done (or rather undone the watch), he explained to me the use and function of every part. To-morrow I am to go to see him put the parts together."—"A very good illustration; now you would understand what you see to-morrow very imperfectly if you had not seen the watch taken to pieces, and if, further, you had not carefully marked and studied every piece of the machinery. After all, your knowledge of the structure and the movements of the watch will remain very much inferior to the watchmaker's knowledge; why?"—"I suppose, because he is more exactly and more thoroughly familiar with the several parts."—"Exactly; apply this to a language; it is the parts or the elements of the English language that I want you to be master of, well knowing that when you are so, you will know and write the language well; but without that mastery you must not expect to become a proficient in our tongue. You did not, I fancy, entrust your watch to the watchmaker's apprentice?"—"I should be very sorry to do so."—"Why?"—"Why? because he is an apprentice, and a young one too."—"Very well, you thought he did not understand his business; and if he did not understand his business, it was chiefly because he was unacquainted with the structure and uses of the parts of your watch."—"But why take the watch to pieces in order to acquire that knowledge?"—"Simply because that knowledge cannot well be otherwise acquired. I dare say you have looked at your watch very often."—"O yes, and I have tried to look *into* it—but never could get to know much about its works, or its operations."—"No, and long enough might the watchmaker's apprentice look at and look into his master's watches before he would acquire the knowledge and skill requisite to make him *a watchmaker*. Now, in regard to the English, you wish to be a watchmaker, that is, you wish to write good English—how can you succeed unless by learning the parts of the structure with which you have to deal? No, no; you must follow the watchmaker's practice, you must take the language to pieces, study those several pieces, and then try to put them all together bit by bit. In this operation everything depends on your acquiring a correct knowledge of the several component parts. Therefore study etymology, study the Greek, Latin, and other stems. If you fail in this you will be, and you will remain, in the condition of the watchmaker's apprentice."—'Surely, I may become a master by studying a good English dictionary."—"Never; the mere use of the dictionary is like *looking at the watch on the outside*; at the best you will thus look only a small way into it, and after all, having given much more trouble than would be necessary to acquire the language thoroughly with the aid of etymology, you will, whatever efforts you may make, acquire nothing more than a superficial acquaintance with English. The etymological study of a language is the only wise and proper one; it is also the shortest and the easiest in the long run."—"What do you mean by 'etymological study?'"—"That study which is founded on etymology or a knowledge of root-meanings, a knowledge of the meanings of the component parts or the elements of a language. Etymology is the A, B, C, of a language; and as you cannot write without knowing 'your alphabet,' so you cannot read without knowing the materials you have to employ. I fancy I should ill succeed in your cabinet-making. Why?"—"For one thing you don't know the tools."—"No; but the tools of the English language I do know, and want to teach you what they are, and what they are for. Therefore study the Greek and Latin stems or roots."—"But you do not forbid the use of a dictionary. Some of the words given in the lessons I cannot make out—what am I to do?"—"Consult a good English dictionary. I am not against the proper use of a dictionary; it is the abuse of a dictionary I wish to guard you against. Do not expect too much from a dictionary. Do not place your reliance on a dictionary. Do not fly to a dictionary the moment you meet with a word you do not understand. Instead of consulting the dictionary, consult your own head. Surely you will be better off if you carry a dictionary about with you."—"Yes, I will get a pocket dictionary."—"No! *no!* I don't meant *that*; pocket dictionaries are of little more use than "pocket pistols;" it is a head-dictionary that I wish to recommend; if you have a dictionary in your own head you will never be at a loss; and the way to acquire such a treasure is by systematic study—the etymological study of the English tongue."—"Still you think a dictionary may be useful; what dictionary do you recommend?"—"I think it indispensable that you should possess a good English dictionary; talent and industry of the first class might do without a dictionary; and you yourself will fail in your duty if you do not learn far more without than you learn by means of a dictionary; nevertheless, there are occasions when a dictionary is useful, not to say necessary, and on that account I will set before you means for determining which of the dictionaries of the English language you should purchase; but enough for the present."

LESSONS IN ARITHMETIC.—No. XI.

PROBLEMS IN VULGAR FRACTIONS.

(Continued from page 134, vol. II.)

13. Having in our former lesson on vulgar fractions explained their nature and the principles of operation employed in their management, we now proceed to show the application of those principles in the solution of those problems which are usually to be found in treatises of arithmetic.

Problem I.

To reduce a vulgar fraction to its lowest terms.

Definition 5.—When a vulgar fraction is expressed in the simplest form which it will admit of, it is then said to be in its *lowest terms* (art. 9, p. 134). Thus, the vulgar fraction $\frac{12}{16}$ is capable of being expressed in the form $\frac{3}{4}$; because by dividing both the numerator 12, and the denominator 16, by the same number 4, which is the greatest common measure or divisor of these terms (see p. 56, vol. II.), its value is not altered (art. 10, p. 134), and it then assumes the simplest form which it will admit of, viz., $\frac{3}{4}$; *this*, then, is the fraction $\frac{12}{16}$ in *its lowest terms*.

Rule 1.—*Find the greatest common measure or divisor of the terms of the fraction, that is, of the numerator and the denominator* (p. 56, vol. II); *and divide both of them by this common measure; the quotients will be the lowest terms of the fraction, that is, they will be the numerator and the denominator respectively, of the fraction in its lowest terms.* Note: If the greatest common measure should be *unity* or 1, the fraction is already in its lowest terms.

Rule 2.—*Apply the theorems relating to the factors or divisors* (given in p. 56, vol. II.) *of numbers, by dividing both the terms of the*

fraction by any divisor which may be found upon trial COMMON TO BOTH; *do the same with the fraction which results from this operation, and with the next, and so on, until it be found that the fraction, ultimately resulting, has no common divisor; this will be the given fraction in its lowest terms.* Note: If the greatest common divisor of the terms of a fraction involves a prime number not included in the theorems above mentioned, and not otherwise determinable from the nature of the numbers themselves, this method will fail in reducing the fraction to its lowest terms; recourse must then be had to Rule 1.

RULE 3.—Resolve the terms of the fraction into their prime factors (see pages 55 and 56, vol. I.), and cancel those factors which are common to each; the products of the remaining factors of each will be the lowest terms of the given fraction respectively.

EXAMPLE TO RULE 1.—Reduce the fraction $\frac{465}{285}$ to its lowest terms.

1. To find the greatest common divisor.

285)465(1 (*a*)
285
180)285(1 (*b*)
180
105)180(1 (*c*)
105
75)105(1 (*d*)
75
30)75(2 (*e*)
60
15)30(2 (*f*)
30

Here, the greatest common divisor is 15.

2. To find the lowest terms.

Here, $285 \div 15 = 19$, and $465 \div 15 = 31$.

Whence, $\frac{19}{31}$ is the fraction $\frac{285}{465}$ in its lowest terms.

EXAMPLE TO RULE 2.—Reduce the fraction $\frac{8844}{18018}$ to its lowest terms.

Here, by employing the first and third theorems in p. 56, and dividing both terms of the given fraction and of the successively resulting fractions, by the common divisors (16), (8), and (3), we obtain the answer required; as in the following scheme, where we have put the common divisors above the fractions to which they belong, the resulting fractions being those on the right of each:—

$$\frac{8844}{18018} \overset{(16)}{=} \frac{552\frac{3}{4}}{1126\frac{1}{8}} \overset{(8)}{=} \frac{69}{141} \overset{(3)}{=} \frac{23}{47}$$ lowest terms.

EXAMPLE TO RULE 3.—Reduce the fraction $\frac{672}{1440}$ to its lowest terms.

1. To find the common factors of each term.

2)672	2)1440
2)336	2)720
2)168	2)360
2)84	2)180
2)42	2)90
3)21	3)45
7	3)15
	5

Here, $672 = 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 7$;
and, $1440 = 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5$.

2. To find the lowest terms.

Here, cancelling the factors 2, 2, 2, 2, 2, and 3, which are common to each term, the remaining term in the numerator is 7, and the remaining terms in the denominator are 3 and 5, whose product is 15. We have the answer, therefore, as follows:—

$\frac{672}{1440} = \frac{7}{15}$ lowest terms.

Of these three rules for reducing a fraction to its lowest terms, the first is generally the most easy of application, and the most universally employed by arithmeticians. It is tedious, however, in its operation, and irksome in the case of large numbers. The following method of abridging the processes both of finding the greatest common divisor, and of finding the lowest terms, will be acceptable to our students:—

1. To abridge the process of finding the greatest common divisor: Arrange the dividends and divisors in two separate columns, and the quotients into two exterior columns alongside of them; then carry on the process of division as usual, in each alternate column, each remainder becoming in its turn first divisor and then dividend. Thus, taking the example already given under rule 1:—

Quotients.	Dividends and Divisors.		Quotients.
(*a*) 1	465	285	1 (*b*)
	285	180	
(*c*) 1	180	105	1 (*d*)
	105	75	
(*e*) 2	75	30	2 (*f*)
	60	30	
	15	·	

Here, the last divisor 15 is the greatest common divisor, as before.

EXPLANATION.

In this example, the 1st dividend is 465, and the 1st divisor 285; these are arranged in separate columns, and the 1st quotient, 1, is put *on the left* of the dividend; the product of the 1st divisor and 1st quotient is put under the 1st dividend, and subtracted from it; the 1st remainder 180 now becomes the 2nd divisor, and the 1st divisor the 2nd dividend. The second quotient 1, is now put *on the right* of the 2nd dividend; the product of the 2nd quotient and the 2nd divisor is put under the 2nd dividend and subtracted from it; the 2nd remainder 105 now becomes the 3rd divisor, and the 2nd divisor becomes the 3rd dividend. This process is carried on in the same way, until the last divisor 15 is obtained, and there is no remainder. This divisor 15 is the greatest common divisor.

In order to render this explanation clearer, we have marked the quotients in the above operation, which correspond with the quotients in the example to Rule 1, with the same letters, *a*, *b*, *c*, *d*, *e*, and *f*.

2. To abridge the process of finding the lowest terms: Arrange the first dividend and all the divisors in succession from the first to the last; then, under each divisor put the quotient which belongs to it. In a new line, put 1 under the last divisor, and put the number which is under it in the preceding line also under the *second* last divisor in the new line. Multiply the number under this divisor in the first line by the number under it in the new line, to the product add the number to the right of it in the new line, and place the sum under the *third* last divisor in the new line. Then, multiply the number under this divisor in the first line by the number under it in the new line, to the product add the number to the right of it in the new line, and place the sum under the fourth last divisor. Proceed in the same way, until numbers be obtained in the new line for all the divisors and for the first dividend; then the last two numbers thus obtained will be the lowest terms of the fraction.

Thus, taking the same example already given under Rule 1, and arranging the first dividend and all the divisors in succession, with their respective quotients, and the numbers in the new line, as above directed, we have

485	285	180	105	75	30	15	
	1	1	1	1	2	2	First line.
31	19	12	7	5	2	1	New line.

Here, the last two numbers obtained are 19 and 31; whence the fraction reduced to its lowest terms is $\frac{19}{31}$.

EXPLANATION.

In the preceding operation it is plain that as the number 2 in the first line under 15 the last divisor, indicates that it is contained 2 times in the preceding divisor, and the number 2 in the same line under 30 indicates that 30 is contained 2 times in the divisor preceding it, therefore 15 must be contained at least 2 times multiplied by 2 times, that is, 4 times in that divisor 75; but as 15 was the remainder, which contains itself 1 time, therefore 75 contains 15 exactly 5 times. Whence, the number 5 is placed under 75 in the new

line. Again, the number 75 is contained 1 time in the preceding divisor, and the remainder was 30, therefore 15 is contained 5 times multiplied by 1 time, that is, 5 times in 75 and 2 times in 30, that is, 7 times in all; therefore 105 contains 15 exactly 7 times. Reasoning in the same way, it can easily be proved that 15 is contained in 180 exactly 12 times; in 285, exactly 19 times; and in 485, exactly 31 times. But 285 and 485 are the two terms of the fraction; therefore 19 and 31 are the two quotients which arise from dividing these terms by the greatest common divisor 15; and consequently 19 and 31 are the lowest terms of the fraction, that is, the fraction reduced to its lowest terms is $\frac{19}{31}$.

Exercises.

Reduce the following fractions to their lowest terms, by one or other of the three rules, or by the abridged process, as may be found most convenient. The student who is anxious to become a good arithmetician, will try all the methods in working these exercises, and thus be enabled to form a judgment for himself as to which is the best in each case.

1. $\frac{247}{323}$.	ans. $\frac{13}{17}$	7. $\frac{6144}{10752}$.	ans. $\frac{4}{7}$
2. $\frac{455}{1274}$.	ans. $\frac{5}{14}$	8. $\frac{137445}{343605}$.	ans. $\frac{113}{283}$
3. $\frac{11111}{33311}$.	ans. $\frac{23}{23}$	9. $\frac{6666666}{10000000}$.	ans. $\frac{33}{333}$
4. $\frac{2448}{3060}$.	ans. $\frac{17}{21}$	10. $\frac{2256471}{3760785}$.	ans. $\frac{9}{15}$
5. $\frac{1240}{1426}$.	ans. $\frac{8}{9}$	11. $\frac{60606}{101011}$.	ans. $\frac{6}{11}$
6. $\frac{31008}{37820}$.	ans. $\frac{6}{7}$	12. $\frac{1111}{1441}$.	

13. In a joint-stock company which was divided into 10,800 shares, what part of the whole concern belongs to the individual who holds 4,050 shares?

14. A ship is worth £21,600; what fraction of the ship belongs to him who contributed to this sum no less than £12,960?

LESSONS IN GEOLOGY.—No. XXIV.

By Thomas W. Jenkyn, D.D., F.G.S., &c.

CHAPTER II.

ON THE ACTION OF WATER ON THE EARTH'S CRUST.

SECTION VIII.

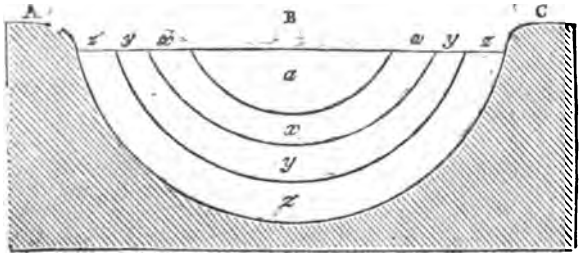
ON THE TRANSPORTING POWER OF RIVERS AND FLOODS.

The materials, which running water loosens from the surface and the sides of rocks against which it rubs, are called by geologists detritus, because that the mass has been rubbed off and borne away from the rocks of which it once formed a part.

The amount of this transporting power of rivers depends on several circumstances, such as the volume of water, the quantity and the size of the solid matter held in suspension, and the velocity or rapidity with which the current moves. It has been satisfactorily ascertained that the velocity of a river-current is *greatest* in the middle, and *least* on the bottom and at the sides though the greatest amount of rapidity is in the middle of a stream, yet we are equally certain that the velocity at the bottom is, across the whole breadth of the river, less than in any part of the waters above it; and that it is greater along the whole width of the surface than at any part of the volume below.

The reason of this difference in the velocity of a stream is, that there is more resistance and friction at the sides and on the bottom, than in the centre of the water. This is represented to your eye in fig. 51.

Fig. 51.



Section of a River course representing Ideal Layers of Water.

On a sight of this diagram, you will easily perceive that the quantity of water that will have the greatest velocity will be that represented by the volume *a*, and that the rapidity of the current will be decreased towards the sides and at the bottom, as may be denoted by the layers of water *z z*, *y y*, and *z z*. Geological observers know that this diminution of velocity at the bottom and towards the sides is a fact; but they do not profess to know the laws of the decrease. Even after they have correctly ascertained the velocity of a current in the middle, the depth of the water, the distance of the centre from the sides, and the shape of the river bed, they do not know the amount of friction that ought, accordingly, to be found at the bottom and sides. What I have stated is sufficient to show the fact that there is always more friction at the sides and the bottom than in the centre of the stream.

The power of a river to remove a body is much modified by the *form* which the body or fragment presents to the current. The mechanical force of a stream finds a stone or a piece of rock, always at first of an angular shape, a shape which presents the greatest resistance to running water. It is obvious that the velocity of a river must first be great enough to move these angular stones, before it can wear them down and give them a rounded shape by friction with other pebbles, in the river-bed. When such fragments of rock have been rounded by being rolled onward in the current, these stones part with their smaller particles, which go to form gravel or sand, which the moving water takes up, holds in suspension, transports to a lower level, and there deposits it as a sediment.

If the rocky fragment thus rolled onward be a piece of sandstone that will easily decompose, or perhaps a conglomerate slightly aggregated, its removal or transport will be easy. But if the stone be compact, such as granite or crystalline limestone and its mass be of an angular shape, the transportation will be more difficult. When the river is sufficiently rapid to rub powerfully against any substance that has either been torn up by its force, or that has fallen into its current, then such fragments, in proportion as their corners and angles are worn away by friction, become more easy of transport; and they would, if their course be unobstructed, be carried eventually to the sea.

You are aware that the velocity of a river depends greatly on the inclination or declivity of its channel; and that the river's transporting power is regulated by the amount and by the length of such a descent. In no case is this inclination of a river-bed uniform. A river, generally, after descending a rapid declivity on a mountain side, comes into a flat and level district. The detritus which it had the power to transport down this declivity, it soon deposits on this plain. It has no power to carry them far into the plain, because its force has been diminished in proportion to the loss of its velocity.

After a river has flowed quietly through a plain, it comes again to another rapid descent, and again acquires by its velocity an increased power of transport. In this second descent, the river cannot affect the pebbles which it left behind at the upper end of the plain, unless a powerful flood, or, as the Americans call it, a freshet, takes them and rolls them on till they come within the reach of the river's new velocity.

Rivers which run in mountainous districts on maritime coasts, as for instance in North Wales and Scotland, have their courses so short and rapid, that they carry down their pebbles and gravel at once into the neighbouring sea. In the same manner, it is found that the torrents which run down the south-western declivities of the Alps, rushing over steep and uninterrupted slopes, transport large blocks into the Mediterranean. On the contrary, where the courses of rivers are long, like those of the Rhine or the Danube, and especially of the American rivers, where their current is slow, they deposit their pebbles at the spot where their velocity diminishes, and transport to the sea, or perhaps to the next lake, only the sand or the mud which they take up in their subsequent course.

The diagram, fig. 52, will help you to understand the respective velocities and forces of rivers as they flow along slopes, or through plains. If you increase the number of these declivities and flats, according to the length of any river, you can form some good conjecture of its transporting power, and be able to account for its pebbles, gravel, or silt, as it enters a lake or the sea.

The transporting power of running water has been carefully observed and calculated by geological observers.

Imagine that the surface rock over which a river flows is clay. The power of the river to tear away a bed of clay will depend upon the velocity of the stream. If it runs at the rate of three inches a second at the bottom of the bed, it will just begin to tear away a clay of the consistency of that which

Fig. 52.

The Slopes of a River-bed in different parts of its course.

is used for pottery. However compact and tenacious it may be, the stream moving at that rate will tear it up. What makes this remarkable is the fact that, when a river does not move faster than three inches a second, no bottom is more permanent than a clay one. The reason seems to be this: as the stream in its passage removes the impalpable particles of clay on the surface at the bottom, the sand which the water holds in suspension sticks to the new bottom, and now protects it from the action of the stream. This settled sand continues this protection until a flood shall bring down coarser gravel and heavier pebbles, which, in their headlong course, wear off both the sandy crust and the surface clay.

Take another case, and suppose that the bed of a river is sandy. If the stream moves at the rate of *six* inches a second, it will disturb and lift up the sand at the bottom. If its rate be eight inches a second, it will remove grains of sand of the size of linseed. At the rate of twelve, it will remove fine gravel; and at twenty-four, it will roll pebbles of an inch in diameter. Still, an angular stone of the size of an egg the river will not disturb, unless it run at the rate of thirty-six inches a second.

You are, perhaps, not aware that a flooded torrent, in many instances, runs at a rate far greater than thirty-six inches, or a yard, a second. When, some years ago, a lake in Switzerland burst its barrier, the water moved for some distance with the terrific velocity of thirty-three feet, that is nearly four hundred inches, a second. This is approaching the speed of a train on the railway. The rapidity of the torrent gradually decreased to eighteen feet, and then to eleven a second; but even at the entrance of the water into the Lake of Geneva, it rushed at the rate of seventy-two inches a second.

Try now to estimate the transporting power of this terrible flood. The entire descent from the barrier of the lake down to the Lake of Geneva was more than four thousand feet—that is, greater than the height of Ben-Nevis or Snowdon. The distance from lake to lake was forty-five miles, and over this distance the water ran in five hours and a half. The water, in its course found enormous masses of rock, which had been long and firmly buried in an ancient alluvial soil—masses of the dimensions of a good-sized house. These large, heavy, and fixed blocks the water tore up, and carried a quarter of a mile down the valley.

Whenever a remarkable flood takes place in a river, everybody is astonished at the ease with which a stream dislodges and removes large and ponderous masses. In estimating the weight of masses in the open air, they forget the comparative lightness or buoyancy of such materials when they are submerged in a fluid denser than air. Such masses, however large, are much more easily moved in water than in air. This is in consequence of a law in hydrostatics, that a solid body fully immersed in water, weighs as much less than it does in the air as is the weight of the water which its body displaces.

It is well known that there are many rocks which, in their composition, are not more than twice that of water in specific gravity, and which are very rarely more than three times. Accordingly, when masses of rock are covered with water they lose some a third, and some half, of what is called their weight. If, therefore, you consider the velocity of a rapid current, and the loss of gravity in the masses which are submerged in the water of a torrent, it will be easy to account for the large quantities of gravel, sand, and mud, which are carried daily into the sea, and also for the large boulders and heavy pieces of rock which are found in rounded fragments at a considerable distance from their native beds.

This transporting power of rivers is a great benefit to our earth and its inhabitants. If rivers had not this power, their channels would be annually choked up by floods, and the valleys in the lower part of their course, as well as the plains at the base of mountains, would be strewn all over with rocky fragments, which would render the most fertile land a sterile wilderness. This evil is prevented by a general law of running water, a law which strikes every observer with surprise. It is found that two equal streams, when united in one bed, do not, as you might expect, occupy a channel of double surface. By this I mean, that when two rivers unite in one, the surface area of the fluid mass is far less than that which was previously occupied by the two separate streams. In this case, the collective waters, instead of spreading their area, contract themselves into a mass which is greater in height than it is in breadth. This increases the power of floods to remove rocky fragments from the surface of the land.

This remarkable law in hydrostatics prevents rivers from occupying so large a space as they otherwise would in the soils of the earth. It is found, as I intimated, that two large rivers after their junction have only the surface which one of them had before. Indeed, there are instances in which their united waters are confined in a bed narrower than either of them had filled before they were united. By this means, streams that drain a land occupy less room as they approach the sea. Consequently, the most valuable part of our soils, such as rich deltas and fertile plains, are prevented from being constantly under water, and thus are preserved for the use and benefit of man.

The knowledge of this law helps you to account for a river phenomenon that must often have struck you. You have ere now seen that a river when flowing through a low level is sometimes more rapid even when the slope of its bed has been much diminished. In trying to reason out this fact, you find that the wider the stream was, it was necessarily the shallower, and that consequently its current was the more retarded by friction against both the sides and the bottom. But now the deeper it is, the smaller is the proportion of its waters that can be affected by the bottom and the sides. The consequence is, that the river is enabled to force its way onward with fewer obstructions, and to remove those materials that have been swept down into it from the upland districts.

I will conclude this lesson by giving you a few illustrations of the enormous size and the amazing weight of masses which running water can move and bear along to great distances.

At Vermont, in the United States of America, a lake burst in 1810. The waters rushed with great violence, and, at the distance of seventeen miles below, they moved a mass of rock which was estimated at the weight of one hundred tons, and carried it to the distance of several rods.

In 1827, a great flood took place in the Cheviot Hills, in Northumberland. A small mountain torrent called the College became exceedingly swollen with rains. Its waters brought down several thousand tons weight of gravel and sand to the plain of the Till. At the time of the flood a bridge was in progress of building, some of the massive stones of which weighed half a ton, and others three-quarters of a ton, but these heavy stones were carried two miles down the stream. At another point the brook bore away a large block of greenstone porphyry, weighing nearly two tons, and deposited it at the distance of a quarter of a mile below.

In 1829, terrible and destructive floods took place in the north-eastern district of the Highlands of Scotland. The water carried away a great number of farm-houses, and thirty-eight bridges. The river Nairn took up a mass of sandstone one foot thick, three feet wide, and fourteen feet long, and carried it to the distance of two hundred yards. At Ballater there is a bridge over the river Dee, built of massive granite, and consisting of five arches. This flood took away mass after mass, till the whole

masonry disappeared, and the immense blocks were afterwards found in the bed of the river at a considerable distance below. On the same occasion, the river Don rushed against a collection of stones between four and five hundred tons in weight altogether, and many of these stones were about two hundred or three hundred pounds weight each. These stones were not borne downward in the bed of the river, but were forced up an inclined plane, rising six feet in eight or ten yards, carried over the ridge, and then were left on a flat ground that laid beyond the declivity of the other side.

LESSONS IN GERMAN.—No. XXXI.

Section LXI.

Als, when it follows the comparative, is translated by "*than*." Ex.: Die Eiche iſt höher **als** die Buche; the oak is higher *than* the beech.

Sometimes, instead of a single word, **als** is made to refer to a whole clause introduced by **daß**; as, Er bettelt lieber, **als daß** er arbeitet; he begs rather *than* work; (literally sooner, or more readily than *that* he works.)

Als, following the negatives kein, nichts, &c., is best translated by "*but*" (except), though the succeeding word may stand in the nominative. Ex.: Niemand **als** du kann ihn überwinden; no one, *but thee*, can overcome him. The same is also true of interrogative sentences when the like negatives are implied in the answer. Ex.: Was hat er ſonſt **als** einen leeren Titel; What has he (else) *but* an empty title? In other positions, **als** often answers to our "*as*." Ex.: Ich erkenne keinen Menſchen **als** meinen Herrn; I acknowledge no human being *as* my master. Ich betrachte ihn **als** einen Freund; I regard him *as* a friend. Er verlangt es **als** ein Recht; he demands it *as* a right. Er ſieht aus **als** ob er krank wäre; he looks *as* though he were sick. **Als** er dieſes Zeichen ſah, fiel er zu Boden; *as* (when) he saw this sign, he fell to the ground.

I. **Wie** also, often signifies "*as*." Ex.: Es iſt heute wie geſtern; it is to day *as* yesterday. Er handelt **wie** ein rechtſchaffner Mann handeln muß; he acts *as* an upright man must act. **Wie** answers also to our word "*like*." Ex.: Es glänzt **wie** Gold; it glitters *like* gold. Er beträgt ſich **wie** ein Wahnſinniger; he behaves himself *like* a maniac. Socrates blühte **als** Jüngling, **wie** eine Roſe, lehrte **als** Mann, **wie** ein Engel und ſtarb **als** Greis, **wie** ein Verbrecher; Socrates bloomed *as* youth (young man) *like* a rose (as a rose blooms), taught *as* man *like* an angel (as an angel teaches), and died *as* old man *like* a criminal (as a criminal dies).

Exercise 64.

Ab'reiſe, *f.* departure;	Feſt'geſetzt, appointed, fixed;	Obſchon, although;
Bauart, *f.* architecture;	Fröhlichkeit, *f.* joyfulness;	Partei', *f.* party;
Beklagen, to complain;	Geiſtig, intellectual, spiritual;	Pfeifer, *m.* piper;
Benach'bart, neighbouring;	Gelangen, to arrive to;	Region', *f.* region;
Bewoh'ner, *m.* inhabitant;	Gewalt', *f.* force;	Sinnlich, sentient, sensual;
Dauernd, enduring;	Grauſam, cruel;	Ue'brigbleiben, to remain over;
Der wie vielſte, (§ 45. 5.);	Habſüchtig, avaricious;	Undank, *m.* unthankfulness;
Dom, *m.* Cathedral;	Hälfte, *f.* half;	Un'geduldig, impatient;
Ehr'geizig, ambitious, aspiring;	Hierherkommen, to come hither;	Verdienſt'voll, serviceable;
Entdecken, to discover;	Kuppel, *f.* cupola;	Verlangen, to require;
Erlan'gen, to attain, reach;	Landluft, countryair;	Vorſichtig, cautious;
Ernten, to reap, harvest;	Landſchaft, *f.* landscape;	Vortheil, *m.* advantage;
Erſcheinen, to appear;	Menge, *f.* multitude;	Weit, far, distant;
	Monat, *m.* month;	Werth, *m.* worth;
		Wirken, to work, effectuate.

Bei dem Regen ſuchten die Feld'arbeiter in dem benachbarten Walde Schutz. — During the rain the field-labourers sought protection in the neighbouring forest.

Der wievielſte iſt heute? — What day of the month is to-day?

Der 24ſte Auguſt'. — The 24th of August.

Vor drei Jahren war ein großes Erdbeben. — Three years ago there was a great earthquake.

Obgleich' der Sturm nachgelaſſen hat, ſo gehen die Wogen doch noch ſehr hoch. — Although the storm has abated, the billows, notwithstanding, (still) run very high.

Unter den Bürgern ſelbſt ſieht man nichts als bleiche Geſich'ter. — Among the citizens themselves one sees nothing but pallid countenances.

Nur in der Stunde des Abſchiedes weiß man, welch einen großen Schatz der Liebe unſer Buſen hegt. — Only in the hour of separation, does one know how great a treasure of (the) love our bosom cherishes.

Obſchon' die Jagd nur ein anſtrengendes und barbariſches Vergnü'gen iſt, ſo wird ſie dennoch oft bei Manchem zur Lei'denſchaft. — Although the chase is only a toilsome and barbarous pleasure, nevertheless, with many a one, it becomes a passion.

Von Weitem ſieht eine Landſchaft ſchöner aus, als in der Nähe. — From afar, a landscape appears more beautiful, than near at hand.

1. Ein geiſtiger Genuß iſt dauernder als ein ſinnlicher. 2. Der Habſüchtige erlangt nie ſo viel als er haben will. 3. Je höher man in die obern Regionen gelangt, deſto kälter wird es. 4. Je mehr ihn die eine Partei haßte, deſto mehr liebte ihn die andere. 5. Je höher Napoleon ſtieg, deſto ehrgeiziger wurde er. 6. Der nahe Fluß gewähret den benachbarten Bewohnern viele Vortheile. 7. Den wievielſten Theil Ihres Vermögens haben Sie verloren? 8 Ich habe mehr als die Hälfte verloren. 9. Den wievielſten reiſen Sie von hier ab? 10. Meine Abreiſe iſt auf den zwölften dieſes Monats feſtgeſetzt. 11. Den wievielſten wird Ihr Herr Bruder hieher kommen? 12. Ich erwartete ihn ſchon vor (Sect. 32. I.) drei Tagen. 13. Vor einem Jahre war ich noch in Deutſchland. 14. In Weimar hatten vor wenigen Jahren die gelehrteſten und geſchickteſten Männer ihre Wohnung. 15. Das Eiſen iſt nützlicher, als Gold und Silber, obgleich der Werth des Goldes und Silbers größer iſt. 16. Die ganze Menge war nur einer Anſicht. 17. Man ſprach von nichts, als von der Zukunft. 18. Ich ſchrieb meinem Freunde nur wenige Worte 19. Um die ganze Stadt herum lagerten nichts, als grauſame Feinde. 20. Nur Gewalt konnte hier wirken. 21. Obſchon er nichts als Mühe und Arbeit hat, ſo (Sect. 44. IV.) iſt er doch immer heiteren Gemüthes. 22. Wir ſahen nichts als Waſſer um uns herum. 23. Ich habe nichts als mein Leben, und daß muß ich dem Könige geben. 24. Wenn der Menſch auch nichts als ein ruhiges Gewiſſen beſitzt, ſo iſt er dennoch glücklich zu ſchätzen. 25. Wenn ihr auch nichts als euer Leben gerettet habt, ſo ſeid doch zufrieden. 26. Dieſes Schloß ſieht man von Weitem. 27. In der Nähe betrachtet, wird man die Kunſt der Bauart ſogleich entdecken. 28. Wenn Sie dieſes Gemälde von Weitem betrachten, ſo ſehen Sie es beſſer. 29. Eine Landſchaft erſcheint, von Weitem betrachtet, viel ſchöner, als in der Nähe.

1. Is your brother as cautious as your uncle? 2. He is not so cautious as my uncle. 3. Take neither more nor less than necessity requires. 4. Although he possesses a beautiful estate, nevertheless I will resign to him a part of mine. 5. They did nothing but complain of their last mishap. 6. I saw nobody in the saloon but the blind piper. 7. The longer he stayed with him, the more impatient he became. 8. On what day of the month will your friend take his departure from here? 9. His departure is fixed for the fourteenth of next month. 10. We will go this way, in order to see the landscape near at hand. 11. Nothing but joyfulness was in the whole family. 12. Only one wish remained over to him. 13. No one is so worthy of our kindness as the friend of my brother. 14. You will recover sooner in the country air than in the city. 15. The most serviceable men reap often nothing but unthankfulness. 16. From afar one can see the cupola of St. Paul's Cathedral. 17. What day of the month is to-day? 18. It is either the twenty-eighth or the twenty-ninth.

Section LXII.

Words denoting quantity, weight or measure, are seldom put in the plural, though connected with numerals signifying more than one; as, ein Pfund, one pound; zehn Pfund, ten pound(s); drei Acker, three acre(s); zwölf Fuß, twelve feet (foot.)

Feminine nouns, however, are usually excepted from this rule; as, ſechs Ellen, six ells; ſieben Meilen, seven miles, &c.

When, between the term of quantity and the thing whose quantity or measure is specified, there intervenes no qualifying word, both nouns stand in the same case; as, ein Pfund Zucker, one pound (of) sugar; zwei Pfund Zucker, two pounds (of) sugar; drei Paar Schuhe, three pair (of) shoes; neunzig Stück Rindvieh, ninety head (of) cattle. (§ 15. 2. *e.* § 123.)

I. Adjectives are formed by suffixing the word jährig, from Jahr, to the cardinal numbers. Ex.: Es iſt einjährig; it is a year old. Dieſes Pferd iſt vierjährig; this is a four year old horse. Ein hundert jähriger Mann; a hundred year old man (a centenarian.)

Nouns are formed by adding er to the cardinals (§ 51. 2.) Ex.: Ein Dreißiger, (ein Mann von dreißig Jahren); a man of 30 years of age. Ein Achtziger; an octogenarian. Der Acht und zwanziger (Wein); the wine of the vintage of 1828.

Hundert, (a hundred) and Tauſend, (a thousand) when placed before a noun, do not generally take the article before them. Ex.: Er hat hundert Schafe und neunzig Ochſen; he has (a) hundred sheep and ninety oxen. Used without a noun, they, as in English, assume the plural. Ex.: Hunderte von Menſchen ſterben vor Hunger; hundreds of man die of hunger. Tauſende fallen in der Schlacht; thousands fall in (the) battle.

Exercises 65.

April', *m.* April; Befehl, *m.* command; Bekannt machen, to publish; Beſchützer, patron; Buch (Papier), *n.* quire; Capital', *n.* capital; Dreifach, (§. 47.); Dreijährig, triennial, three years old; Dutzend, *n.* dozen; Einladen, to invite, to bid; Elle, *f.* ell, yard; (24 inches.) England, *n.* England, Britain; Entdecker, *m.* discoverer, descryer; Geburtstag, *m.* birthday; Genoeſer, *m.* Genoese; Gründen, to found; Halb, half; Hübſch, pretty, handsome, fair; Juni, *m.* June; Liebhaber, *m.* lover, friend; Loth, *n.* half an ounce; Ludwig, *m.* Lewis; Luther, Luther; Mal, *n.* time (§ 50. Note); Minute, *f.* minute; Oel, *n.* oil; Pfund, *n.* pound; Procent', per cent; Sech'ziger, *m.* one sixty years of age; Ungefähr, about, near; Verhei'rathen, to marry Verzinſen, to pay interest; Viertel, *n.* quarter; Worunter, under which, among which.

We here insert, to facilitate the studies of our subscribers, the table of cardinal and ordinal numbers.

CARDINALS.		ORDINALS.
Eins (ein, eine, ein)	1.	der erſte (not der einte), the first.
zwei	2.	„ zweite (also der andere), the second.
drei	3.	„ dritte (not dreite), the third.
vier	4.	„ vierte, the fourth.
fünf	5.	„ fünfte, the fifth.
ſechs	6.	„ ſechste, the sixth.
ſieben	7.	„ ſiebente, the seventh.
acht	8.	„ achte (not achtte), the eighth.
neun	9.	„ neunte, the ninth.
zehn	10.	„ zehnte, the tenth.
elf	11.	„ elfte, the eleventh.
zwölf	12.	„ zwölfte, the twelfth.
dreizehn	13.	„ dreizehnte, the thirteenth.
vierzehn	14.	„ vierzehnte, the fourteenth.
fünfzehn	15.	„ fünfzehnte, the fifteenth.
ſechzehn	16.	„ ſechzehnte, the sixteenth; &c.
ſiebenzehn or ſiebzehn	17.	„ ſiebenzehnte or ſiebzehnte
achtzehn	18.	„ achtzehnte.
neunzehn	19.	„ neunzehnte.
zwanzig	20.	„ zwanzigſte
ein und zwanzig	21.	„ ein und zwanzigſte.
zwei und zwanzig ꝛc	22.	„ zwei und zwanzigſte ꝛc.
dreißig	30.	„ dreißigſte.
ein und dreißig	31.	„ ein und dreißigſte.
zwei und dreißig ꝛc.	32.	„ zwei und dreißigſte ꝛc.
vierzig	40.	„ vierzigſte.
fünfzig	50.	„ fünfzigſte.
ſechzig (not ſechszig)	60.	„ ſechzigſte.
ſiebenzig (or ſiebzig)	70.	der ſiebenzigſte or ſiebzigſte.
achtzig	80.	„ achtzigſte.
neunzig	90.	„ neunzigſte.
hundert	100.	„ hundertſte.
hundert und eins	101.	„ hundert und erſte.
hundert und zwei	102.	„ hundert und zweite.
hundert und drei ꝛc.	103.	„ hundert und dritte
zwei hundert	200.	„ zweihundertſte.
drei hundert	300.	„ dreihundertſte.
tauſend	1000.	„ tauſendſte.
zwei tauſend	2000.	„ zweitauſendſte.
drei tauſend	3000	„ dreitauſendſte.
zehn tauſend	10,000	„ zehntauſendſte.
hundert tauſend	100,000	„ hunderttauſendſte
eine Million	1,000,000	„ Millionſte.
zwei Millionen	2,000,000.	„ zwei Milliſonſte ꝛc.

Der Elephant wird (Sect. 35. I.) ungefähr hundert Jahre alt.	The elephant lives (becomes) about a hundred years.
Dieſer Brunnen iſt zwanzig Fuß tief.	This well is twenty feet deep.
Dieſer Matroſe hat drei Paar Stiefeln und ein Paar Schuhe gekauft'.	This sailor has bought three pair of boots, and one pair of shoes.
Er war vorgeſtern zum erſten Male im Theater.	He was, for the first time, the day before yesterday, in the theatre.
Die Frau kaufte vier Ellen Kattun'.	The woman bought four ells of calico.
Dieſes Fohlen iſt ein jähriges.	This colt is a yearling.
Um ein Viertel auf acht frühſtücken wir.	At a quarter past seven we breakfast.
Um halb Zehn brach in der Vorſtadt Feuer aus.	At half past nine a fire broke out in the suburbs.
Zehn Minuten nach zehn hörte ich Kano'nenſchüſſe.	Ten minutes past ten I heard the report of cannons.
Er iſt ein Acht'ziger.	He is an octogenarian.

1. Ich bin neunzehn Jahre alt und in meinem drei und zwanzigſten Jahre gehe ich mit meinem Vater nach England. 2. Mein älteſter Bruder hatte fünf und zwanzig Perſonen eingeladen, worunter ungefähr die Hälfte verheirathete Leute waren. 3. Um drei Viertel (Sect. 25. IX.) auf zwölf Uhr hat uns die Geſellſchaft verlaſſen. 4. Columbus war im Jahre (1492) vierzehn hundert zwei und neunzig der Entdecker von Amerika. 5. Ein Dutzend hat zwölf Stück, und ein Pfund hat zwei und dreißig Loth. 6. Wir kauften drei Faß Oel, zwei Paar Schuhe und ſieben Ellen Tuch 7. Tauſende von Deutſchen wandern nach Amerika aus. 8. Ich habe hundert Federn für einen haben Thaler verkauft. 9. Der drei und zwanzigſte April iſt Shakſpeares Geburtstag. 10 Ludwig der Vierzehnte war ein Liebhaber von Künſten und Wiſſenſchaften. 11. Zwanzig Minuten nach eilf Uhr ſtarb der Kaiſer. 12. Ich war erſt zwei Mal in Amerika, aber das vierte Mal in England. 13. Die Deutſchen hatten zu verſchiedenen Malen Krieg mit den Franzoſen. 14. Die Vier und Neun haben dreifach gewonnen. 15. Den achtzehnten Juni 1815 war die Schlacht bei Waterloo. 16. Wiſſen Sie, wie alt jener Mann iſt? 17. Er iſt ein Sechziger. 18. Dieſes hübſche Pferd iſt dreijährig und jenes größere iſt ſechsjährig. 19. Was iſt dies für Wein? 20. Es iſt vier und dreißiger (1834). 21. Ich verzinſe dieſes Capital zu fünf Procent. 22. Giebt es Hirſche in dieſem Walde? 23. Ja, der Jäger hat vorgeſtern einen Sechszehner geſchoſſen

1. My brother has a hundred books, and my uncle, the professor, has more than a thousand. 2. He rose generally at half-past five in the morning, and work till a quarter to eleven o'clock. 3. I have spent seven months with him. 4. I have sold two dozen of pens and seven quires of paper. 5. The half of a hare did he eat at his breakfast. 6. This beautiful horse is five years old. 7. The third part of this money belongs to me. 8. I forgave you once. 9. You did it twice. 10. This piece contains about twenty-two yards. 11. My sister died in the sixteenth year of her age. 12. Thousands died of the cholera in Poland in the year 1852. 13. The wine of the vintage of 1832 is sold at one thaler a bottle. 14. My sister

bought three yards of ribbon. 15. Rome was founded by Romulus seven hundred and twenty-five years before the birth of our Saviour. 16. After a voyage of seventy days, Columbus, a Genoese, discovered America, on the 12th of October, 1492. 17. He had three ships under his command from the Queen Isabelle of Spain. 18. It was in the year 1517, the 31st of October, when Luther published his ninety-five theses in Wittenberg. 19. Lewis the Fourteenth was a patron of learned men.

LESSONS IN FRENCH.—No. XLI.

By Professor Louis Fasquelle, LL.D.

Section XCIV.

1. The word monde, *world*, is often used in French in a restricted sense. It has then the meaning of *people, company, retinue, servants*, &c:—

Y avait-il beaucoup de monde à l'église?	*Were there many people at church?*
Se mettant à la tête de son monde, il ouvrit lui-même la porte. Voltaire.	*Placing himself at the head of his people, he himself opened the door.*

2. The word gens also means *people*, and is of the masculine gender; but, by a singular anomaly, the adjectives which precede *gens* are put in the feminine, while those which follow it must be in the masculine gender:—

Ce sont les meilleures gens du monde.	*They are the best people in the world.*
Ces gens sont fort dangereux.	*Those people are very dangerous.*

3. The words tout, tel, quel, certain, not preceding immediately the word *gens*, are put in the masculine, except when the word coming between is an adjective having a different termination in the two genders:—

Tous ces gens là étaient-ils chrétiens? Pascal.	*Were all those people Christians?*
Tous ces gens là sont sottement ingénieux. J.J. Rousseau.	*All those people are foolishly ingenious.*

4. The words tout, tel, quel, meaning certain, are put in the feminine when they precede immediately the word *gens*, or are separated from it by an adjective having a different termination in the feminine:—

Quelles gens êtes-vous? Quelles sont vos affaires? Racine.	*What people are you? What is your business?*
Quelles bonnes et dignes gens!	*What good and worthy people!*

Resumé of Examples.

Après s'être fait craindre de tout le monde, il craignit tout le monde aussi. Flechier.	*After having inspired everybody with fear, he feared everybody.*
Il dit du mal de tout le monde.	*He slanders everybody*
Tout le monde le dit.	*Everybody says so.*
Avez vous amené beaucoup de monde?	*Have you brought many people?*
Le monde n'est pas encore arrivé.	*The company is not yet come.*
Il n'y avait pas grand monde.	*There were not many people there.*
Il y a du monde avec lui.	*There is some person with him.*
Il a congédié tout son monde.	*He has discharged all his servants (people).*
Ce capitaine a tout son monde.	*That captain has all his crew.*
Voilà de sottes gens.	*Those are foolish people.*
Il s'arrête chez les premières bonnes gens qu'il trouve. Boiste.	*He stops with the first good people that he finds.*
Il y a à la ville, comme ailleurs, de fort sottes gens, des gens fades, oisifs, désoccupés. La Bruyere.	*There are in the city, as elsewhere, very silly people, tedious, idle, unemployed people.*
Quels braves gens!	*What worthy people!*
Quelles viles et méchantes gens!	*What vile and wicked people!*

Exercise 187.

Accommoder (s',) 1. ref. *to put up with, to agree with.*	Dès que, *as soon as.*	Perd-re, 4. *to lose.*
Attend-re, 4, *to wait, to expect.*	Equipage, m. *crew.*	Rassembl-er, 1. *to bring together.*
Bord (à), *on board.*	Eveill-er, 1. *to awake.*	Reven-ir, 2. ir. *to return.*
Campagne, f. *country.*	Gens d'épée, *military men.*	Salon, m. *drawing-room*
Démêl-er, 1. *to settle, arrange.*	Gens de lettres, *men of letters.*	Serv-ir, 2. ir. *to serve.*
	Gens de robe, *lawyers.*	Terre, f. *land, shore.*
	Patron, m *patron saint.*	Voyag-er, 1. [§ 49] *to travel.*

1. Avez-vous rassemblé beaucoup de monde chez vous? 2. Il n'est venu que peu de monde. 3. A quelle heure servira-t-on le dîner aujourd'hui? 4. On le servira dès que notre monde sera venu. 5. Le capitaine a-t-il tout son équipage à bord? 6. Non, Monsieur, il a envoyé du monde à terre. 7. Vos gens se lèvent-ils de bonne heure? 8. Il faut que tous les jours j'éveille tout mon monde (Molière). 9. Les Moscovites perdirent trois fois plus de monde que les Suédois (Voltaire). 10. Où est Madame votre mére? 11. Elle est dans le salon, il y a du monde avec elle (*company*). 12. Tout le monde peut voyager comme moi (X. de Maistre). 13. Ainsi va le monde. 14. Elle attend pour quitter le monde, que le monde l'ait quittée (Flechier). 15. Vos gens sont-ils revenus de la campagne? 16. Nous attendons nos gens aujourd'hui. 17. Y a-t-il ici une société de gens de lettres? 18. Non, Monsieur; il n'y a qu'une société de gens de robe. 19. Connaissez-vous ces braves gens? 20. Je crois que ce sont des gens d'épée. 21. Tels sont les gens aujourd'hui. 22. Telles gens, tels patrons (La Bruyere). 23. Tous mes gens sont malades. 24. Il faut savoir s'accommoder de toutes gens (L'Academie). 25. Que pouvez-vous avoir à démêler avec de telles gens?

Exercise 188.

1. Are there many people at your brother's? 2. There are not many people there. 3. Does that young man slander everybody? 4. He slanders nobody. 5. Have you brought many people with you? 6. We have brought but few people with us. 7. Is there company with your mother? 8. There is no company with her. 9. Who has told you that? 10. Everybody says so. 11. Is the company come? 12. The company is not yet come. 13. Has your mother discharged two servants (*domestiques*)? 14. She has discharged all her people. 15. Do you know those people? 16. I know them very well; they are very worthy people. 17. When he travels, he stops always with good people. 18. Are there foolish people here? 19. There are foolish people everywhere (*partout*). 20. Do you awake your people every morning? 21. Yes, Sir; I must awake them every day. 22. What can your brother have to settle with those people? 23. They are the best people in the world. 24. Were there many people at church this morning? 25. There were not many people there. 26. Are your people sick? 27. Yes, Sir; all my people are sick. 28. There is here a society of learned men. 29. There are in Paris several societies of lawyers. 30. What worthy people! 31. What good people! 32. Do you expect your people to-day? 33. We expect them this evening. 34. So goes the world. 35. Has your captain all his crew? 36. He has all his crew on board.

Section XCV.

1. When property or possession is affirmed of things inanimate, the relation of possession is often expressed by the relative pronoun *en* [§ 95 (5)]:—

Voilà un bel arbre; le fruit en est excellent.	*That is a fine tree; its fruit is excellent.*

2. When, however, the inanimate possessor is the subject of the same clause, the possessive adjective is used [§ 95, (4.)]:—

Cet arbre a perdu son fruit.	*That tree has lost its fruit.*

3. Entendre, *to hear*, is used in the sense of *to understand*. It is also used reflectively. It means then, *to be understood, to understand one's self*, or *one another*, or *to agree with one another*. It means also, *to be expert in anything*. In this latter sense it takes *à* before its regimen. This regimen is at times replaced by the pronoun *y*:—

Comment entendez-vous cela?	*How do you understand that?*
Cela s'entend.	*That is understood.*
Il s'entend aux affaires.	*He is expert in business.*

4. Se faire entendre corresponds to the English, *to make one's self understood, to make one's self heard*:—

Nous sommes fait entendre.	*We made ourselves understood.*

5. Taire [4. ir.] means, *to conceal, to keep to one's self*. Se taire, ref., *to be silent*.

Taisez-vous. Taisons-nous.	*Be silent (hold your tongue). Let us be silent.*
Dites-lui de se taire.	*Tell him to be silent*

Résumé of Examples.

L'auteur d'un bienfait est celui qui en reçoit les plus doux fruits. DUCLOS.	*The author of a good deed is the one who receives its sweetest fruits.*
Votre jardin est magnifique ; les arbres en sont superbes.	*Your garden is magnificent ; its trees are very beautiful.*
La vie a ses plaisirs et ses peines.	*Life has its pleasures and its troubles.*
L'étude a ses charmes.	*Study has its charms.*
Entendez-vous bien le latin ?	*Do you understand Latin well?*
Cet avoué n'entend rien aux affaires.	*That attorney has no knowledge of business.*
Il ne s'y entend pas.	*He is not expert in this.*
Je lui ai donné à entendre, qu'il était de trop ici.	*I gave him to understand that he was in the way here.*
Qu'entendez-vous par là ?	*What do you mean by that?*
Il y avait tant de bruit, que nous n'avons pu nous faire entendre.	*There was so much noise, that we could not make ourselves heard.*
Taisez le premier, ce que vous voulez qu'on taise. LATIN MAXIM.	*Keep to yourself that which you would wish to have kept secret.*
Pourquoi ne vous taisez-vous pas ?	*Why are you not silent?*
Nous l'avons fait taire.	*We made him hold his tongue (silenced him).*

Exercise 189.

Agrément, m. *pleasure*	Chirurgien, m. *surgeon.*	Manche, f. *sleeve.*
Avantage, m. *advantage.*	Consent-ir, 2. ir. *to consent.*	Mêl-er, 1. *to mix.*
Basque, f. *skirt of a coat.*	Court, e, *short.*	Muet, te, *dumb, mute.*
Brave, *worthy.*	Force, f. *force, power.*	Pays, m. *country.*
	Fort, *very.*	Raison, f. *reason.*
		Réuss-ir, 2. *to succeed.*

1. Est-ce un habit neuf que votre fils porte ? 2. C'est un habit neuf, le drap en est très fin. 3. Les manches n'en sont elles pas trop courtes ? 4. Je crois que les manches en sont trop courtes et les basques trop longues. 5. La campagne n'a-t-elle pas ses avantages ? 6. J'aime la campagne ; j'en connais les avantages. 7. Paris a ses agréments. 8. J'aime Paris ; j'en connais les agréments. 9. Ce chirurgien s'entend-il à la médecine? 10. Il n'y entend rien du tout. 11. Entendez-vous la médecine. 12. Je ne m'y entends pas. 13. Je ne l'entends pas. 14. Je n'y entends rien. 15. Avez-vous réussi à vous faire entendre? 16. Nous n'y avons pas réussi. 17. Mon voisin est un brave homme et je m'entends fort bien avec lui. 18. Faire taire certaines gens est un plus grand miracle que de faire parler les muets (BALZAC). 19. Savez-vous de quel pays est cet homme? 20. Il tait son pays et sa naissance. 21. Par la force de la raison, elle apprit l'art de parler et de se taire (FLECHIER). 22. Voulez-vous vous taire impertinente, vous venez toujours mêler vos impertinences à toutes choses (MOLIERE). 23. Qui se tait consent (PROVERB).

Exercise 190.

1. Have you a very good garden? 2. We have a very large one, but its soil (*terre*, f.) is not good. 3. Is your brother's coat new? 4. He has a new coat, but its sleeves are too short. 5. Are not its skirts too long? 6. No, Sir; its skirts are too short. 7. Have you not heard that preacher (*prédicateur*)? 8. There was so much noise, that I could not hear him. 9. Does not the country have its pleasures? 10. The country has its pleasures. 11. Does not your brother like the city? 12. He likes the country; he knows its pleasures. 13. What does your brother mean by that? 14. He means what he says. 15. Is your father expert in business? 16. My father has no knowledge of business. 17. Does that young man understand English well? 18. He understands French and English very well. 19. Do you agree well with your partner? 20. My partner is an honest man [§ 86]; I agree very well with him. 21. Does that young man conceal his age? 22. He conceals his age and his country. 23. Does your father understand medicine? 24. He does not understand it. 25. He has no knowledge of it. 26. Be silent, my child. 27. Tell that child to be silent. 28. Silence gives consent. 29. Will you not be silent? 30. What have you given him to understand? 31. We gave him to understand that study has it charms. 32. Have you silenced him? 33. Yes, Sir; we silenced him. 34. Tell him to be silent. 35. I have already (*déjà*) told him to be silent. 36. Let us be silent.

Section XCVI.

The Present Participle.—The Verbal Adjective.

1. The present participle is invariable, and ends always in *ant*. It expresses action, not situation. It cannot be rendered into English by an adjective, but is rendered by the participle present or by the present of the indicative preceded by a relative pronoun. The present participle has often, or may have a regimen [§ 64].

Ces hommes, prévoyant le danger, s'enfuirent.	*Those men, foreseeing the danger, fled.*

2. The part of the verb used after the preposition *en*, is always the present participle :—

En écrivant, en lisant.	*In writing, in reading.*

3. When the wording ending in *ant* is used to express the qualities, properties, or moral or physical situation of a noun, it is a verbal adjective, and assumes in its termination the gender and number of the noun which it qualifies. It must in this case be rendered into English by an adjective :—

Ces hommes sont prévoyants.	*Those men are cautious, provident.*

4. The verbs entendre, *to hear*; faire, *to cause, to make*; laisser, *to let*, &c., followed by another verb completing their meaning, are not in French separated from that verb. In the corresponding sentences in English, the two verbs are usually separated by other words :—

J'ai laissé tomber mon couteau.	*I have let my knife fall (dropped).*
J'ai entendu dire cela.	*I have heard that said.*

Résumé of Examples.

Je connais des personnes dormant d'un sommeil si profond, que le bruit de la foudre ne les réveillerait pas. BESCHER.	*I know persons, sleeping (who sleep) so profoundly, that the noise of thunder would not awake them.*
Les eaux dormantes sont meilleures pour les chevaux que les eaux vives. BUFFON.	*Sleeping (still) waters are better for horses than living waters.*
Nous avons trouvé cette femme mourante.	*We found that woman dying.*
Cette femme mourant dans la crainte de Dieu, ne craignait point la mort.	*That woman dying in the fear of God, did not fear death.*
On est heureux en se contentant de peu.	*One is happy in contenting one's self with little.*
Avez-vous laissé passer ce voleur?	*Have you let that thief pass?*
Je l'ai laissé passer.	*I let him pass.*
Pourquoi avez-vous fait faire un habit?	*Why have you had a coat made?*
Je n'ai pas fait faire d'habit.	*I have had no coat made.*
J'ai lassé tomber quelque chose.	*I let something fall.*
Lui avez-vous entendu dire cela?	*Have you heard him say that?*
Je le lui ai entendu dire.	*I heard him say it.*
Je l'ai entendu dire.	*I heard it said.*
Je l'ai entendu dire à ma sœur.	*I heard my sister say it.*

Exercise 191.

Appliqu-er (s'), 1. ref. *to apply.*	Hât-er (se), 1. ref. *to hasten.*	Prévenant, e, *obliging.*
Besoin, m. *want.*	Lecture, f. *reading.*	Preven-ir, 2. ir. *to anticipate.*
Changement, m. *alteration.*	Obligeant, e, *obliging.*	Répét-er, 1. *to repeat.*
Emouss-er, 1. *to blunt.*	Plai-re, 4. ir. *to please.*	Suivant, e, *following.*
Empêch-er, 1. *to prevent.*	Pointe, f. *point.*	Suiv-re. 4. ir. *to follow.*
Essay-er, 1. *to try.*	Pleuv-oir, 3. ir. *to rain.*	Voyant, e. *bright, showy.*

1. Ma cousine est-elle aussi obligeante que la votre? 2. Elle est aussi obligeante, et bien plus charmante que la mienne. 3. Vos enfants sont-ils prévénants? 4. Mes enfants, prévénant tous mes besoins, ne me laissent rien à désirer. 5. Lisez bien attentivement les pages suivantes. 6. Ces demoiselles, suivant l'exemple de leur mère, s'appliquent à la lecture. 7. Les couleurs voyantes ne me plaisent point. 8. Mes sœurs voyant qu'il allait pleuvoir, se hâtèrent de revenir. 9. Qu'avez-vous laissé tomber? 10. J'ai laissé tomber ma plume; la pointe en est émoussée. 11. Les avez-vous fait parler? 12. Je les ai fait parler, mais avec difficulté. 13. Avez-vous fait des changements dans votre maison? 14. J'y en ai fait faire. 15. A quoi en avez-vous fait faire? 16. J'en ai fait faire à la salle à manger et au salon. 17. Avez-vous laissé passer cet homme? 18. Je n'ai pas essayé de l'en empêcher. 19. A qui (*whom*) avez-vous entendu dire cela? 20. Je l'ai entendu dire à mon père. 21. Je le lui ai entendu répéter. 22. Il vous

l'a entendu dire. 23. Il vous a vu faire cela. 24. Il vous l'a vu faire. 25. Je l'ai vu passer.

EXERCISE 192.

1. Are still waters good for horses? 2. Buffon says, that they are better for horses than living waters. 3. Are your sisters cautious? 4. They are not very cautious. 5. My sisters, foreseeing that it was going to rain, brought their umbrellas. 6. What have you let fall? 7. I have let my knife and book fall. 8. Do very bright colours please your brother? 9. Very bright colours do not please him. 10. Have you read the following pages? 11. Have you seen the dying woman? 12. Your sister, dying in the fear of God, was very happy. 13. Your sister, following your example, applies herself to study. 14. Have you made them read? 15. I have made them read and write. 16. I made my brother write. 17. I have had a book bound (*relier*). 18. Has your father had alterations made in his house? 19. He has had some made in it. 20. In which room has he had some made? 21. He has had some made in my brother's room. 22. Whom have you heard say that? 23. I heard my sister say it. 24. Have you heard him say that? 25. I have not heard him say it. 26. Have you seen my father pass? 27. I have not seen him pass. 28. I have heard him speak. 29. Make him speak. 30. Let it fall. 31. Do not let it fall. 32. What has your brother dropped? 33. He has dropped nothing. 34. Whom have you heard say that? 35. I heard your brother say it. 36. I have heard you repeat it. 37. We have seen you do that.

A KEY TO THE EXERCISES IN THE LATIN LESSONS.

(*Continued from page* 223, *vol. II.*)

By JOHN R. BEARD, D.D.

Page 339, col. 1, vol. I.—LATIN-ENGLISH.

I was praising thee, you were blaming me, brother was judging; I shall praise thee, thou wilt blame me, brother will judge; I walked, you watched, the wind blew; I had walked, thou hast watched, the wind had blown; I shall have praised thee, thou wilt have blamed me, brother will have judged; when the soldiers were entering the city, all the citizens were full of fear; when we were walking in the wood a strong wind was blowing through the high oaks, while tranquil sleep refreshed you (vos); you were watching; so long as you are (will be) happy you will number many friends; I shall always praise the good, and shall always blame the wicked; if you fight energetically, O soldiers, you will deliver (liberate) your country from ruin; if thou lovest virtue, all good men will love thee; because you have always observed the precepts of virtue, you have acquired to yourselves great praise; why didst thou watch during the whole night? I have always loved my teachers; hast thou not loved thine? you fought energetically against the enemies; when the soldiers had entered the city great fear seized the minds of all the citizens; the narrative which you (had) lately narrated to me, had delighted me greatly; when the hostile army had attacked the city, we had already gone out; if you have adorned your mind with virtues you will always be happy; when the enemies have laid waste the fields of our city they will attack (oppugnabunt) the city itself.

Page 339, col. 1, vol. I.—ENGLISH-LATIN.

Nos te laudabamus, tu me vituperabas, pater judicabat; tu me laudabis, ille te laudabit, pater nos judicabit; ambulâsti, vigilavi, venti flavêre; foris ambulabo; vigilas; ventus flabat; milites urbem intrabunt; milites urbem intrabant; milites urbem intrant; milites urbem intraverunt; milities urbem intraverant; vehemens ventus per domum flat; multosne milites numeras? multos numeravi amicos; patriam interitu liberavit; per totamne noctem vigilâsti? amate praeceptores; parentes amanto; O pueri, amate virtutem! narratio fratrem delectavit; narratio puellas delectat; narratio patrem et matrem delectabit; famam narratione interîtus comparavisti.

Page 339, col. 2, vol. I.—LATIN-ENGLISH.

It often happens that utility strives with honesty; see that you sin not against the precepts of virtue; all parents wish that their children may cultivate learning diligently; we ought to live so as to (so that we may) preserve a pure conscience in everything; the physician takes every care that he may heal the sick man; I love thee that thou mayest love me again; the general commanded that the soldiers should keep their posts; I walked yesterday, that I might gladden my sad mind; our men (army) fought very bravely that they might preserve the city from ruin.

Page 339, col. 2, vol. I.—ENGLISH-LATIN.

Vide ne filius pecoet; peccasne contra virtutis praeceptas sapiens pater curam adhibent ne liberi peccent; duces curam adhibent ut milites stationes suas servent; curam adhibetis ne liberi peccent; bonae matres curam adhibent ut liberi earum praeceptis obtemperent; ita vivere debes ut honestatem serves.

Page 339, col. 2, vol. I.—LATIN-ENGLISH.

I doubt not that our soldiers have overcome the enemies; I did not doubt that our soldiers had overcome the enemies;* I doubt not that our soldiers will overcome the enemies; I did not doubt that our soldiers would overcome the enemies; I did not doubt that you would free your country (*patriam*) from servitude; there was no doubt that our army would easily endure all labours and hardships; who doubts that Hannibal fought most bravely against the Romans? you will not doubt that I have always loved you; who doubts that we have always praised the good, and have always blamed the bad? there is no doubt you have always kept faith; no one doubted that the enemies had taken the city; no citizen doubted (it was doubtful to no one of the citizens) that you had fought very bravely for your country's (*patriae*) liberty; when the enemies attacked the city, there was no doubt that great terror had seized the minds of all the citizens.

Page 339, col. 2, vol. I.—ENGLISH-LATIN.

Nemo dubitat quin pro patriae libertate acerrime pugnaturi sitis; nemo dubitat quin fortiter pugnaverit; nemo dubitabit quin fortiter pugnaturus sit; nemo dubitabat quin fortiter pugnavisset; quis dubitat quin milites urbem expugnaturi sint? dubium non est quin studeatis servare honestatem; non dubito quin pater venturus sit; quis dubitat urbem religiose servaturus sim?

Page 339, col. 2, vol. I.—LATIN-ENGLISH.

My friend, diligently take care of your health; O boys, love learning; do not doubt concerning the immortality of the soul; my son, always preserve a clear conscience; let the scholar love the teachers; praise the good, blame the wicked; do not praise bad boys; let all men love God.

Page 339, col. 2, vol. I.—ENGLISH-LATIN.

Cura te, mi filii, matrem; Carole, ne dubita de bonorum immortalitate; servate, liberi, conscientiam rectam; liberi amante praeceptores; mi amici, amatote Deum; Carole, ne vitupera sororem.

Page 340, col. 1, vol. I.—LATIN-ENGLISH.

My parents removed into the city to dwell; the hostile army came to lay waste our fields; an unripe grape is bitter to the taste; troubles are hard to bear; thirst is most difficult to bear; pears are sweet to the taste; the nightingale singing delights our minds; the enemies come for the purpose of taking (about to take) the city; we ought not to doubt of the deathlessness of the soul; we should obey the precepts of virtue.

Page 340, col. 1, vol. I.—ENGLISH-LATIN.

Milites adventant regem liberatum; exercitus hostilis adventat urbem expugnatam; uvae maturae sunt dulces gustatu; uvae immaturae difficillimae sunt toleratu; adventant agros occupaturi (fut. part. act.); aves cantando animum delectant; pro patriâ fortiter (nobis) pugnandum est; milites adventaverunt pro domibus et uxoribus pugnatum.

Page 356, col. 1, vol. I.—LATIN-ENGLISH.

I exercise; I was exercising; he was exercising; I will exercise; I rejoice that thou art well; the teacher was rejoicing that you were obeying his commands; thou wast pleasing thyself, (thou wast) displeasing others; no forgetfulness will blot out the honour of virtue; I exercised; Greece flourished in all the arts; I praise you because you have properly exercised your mind in study; why were you silent? thy boy was suddenly (*repente*) silent; the mother was silent; all are silent; unless you have obeyed the precepts of virtue, the entrance to heaven will not be open to you; if thou hast restrained thy desires thou wilt be happy; I take care to improve (that I may improve) the morals, and to exercise the body of the boy; I advise you to observe (that you may observe) the commands of your father; I feared I was displeasing you; take care to improve the morals, and to exercise the body of the boy; I feared that an enemy was injuring me; the boy feared that his mother was silent; I took care to improve (that I might improve) the morals, and to exercise the body of the boy; I took care that you should improve the morals, and (that you should) exercise the body of the boy; I took care that the teacher should improve the morals, and exercise the body of the boy; I fear that you will (may) not come;

* Observe the difference of arrangement in the Latin.

the husband fears that his wife will (may) die; the teacher feared that (*ut*) the scholar would not obey his words; the bad boy fears that (*ne*) the teacher will come.

Page 356, col. 2, vol. I.—ENGLISH-LATIN.

Ille me monebat; illi regem monebant; ego vos monerem; vos me moneretis; illi puerum monuerunt; tu mulierem monebas; ego praeceptorem monebo; tace; tacete; tacento; mulier repente tacuit; cura ut emendes; cura (*take care*) ut civium mores emendes; timeo ne tibi displiceat; pueri timebant ne patri displicerent; omnibus placet; bonus malis displicebit; cur taces? metuunt ne Caesar patriam vincat; bonae sorores timent ut fratres valeant; valesne? timeo ut valeas; si corpus exercueris valebis; mater timet ut mihi aditus in coelum pateat.

Page 371, col. 2, vol. I.—LATIN-ENGLISH.

I am exercised; thou art exercised; he is exercised; I was exercised; thou wast exercised; he was exercised; I shall be exercised; you will be exercised; he will be exercised; father takes care that I am well exercised; the ditch is filled up; I take care that you are well exercised; I take care that the boy is well exercised; the father took care that his son was well exercised; I took care that you were well exercised; I took care that your daughter was well exercised; who knows not how our minds are increased by excellent fruits in the pursuit of learning; we fear that our army will (may) be conquered by the enemies; all the citizens feared that the city would be surrounded with a blockade (blockaded) by the enemies; when we are exercised in letters our minds are increased by the knowledge of many useful things; when we are frightened by a sudden danger we ought not forthwith to despair of safety; the honour of virtue will be blotted out by no forgetfulness; the boys have been strenuously exercised in the study of letters; we feared that the city had been surrounded by a blockade by the enemies; I fear that the soldiers have been frightened by a sudden danger; let the boy be strenuously exercised; be not deterred from the design by the difficulties of things; good scholars endeavour to be exercised in the study of letters; a boy well educated pleases all; the enemies being terrified remain in the camp; boys ought to be strenuously exercised.

Page 371, col. 2, vol. I.—ENGLISH-LATIN.

Pueri strenue exercentur; strenue exercentor pueri; pueri strenue exercendi sunt; pueri strenue exercebuntur; strenue exercentur pueri; pueri strenue exercebantur; pueri strenue exerciti sunt; pueri strenue exerciti erunt; curo ut pueri strenue exerceantur; curabam ut pueri strenue exercerentur; meae sorores strenue exercitae sunt; puella strenue exercita erit; metuo ne urbs obsidione cingatur.

Page 372, col. 1, vol. I.—LATIN-ENGLISH.

We have led; thou hast led; thou leadest; I was leading; he will lead; he may lead; while I was painting, thou wast writing, and brother was reading; the enemies were forming a line of battle; as long as you live, you will live well; if you cultivate virtue, good men will love you; the enemies formed a line of battle; the enemies will draw up their line of battle; we have written many letters (of the alphabet) to-day; the enemies carried on a most frightful war; Caesar had drawn up in line of battle; as soon as we have written the letters, we will walk; I take care that I cultivate the minds of boys; I took care that the teacher (praeceptor) cultivated the mind of my son; no one doubts that I have always diligently corrected the boy; we fear that the enemies have burnt the city; no one doubts that the enemies will surround the city with a blockade (will blockade the city); tell us what your parents have written; let him write; learn, O boy; good boys learn willingly; the soldier, bravely defending himself against enemies, is praised; we ought to restrain our desires.

Page 372, col. 1, vol. I.—ENGLISH-LATIN.

Urbem defendi; milites urbem defendebant; urbem defendent; urbem defenderunt; scribebant; ille literas scripsit; nemo dubitat quin tu bonas literas scripturus sis; cura ut literas scribas; praeceptor curat ut discipuli bonas literas scribant; hodie literas scripsi; hostes aciem instruent; milites urbem combusserunt; literas legi, quas scripsisti; metuo ne hostes urbem obsidione cincturi sint; corrige illum puerum; praeceptor curabit ut discipulos corrigat; narra mihi, quid patri dixeris; cupiditates coerceto; cupiditates coercere debemus; puer coercens cupiditates amatur; strenue animum cole, mi fili!

Page 387, col. 2, vol. I.—LATIN-ENGLISH.

My father takes care that I am strenuously cultivated; I take care that the boy is well cultivated; the father took care that the boy was well cultivated; I take pains, that I may be loved by thee; the conspiracy of Catiline was detected by Cicero; three most frightful wars have been carried on between the Romans and Carthaginians; labour and pleasure have been joined together by a certain natural relationship; many cities have been burnt by the enemies; scarcely had the enemies been beheld, when the soldiers were led out of the camp, in line of battle, by their general; we feared that the city had been blockaded by the enemies; let God be religiously worshipped; let not the laws of God be despised; wise men always strive to be governed by reason; boys must be well cultivated; be not conquered by your desires; you will not be rich, unless riches (shall) have been despised by you; despising pleasures, you are loved; so long as there is honour in learning, the Greek and Latin writers will be read in schools.

Page 387, col. 2, vol. I.—ENGLISH-LATIN.

Meus animus excolebatur; fratris mei animus excultus est; si animus excultus erit tu diligéris; divitiae ab sapientibus contemnuntur; divitiae a me contemnentur; divitiae a patre contemptae erunt; divitiae a te mi fili, contemnuntor; ratione regi studet; puer probe excolendus est; puer probe excolitor; curae mihi fuit ut voluptates a liberis meis contemnerentur; Latini Scriptores in schola mea leguntur; si bene vives, tu a bonis diligéris; metuo ut divitiae a te contemnantur; multa bella ab Anglis gesta sunt; urbs ab hostibus combusta est.

CORRESPONDENCE.

SELF-IMPROVEMENT.

Queen's Head, near Bradford, Yorkshire.

SIR,—I am now 28 years of age, and must confess that I have spent my time very ill; the fact is, I have studied without method, having had no one to direct me. Still I thought I knew a "thing or two," for I could perform a great many problems in geometry, yet I cannot find the contents of regular bodies, or explain the principle of their construction. I can draw perspective a *little*, and I am considered a moderate hand at mechanical drawing. I have also done a little at portrait painting! Yet, would you believe it, sir, before the *Popular Educator* made its appearance, I was totally unacquainted with the principles of English grammar and composition! But, I think I have now got hold of the "right end of the stick,"—thanks to you, sir; I hope, by careful attention, to make some progress in the right direction now. I shall feel obliged if you will give me your opinion of the following attempt at composition, and also of my hand-writing. I am studying "Wesley's Logic," besides English grammar: do you think that is a good work for a beginner?

THEME: *A good conscience fears nothing.*

A good conscience is the greatest blessing man can possess; but how is he to obtain it? Will he procure it by swearing, or by following other low and base practices? No; if he wishes to have a good conscience, (and by having a good conscience we mean an approving one,) he must "do unto others as he would they should do unto him;" he should not live for himself alone; but consider that he is only a link in the great chain of the human family, and that it takes many links to form the whole chain. His duty is to help his fellow man both by word and by substance, if it be in his power. Kind words cost nothing; and how often do they serve as a balm to our sores, when contrary words would make them bleed afresh? It may be asked,—what is conscience, or rather, consciousness? It is one of the faculties of the mind. Mind is composed of many faculties, of which the chief are reason and consciousness; their throne or seat is the brain; they govern all our actions, when not dethroned by passion; and we have nothing to fear when conscience applauds and reason points the way! Conscience holds the balance of justice, and never fails to reprove us when we are in the wrong, with its "still small voice." Let us, then, attend to its warnings; and instead of being led astray by specious, but unmeaning words,—breathed by empty headed fools or cunning rogues, let us use our reason; and when we are conscious that we have arrived at truth, let us leave prejudice and folly a march behind, and cleave to that which is good; then, and not till then, shall we be able to appreciate the truth of the remark—"A good conscience fears nothing."—I am, sir, ONE MORE USED TO A FILE THAN A PEN.

[We have inserted the above, as a very fair specimen of the utility of our journal to the working classes. We hope that many such specimens might be found out, if search was made; and if natural diffidence could be overcome. The preceding remarks are both just and well expressed; the only observation we would make is, that Conscience must be *well-informed* before its dictates can be thoroughly and implicitly trusted; and without the careful study of the Word of God, no conscience can lay claim to this important function. The necessity of a well-informed conscience is a subject on which we are the more called upon to make a few observations, inasmuch as the following lines of Pope have gained too much ground among the reading community:

"For *modes* of faith, let angry zealots fight,
His can't be wrong, whose life is in the right."

Now, we utterly deny that any man's life can be *in the right*, who follows an *erroneous mode* of faith. The bad effect of such a mode will sooner or later be seen in the life and conversation.]

ANSWERS TO CORRESPONDENTS.

J. R. KITCHENER (West Ham): English history will be given in the P. E. at some future period. In the meantime study Cassell's History of England, price 3s. 6d.—ARCHITAS (Hawarden): There is *no prize* offered for the quadrature of the circle.—R. HUMBLE (Hartlepool) is right on the difficulty in the explanation of the tides.—POOR STUDENT: Thanks for his intimation concerning lectures to schoolmasters at University College.—J. D. B. (Southend): 1. Yes. 2. No. 3. Thomson's School Chemistry, or Marcet's Conversations. 4. Yes. Thanks for his letter.—J. J. AYLWARD: A. N. R. N. S. very good.—A. W.: There is no rule without exceptions of some kind, which can only be learned by practice.—K. D. (London): We see nothing ungrammatical in these lines:—

Through the hamlet's flow'ry vale,
The vesper's bell is pealing;
" Gently on the evening gale
Its warning notes are stealing."

D. H. (Driffield): Thanks for his communication; he will see by this that we have decided on the subject. We advise him to read first Tytler's "Elements of General History," with continuation to the present time, edited by the Rev. B. Turner, M.A., published by Scott, Charterhouse-square, London. N.B.: Tytler was a Scotch lawyer, and a very clever fellow. His law name was *Lord Woodhouselee*. We fear that we must, to please our friends, take up the arduous task of teaching metaphysics and mental philosophy *ourselves!* Diaries waste much time; a simple *note book* is better. It is of no use to copy what is *in print*; have an index, and use references; we have made our *mind* our *diary*.—W. RUDD (Newby Wiske): We are glad that he and two others are about to study geometry.

A WARM FRIEND (Farnham): His suggestion is good; but we have so many good suggestions that to follow them all, we should have to give up our own plans entirely, and go to sea.—A MANCHESTER CLERK is quite right about the German.—ARTIST'S PUPIL (Sheffield) should consult an artist, or get a book of receipts.—L. L., A LITTLE GIRL, will now be pleased.—YOUNG PAINTER (Bradford): We shall see.—CARPENTER'S APPRENTICE: We have not seen the book; Dr. Beard's will be the best.—G. ROWLEY (Regis): See Lessons in Arithmetic, No. XVII. In subtracting, where the radix is 9, borrow 9, instead of 10, and carry one as usual; see also Cassell's Arithmetic, p. 50-55.—J. MURGATROYD (Idle): See vol. I., p. 288, col. 2, line 49. *Embonpoint* is a French word signifying *a good state of body, plumpness, fatness*.—EXCELSIOR (Bolton-le-Moors): Nothing answers so well as mahogany; Honduras or Bay mahogany, as it is called, may be had very cheap.—A YOUNG BEGINNER (Canterbury): See vol. I., p. 288, col. 2, line 49. Imitate our court-hand a little more.—J. H. EASTWOOD (Middleton): The students of Cassell's Euclid should solve the exercises by help only of the propositions preceding them.

F. JONES (Pentonville): It is better to draw from nature, if you can, than from copies.—R. PAUL (Gray's Inn): Consult the Royal Astronomical Society's monthly notices.—C. S. SEARCH: We thank him for his letter; the suggestions shall be kept in view.—H. J. M. (Manchester): Fulgur means *a flash of lightning*; fulgura, *flashes of lightning*, or simply *lightning in general*; fulgura requires terrant, and it might be rendered *flashes of lightning terrify*. Amplo, in the feminine, is a misprint for ampla. Andrew's translation of Freund's dictionary is capital; Kuhner's grammar is very good; both books will do very well.

T. HIRST: Thanks for his queries.—W. HOARE (Grosvenor-square): *Pitcairn's Island* is in Lat. 25° 4' S., and Long. 130° 10' W. You will only find it in a map of *Oceanica*, or *Australia and Polynesia*, as it is in the *South Pacific Ocean*, about 1,000 miles from Tahiti.—M. MCNAUGHT (Glasgow): We shall have an article on the subject.—HOPPNING (Leeds): Hymer's Conic Sections, Waud's Algebraic Geometry, or Hann's Analytic Geometry.—G. F. GIBBS (Wigan): Yes.—E. T. S. (Little Cookham): We think that the garden of Eden was destroyed by the flood.—J. GRAY (Netherinch): The best Testaments in Latin, English, French, and Greek, may be had of Messrs. Bagster, Paternoster-row, London; write to them for a catalogue. Your penmanship wont do yet.—T. AFRICA: We said that the use of the Matriculation examination was to become a *Member of the University of London!*—W. EDWARDS (Plymouth): 1. Tables of the weights, measures, and coins of France, cannot, we fear, be purchased alone. They are to be found in McCulloch's Commercial Dictionary. 2. We recommend all rules to be written out, as a large stride towards their recollection. 3. Will be answered again. 4. If you buy an article for 6d. and sell it for 7d., you gain $\frac{1}{7}$ of the buying price, and $\frac{1}{8}$ of the selling price, which is 16⅔ per cent. on the money laid out. 5. The weekly edition of "Uncle Tom's Cabin" is not abridged, but complete.—H. DUNKLEY (Plumstead): "Good workmen wanted in the trades of smith and wheeler," is quite corrrect.—G. DIBBLE (Camden-town): Try: we doubt.

S. ELMSLEY (Sheffield): We really do not know the law on the subject.—G. CHEETHAM (Stockport): We are glad to say we know nothing of the subject on which he writes to us.—W. R. (Bolton): We are glad our Penmanship has enabled him to write us such a fair letter at 40 years of age.—AMICI (Clitheroe): If they could help us through with our four present languages we should gladly begin Greek.—W. TIDMAN (Wormwood-street) will see what is meant by studying the examples in vol. I., p. 103.—J. STEVENSON (Carrickfergus): Many thanks.—CAROLUS (Alveston): The period of publication of the Latin dictionary is not yet fixed.—YOUNG NATURALIST: We cannot give him any advice on the subject.—W. V. U. (Bd. Castle): His exercises are very creditable.—JOHN MUS (Newtown): We shall do what we can to please him as one of our own pupils.—E. C. B. (Clifton): The references in the German and French are to the *second parts* of the lessons in each.—J. PATON (Cardiff): See vol. I., p. 115, col. 1.—LADY AMATEUR: We have not seen her composition, and therefore can't form an opinion.—J. F. WILSON (Syke): His question is a very ingenious one, and we shall insert it when the solutions of others which have not been yet solved are given.—D. LANCASTER (Leeds): Under consideration.—A. DEANS (Hill Dyke): Nisbet and Crocker on land-surveying, and Simms on levelling.—INQUIRER (Ugborough): *Aion*, from the Greek adverb *aei* or *aiei*, means *always, ever, for ever*; *le olam*, in Hebrew, is synonimous; for, a period *hidden as to its end*, is *everlasting*. Your ideas on propositions are very good; persevere, and obscurities will vanish. The extract from Barrow is given as to the use of a word in English, but it has no influence on the original tongues from which these words are said to be translated.

AN ADMIRER (London): We expect that rules for the doubling of final letters in such words as *ballot, balloted*, will be given in due course. The stereotyping perpetuates errors, which can only be corrected in a second issue.—W. C. (Pontypridd) wishes to know where Foden's Mechanical Tables are to be had.—J. MAINE (Wells): We would advise the members of the "Useful Knowledge Society" to apply to some eminent and philanthrophic individual in the neighbourhood for assistance and encouragement—say a minister, a merchant, a member of parliament, or a wealthy and liberal gentleman well known among the community; or, what would be better, let them form classes for teaching the young, and public lectures for adults, at a small rate of charge, and try and make the society self-supporting. Could not a reading room be added to its advantages? This ought to pay.—TYRO (Liverpool): We really can recommend nothing better than the P. E. for his particular purpose.

O. C. (Pimlico): You may get a German dictionary for a few shillings at an old book shop in Fleet-street, or the Strand.—J. W—N (Kilsyth): Very well.—E. P. BLACKBURN (Batley) should read more carefully; the references are to the *second part* of the Lessons in French and German.—J. J. AYLWARD (New Ross): For the encouragement of the New Rossians we insert the following:—

1. "A gentleman a horse did buy;
He was both lean and poor;
A golden guinea was his price,
And five good shillings more.
He fed this horse with oats and grass,
Till he got very sound,
And meeting with a purchaser,
He sold him for ten pound.
He lost by this one-fourth prime cost,
And half his feeding too;
What did the feeding stand him in?
Is all I ask of you."

2. Find two numbers whose sum and product are equal, neither of them being 2. We have not seen either Kavanah's or McGawley's arithmetic; but we presume that Cassell's is best for beginners. We shall be glad to hear of the establishment of the "New Ross Co-instruction Society." Query 4 is right; we shall see to the others.—A. H. (Alexandria), N. B., and YOUNG ASTRONOMER: We cannot answer their queries in our notices; they must wait till we treat of optics.—S. N. S. (St. Austel): We do not.—T. CARTER (Barking): Flugel's is better than Burchardt's. Dr. Beard will give rules for *et* and *que* in Latin.—ADMIRER and INQUIRER: Pelagius is generally considered to have been a native of Britain. Christian and American, *are both adjectives and nouns*. We may say *breads* if we speak of *different kinds of bread*, as we say *meats* when speaking of *different kinds of meat*. The statements of writers as to the number of words in the English language vary; we advise our correspondent to count for himself. We do not understand his last two questions.

LITERARY NOTICES.

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LESSONS IN PHONETIC SHORT-HAND.—No. III.

By Alex. Melville Bell, F.R.S.S.A.,

Professor of Elocution and Vocal Physiology, Member of the British Phonetic Council, Author of the "Principles of Speech and Elocution"—"The Elocutionary Manual"—"Steno-phonography,"—&c.

34. In all former systems of stenography, Vowels have been the great source of practical difficulty. Indispensable to the legibility of the writing, they could not be safely omitted; and the pen having to be lifted for each, their insertion occupied almost as much time as the writing of the more important parts of words—the articulations, or consonants. And the general effect of vowel pointing has been rather to indicate merely *where* vowels occurred than exactly *what* vowels. In systems founded on *letters*, the vowel marks could have but little other effect in the most careful writing, from the very vague manner in which vowel letters are used in our orthography; and even in systems founded on *sounds*, the practical result has been much the same, from the complexity of the notation, which, for the sake of simplicity in the alphabet, has too often sacrificed facility of application, by the variety of sounds assigned to each mark, as written dark or light, or in one or another of several easily confounded positions. With so many important niceties of size, place, &c., to be attended to, an exact application of the vowel points was rendered impracticable in rapid writing. In actual reporting, indeed, vowels could be rarely inserted at all; but they have been omitted, hitherto, only at a great sacrifice of legibility, and at the cost of much extra labour in revising the MS. while the subject was fresh in the mind, and inserting the vowel points—without which the notes could not be fully deciphered by another person, or even by the writer himself at a future time.

35. The present system attains all the advantages of the common vowel notation, *without the insertion of a single vowel mark*. The writing of the articulations—and that without any arbitrary characters for compound letters, but merely in application of the primary alphabet—not only shows unmistakeably where a vowel is to be sounded, but also,—removing all possibility of doubt and confusion,—points out where there is none. It, at the same time, leaves *room* for the insertion of the vowels at the proper places, and excludes them, by want of room, from improper places.

36. With this principle of implying or denying preceding vowels by the mode of writing the articulations, a scheme of vowel marks might very well be dispensed with; but though unnecessary for all the ordinary purposes of short-hand, it is of course indispensable for the accurate notation of speech as it is spoken, and will therefore be furnished in a future lesson. To a short-hand writer, the use of a *general* vowel mark might, in almost all cases, be sufficient in any system of stenography. Writing a language with which he is familiar, an indication of where vowels occur would rarely fail to direct him to the right word in any context. Fully three-fourths of all the words in the English language could be perfectly individualised by the insertion of a merely general vowel point. Now, in the present system, the reader is directed to this extent by the mode in which the simple "articulate skeletons" of words are written. The consonant outline of every word presents a positive indication of the position of its vowels; and even in ambiguous cases, the "articulate skeleton" shuts up the reader to so very limited a choice of words, that, in nineteen instances out of twenty, the context would infallibly guide him out of all ambiguity. Thus, for example—to take some words given in a previous illustration—the letters *p r t*, written with a full-sized R and a contracted *p* and *t*, cannot be *prate*, *parrot*, *upright*, *apart*, or *operate*, but must be either *pert*, *pert*, or *port*: the same letters with a full sized T, and contracted *p* and *r*, can be nothing else than *prate*; with full sized R and T, and contracted *p*, they must be either *parrot* or *pirate*; with the arrangements presented in the skeletons of *upright*, *apart*, and *operate*, they can indicate no other English words than these. In any doubtful case the reader has but to run over, mentally, the scale of the five alphabetic vowels, long and short, to discover the extent of the possible ambiguity. Thus with the letters *p r*-T (prut) he would think over

"prate, prete, prite, prote, proot,
prat, pret, prit, prot, prut,"

and discover that "prate" is the only English word containing the combination.

37. Proper names, technical terms, and foreign words, might frequently require the insertion of their appropriate vowels, to be intelligible to the general reader: but for hardly any other purpose will the learner of this system of short-hand ever require to make use of the vowel scheme.

38. The vowel words, *eye*, *awe*, *owe*, *aye*, *ay*, *oh* and *ah*, are denoted by an addition to the appropriate vowel symbols, to give them a distinctive appearance as words. A *dot* is added to the ordinary vowel mark for each of the first five words, and the mark of exclamation is added for the interjectional sounds *oh*! and *ah*! Thus:—

39. The letters Y and W are the connecting links between the two classes of sounds—vowels and articulations; *y* being of the same formation as the vowel *ee*, and *w* of the same formation as the vowel *oo*, but differing from these vowels by a close *action* of the organs, which cuts short the sound and deprives it of vowel purity, and of the effect of a syllable, which, if prolonged as a vowel, it would have. *Y* and *W* are always articulations at the beginning of a syllable, but never at the end of one in English. In such words, therefore, as *saw*, *chew*, *now*, *prey*, *boy*, *sky*, *plenty*, &c., there is no *y* or *w* to be written in short-hand—the letters being merely vowel signs.

40. Y and W are frequently pronounced when they are not written; as in *filial*, *minion*, *assuage*, *dessuetude*, &c., pronounced *fil-yal*, *min-yun*, *ass-wage*, *des-wes-tyood*, &c. The letters *e* and *i* before a vowel often take the sound of *y*, and *u* before a vowel is in many cases pronounced *w*; while the ordinary sound of the alphabetic or "long U" is not a simple element, but a compound of the *articulation y* and the vowel *oo*—being equivalent to *yoo* or *you*. So intimately connected is the sound "*yoo*" with the single letter U in English, that many persons might have a difficulty in recognising *y* as a necessary part of the phonetic notation of that letter, and would prefer to represent the combination by a single character. On this account, as well as for the sake of simplicity in writing some combinations, the letters *y* and *w*, written very small, and in vowel positions, are adopted as separate signs for *y* and *w* in combination with any vowel. These characters are called "yŭ" and "wu."

41. The following examples illustrate the use of the *w* and *y* combination marks—

Words.	*Marks.*	*Analysis.*
future		f-(yu)t-(yu)r
celestial		s-ul-us-t-(yu)l

Words.	*Marks.*	*Analysis.*
rebellious		r-ub-ul-(yu)s
virtuous		v-ur-t-(yu)u-s
quill		k-(wu)l
equality		uk-(wu)l-uty
swell		s-(wu)l
housewife		h-uz-(wu)f (pr. *huz-wif*)

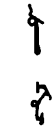
42. The *w* and *y* combination marks may be united to repeaters without lifting the pen. This increases brevity without endangering legibility. "Wŭ" added to a repeater, will form a curve at the right end or side, and "yŭ" a curve at the left end of the repeater; as in the following illustrations :—

Words.	*Marks.*	*Analysis.*
attitude		ut-ut-(yud)
outwitted		ut-(wut)-ud
ill-will		ul-(wul)
disuse		d-us-(yus)
quickwitted		k-(wuk)-wut-ud
desuetude		d-us-wut-(yud)

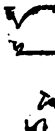
ABBREVIATIONS.

43. Our pupils have now before them, complete, the means of full unabbreviated phonetic writing. This, brief as it is, may be very greatly contracted by simplified modes of writing syllables and words of frequent occurrence or subordinate value. The following is a list of all the leading *Prefixes* and *Affixes*, with their contracted notation :—

Prefixes.	*Marks.*	*Explanation.*
circum mis		*A ring, in a vowel position.* The use of the same mark for these two prefixes can cause no confusion, as they are never followed by the same radical word. The illustrations are "*circumference*" and "*mistake.*"
uncircum unmis		The ring as above, *with a line drawn across it*, analogously to "crossing a thing out." The illustrations are "*uncircumcised*" and "*unmistakeable.*" [In the latter word the affix "able" is contracted.]
com con		A short line (*k*) crossing the beginning of the next character at any angle. The illustrations are "*compare*" and "*conceal.*"
incom-con uncom-con		The sign "com" negatively "*crossed out.*" The illustrations are "*incommode*" and "*unconcerned.*"

Prefixes.	*Marks.*	*Explanations.*
accom unaccom		The sign "com" enlarged to double size; and for "unaccom" analogously "*crossed out.*" The illustration is "*unaccommodating.*"
recom-con unrecom		A very short *r* prefixed to "com;" and for "unrecom" the *r* "*crossed out.*" The illustrations are "*recommend*" and "*un-recompensed.*"
irrecon		The *r* of "recom" enlarged to double size. The illustration is "*irreconciled.*"
miscom,con		The ring "mis" united to the line "com." The illustration is "*misconduct.*" [The *first* character should cross the *second*, and the *third* should be *thin.*]
counter		A very short *k* with a ring, written in a vowel position. The illustration is "*countermand.*"
exter extr		A *curve* with its exterior or convex side crossing the beginning of the next character. The illustration is "*extrinsic.*"
inter intr intro enter		A *curve*, with its interior or concave side crossing the beginning of the next articulation. The illustrations are "*intrinsic,*" "*introductory,*" and "*entertain.*"
super		A very small *sr* (*hook* and horizontal *r*) either in a vowel position or connected with the next character. There is no initial *sr* in English, therefore this contraction can cause no ambiguity. The illustrations are "*supercilious*" and "*superintendent.*"
trans		A very small *tr in a vowel position.* The illustration is "*transacted.*"
under		A very small *dr* in a vowel position. The illustration is "*undertake.*"
dis		A hook instead of a full *s*
ex (not acc)		A short instead of a full *k*
pos		A hook instead of a full *s*
sub		A short instead of a full *b*

Written, not in a vowel position, but in connection with the next character. The illustrations are "*distress,*" "*explicit,*" "*posterity,*" and "*substance.*"

undis &c.		The negative prefixes "in" "un" "im" may be indicated before "dis" "ex" "sub" and "pos" by analogously "*crossing out*" the first character. The illustrations are "*undiscovered,*" "*insubordination,*" and "*impossible.*"
discom &c.		The compound prefixes, "discom," "disaccom," "excom," "compos," "consub," &c., may be formed by uniting the simple prefixes, as in the illustrations—"*discomfiture,*" "*excommunicate,*" and "*consubstantiate.*"

cal
col
incal &c.
incalculable

A short instead of a full *l*, and the l *written upwards*, to distinguish the combination from c l, as in *clever*, which would have a downward l. This contraction is especially useful in words such as "*calculate*," "*colloquy*," &c., (the illustrations) where the prefix is followed by a *k* or a *q*. There can be no confusion between *cal* and *col*, as they are rarely, if ever, followed by the same radical word. The negative prefix, "in" or "un" may be indicated by "*crossing out*" the *l*—as in the last illustration, "*incalculable.*"

LESSONS IN LATIN.—No. XXXIX.

By John B. Beard, D. D.

IRREGULAR VERBS.

We now come to those verbs which custom characterises as the *the Irregular Verbs*, inasmuch as they greatly depart from the models supplied in the four conjugations; and first we present Possum.

1. Possum, posse, potui, *to be able.*

Possum consists of potis, *able*, and sum, *I am.* The potis is contracted into the stem pot, and pot before the *s* in sum, becomes pos; whence comes pos-sum.

Indicative Subjunctive. Present.		Indicative Subjunctive. Perfect.	
I am able.	*I may be able.*	*I have been able.*	*I may have been, &c.*
pos-sum	pos-sim	pŏt-ui	pot-uerim
pŏt-es	pos-sis	pot-uistis	pot ueris
pot-est	pos sit	pot-uit	pot-uerit
pos-sumus	pos-simus	pot-uimus	pot-uerimus
pot estis	pos-sitis	pot-uistis	pot-uerítis
pos-sunt	pos-sint	pot-ŭerunt (ēre)	pot-uerint.
Imperfect.		Pluperfect.	
I was able.	*I might be able.*	*I had been able.*	*I might have been,*
pot-ĕram	possem	pot-uĕram	pot-uissem [&c.
pot-eras, &c.	posses, &c.	pot-uĕras, &c.	pot-uisses, &c.
1st. Future.		2nd. Future.	
I shall be able.		*I shall have been able.*	
pot-ĕro		pot-uĕro	
pot-ĕris, &c.		pot-uĕris, &c	
Infinitive.		Participle.	
Pres. : pos-se, *to be able*		pot-ens (only as an adjective *powerful.*)	
Perf. : pot-uisse, *to have been able*		none	
Fut. : none.		none	

No Imperative.

It is thus seen that with the aid of potis the verb is formed by sum and its parts, of which the *ui* is for *fui*, the *f* or aspirate being dropped in combination to prevent the harshness of two consonants coming together, as pot-*fui*, &c.

Vocabulary.

Celare (aliquem aliquid) 1, *to conceal*; enumerare 1, *to number*; meditari 1, dep. (with acc.) *to meditate on*; pejĕrare (in its original form perjūro, from per, *through*; and jus, *right*), *to swear falsely*; constituĕre 3, *to appoint, ordain*; demittĕre 3, *to stand back from, desist, cease*; inducĕre 3, *to lead to, induce*; mitescĕre (no perf., no supine) 3, *to become mild, tame*; quam potuit maximis itineribus, *with the utmost speed*; effector, óris, m. *a creator*; situs, ûs, m. *place, position*; adeo, *to such a degree, greatly*; proinde quasi, *just as if*; casus (cado, *I fall*), ûs, m. *chance.*

Exercises.—Latin-English.

Pergite, pueri, atque in id studium, in quo estis, incumbĭte, ut et vobis honori et amicis utilitati et republicae emolumento esse possĭtis; nemo adeo ferus est ut non mitescĕre possit; hoc quotidie meditare, ut possis aequo animo vitam relinquere; quidam idcirco Deum esse non putant, quia non appāret nec cernĭtur; proinde quasi nostram ipsam mentem vidēre possĭmus; universum mundum quum cernĭmus, possumusne dubĭtare quin ei praesit aliquis effector et moderator? nihil tam difficile est quin (=ut non) quaerendo investigari posset; sic cogitandum est tanquam aliquis in pectus intĭmum inspicere possit, et potest; satis nobis persuasum esse debet, etiamsi Deum hominesque celare possimus, nihil tamen injuste esse faciendum; potestisne dubĭtare quin Deus universum mundum gubernet? non possumus; cur nobiscum ambulare non potes? Alcibĭades Athenas Lacedaemónii servire non potĕrat pati. Marcellus pedĭtes primum, deinde equĭtes, quanto maximo possent impetu in hostem erumpĕre jussit; Agesilāus non destĭtit quibus cunque rebus posset patriam juvare; Caesar quam potuit maximis itineribus, exercitum contra hostes duxit; casus est, quum sic aliquid evenit, ut vel non evenire vel aliter evenire potuerit; omnes mundi partes ita constitutae sunt, ut neque ad usum meliores potuerunt esse, neque ad speciem pulchriores; ante occupatur animus ab iracundiâ, quam providere satis potuit ne occuparetur; vix Caesar milites e castris educere potuerat, quam hostes impetum fecerunt; quid enumerem artium multitudinem sine quibus vita omnis nulla esse potuisset? quem ut mentiatur inducere possumus (eum) ut pejĕret exorare facile poterimus; dolorem si non potero frangĕre, occultabo; facile intelligitur nec figuram situmque membrorum nostrorum, nec ingenii mentisque vim effici potuisse fortunâ; hoc primum sentio nisi in bonis amīcitiam esse non posse.

English-Latin.

We cannot conceal wickedness from God; you cannot doubt that the world is governed by a mind; can the world be from nothing? out of nothing, nothing can arise; what can arise out of confused masses? can order arise out of chance? they could not allow good men to be punished; I will return home with the utmost speed; they will return home with the utmost speed; before I could speak I was seized; the world cannot be more beautiful; can those women be more fair? I will give thee a book if I am (shall be) able; he was unable to subdue his grief, but he will be able to conceal it; only among good men can friendship exist; if I could have come I would have told you all; unless they had been able to come we should have known nothing; canst thou take a walk? I shall be able to take a walk to-morrow; without the arts the life of man could not be.

2. Edo, edere, edi, esum, *to eat.*

This verb in its irregularities has an apparent identity with parts of the verb esse, *to be.* This arises from the changes required with regard to sound. The *e* in sum is short; in the parts of edere it is long, inasmuch as it involves a contraction.

Present Indic.: Edo, edis (*es*), edit (*est*), edimus, editis (*estis*), edunt.
Imperf. Subjunc: Ederem (*essem*), ederes (*esses*), ederet (*esset*), ederemus (*essemus*), ederetis (*essetis*), ederent (*essent*).
Imperative: Ede (*es*), edite (*este*), edito (*esto*), editote (estote), edunto.

The other parts are regular; only for editur, estur is found; and for ambedens, ambens, *eating round.* So the compounds comedo, comĕdis, comēs (*to eat up*), exedo, exedis, exēs (*to eat up or out*). Comedo has comesus, as well as comestus.

Vocabulary.

Symbŏla, ae, *a contribution*; de symbolis esse, *to eat at the common expense, to enjoy a pic-nic*; adolescentulus, i, *a young man*; argentum vivum, *quicksilver*; curculio, ónis, *the corn worm*; moles, is, f. *a mass*; familiaris, e, *belonging to the family*; res familiaris, *property, substance*; perrumpĕre 3, *to break through, break into*; vae, *woe! alas!* modicē, *moderately.*

Exercises.—Latin-English.

Esse oportet ut vivamus; non, vivere ut edamus; modĭce bibite et este; heri aliquot adolescentuli convenerunt ut de symbolis essent; haec herba acerba esu est; aegritudo lacĕrat, exest animum planeque conficit; curculiones frumentum exesse incipiunt; argentum vivum exest ac perrumpit vasa; majores nostri cavere non potuerunt, ne vetustas monumenta exesset; quae unquam moles tam firma fuit quam non exessent undae? vae vobis qui omnem rem familiarem luxuriâ comestis! fabulae narrant Saturnum liberos ex se natos comesse solitum esse; consūmit enim aetas temporum spatia.

English-Latin.

Saturn did not devour his children do you think that Saturn devoured his children? the waves eat away rocks; thou livest to eat; thou oughtest to eat in order to live; they eat very little; we are going into the country in order to enjoy a pic-nic; this bread is bitter to eat; corn-worms have eaten up the corn; old age devours all things; grief will devour the mind, and destroy life. they have eaten and drunk moderately; a wise man will eat little.

3. Fero, ferre, tuli, latum, *to bear.*

Present Active.	Present Passive.
Indic.: fero, *fers, fert,*	feror, *ferris, fertur,*
ferimus, *fertis,* ferunt,	ferimur, ferimini, feruntur,
Infinitive: *ferre,*	*ferri.*
Imperative: S. *fer, ferto,*	S. *ferre, fertor,*
ferto,	*fertor.*
P. *ferte, fertote,*	P. feriminor,
feruntо,	feruntor.
Imperfect Subjunctive.	Imperfect Subjunctive.
ferrem, ferres, ferret,	*ferrer, ferrēris* (e), *ferretur.*
ferremus, ferretis, ferrent,	*ferremur, ferremini, ferrentur.*

Imperative (of volo and malo none).

[illegible] P. 2, nolite, nolitote; 3, nolunto.

Participle.

[illegible] nolens, tis; (of malo none.)

The [illegible] are made from the perfect are regular, thus: [illegible] nolvero, volueram, voluisse, voluissem. The [illegible] are wanting.

Vocabulary.

[illegible] *be weary*, nobilitare, *to make known*, or celebrate; [illegible] *to make public*; sectari (with acc.), *to follow*, [illegible]; astringere, *to bind*; serius, a, um, *earnest, serious*; [illegible] *that binds*; acer, acris, acre, *sharp, energetic*; velim [illegible] *either I will or not, will-I, nill-I*; faber, bri, a workman; [illegible], *a carpenter*.

Exercises.—Latin-English.

[illegible] virtutem suam publicari vult, non virtuti laborat sed gloriae; [illegible] postea post mortem nobilitari volunt? ego non eidem volo [illegible] volui adolescens; si vis amari, ama; bono mentis [illegible] est, si beati esse volumus; docilis est qui attente vult [illegible]; omnia benefacta in luce se collocari volunt; si acres ac [illegible] esse vultis, magna saepe intelligetis ex parvis; quem [illegible] velis facere, simul attentum facias oportet; sic cum inferiore vivamus, quemadmodum nobiscum superiorem velimus vivere; [illegible] Socrates hanc viam ad gloriam proximam dicebat esse, si [illegible] id ageret ut qualis haberi vellet, talis esset; si quis veram gloriam adipisci volet, virtutis officiis fungi debebit; nolumus in conservandis bonis viris defatigari; homines nolunt eundem plurimis rebus excellere; si quid per jocum dixi, nolito in serium convertere; libero sum judicio, nulla ejusmodi adstrictus necessitate ut mihi, velim nolim, sit certa tuenda sententia; Socrates [illegible] ex carcere edûci quum facile posset; ego me Phidiam esse malem quam vel optimum fabrum lignarium; Utrum corporis an ingenii vires tibi augeri mavis? virtute in aliâ alius vult excellere; [illegible] id persuasum est ut nihil malint se esse quam bonos viros, [illegible] reliqua facilis est doctrina; vae vobis qui divitias quam virtutem sectari mavultis; malumus eum virtute paucis contenti esse, quam sine virtute multa habere; Aristides, Atheniensis, bonus esse malebat quam videri.

English-Latin.

They wish to be wise; they prefer to have wisdom rather than riches; do not wish to excel in luxury; I wish to excel in virtue; dost thou wish to take a walk with me? I would rather read this book; they refused to go from their homes; he will refuse to hear what thou wishest to say; if any one shall wish to become wise, let him read the best books; men are unwilling for the same person to have learning, riches, and power; I would rather have learning than riches; I prefer to be wise than to be rich; few prefer wisdom to power.

Aesopii Fabulae.

Viatores et Asinus.

Duo qui una iter faciebant, asinum oberrantem in solitudine conspicati, accurrunt laeti, et uterque eum sibi vindicare coepit, quod eum prior conspexisset. Dum vero contendunt et rixantur, nec a verberibus abstinent, asinus aufugit, et neuter eo potitur.

Corvus et Lupi.

Corvus partem praedae petebat a lupis, quod eos totum diem comitatus esset. Cui illi, "Non tu nos," inquiunt, "sed praedam sectatus es, idque eo animo, ut ne nostris quidem corporibus parceres, si exanimarentur."

in actionibus non spectatur quid fiat sed quo animo fiat.

Pastores et Lupus.

[illegible]tores caesâ ove convivium celebrabant. Quod quum lupus cerneret, "ego," inquit, "si agnum rapuissem, quantus tumultus fieret! At isti impune ovem comedunt!" Tum unus pastorum, "nos enim," inquit, "nostrâ non alienâ ove epulamur."

Tubicen.

Tubicen ab hostibus captus, "ne me," inquit, "interficite, nam inermis sum, neque quidquam habeo praeter hanc tubam." At hostes, "Propter hoc ipsum," inquiunt, "te interimemus, quod quum ipse pugnandi sis imperitus, alios ad pugnam incitare soles."—Fabula docet non solum malefícos esse puniendos, sed etiam eos qui alios ad male faciendum irritent.

Accipitres et Columbae.

Accipitres quondam acerrime inter se belligerabant. Hos columbae in gratiam reducere conatae, effecerunt ut illi pacem inter se facerent. Quâ firmatâ, accipitres vim suam in ipsos

columbas converterunt.—Hæc fabula docet potentiorum discordias imbecillioribus sæpe prodesse.

VOCABULARY.

Iter facere, *to travel*; una, *together*; oberro 1, *I stray*; sibi vindico, *I claim*; aufugio (ab and fugio) 3, *I flee*; viator, óris, m. *a traveller*; corvus, i, *a raven*; exanimor 1, *to be exhausted, die*; epulor 1 (dep.), *I feast on* (with abl.); tubicen, inis, m. *a trumpeter*; interimo 3, *I kill*; irrito 1, *to provoke, move, induce* (quâ refers to pax).

LESSONS IN GEOMETRY.—No. XIV.

LECTURES ON EUCLID.

In our last lesson, we brought before the notice of our students and readers, the fact of the existence of a "Geometry without Axioms," and made some useful extracts from that curious and ingenious work, particularly from the "Intercalary Book," in which the author demonstrates the truth of the axioms and postulates of Euclid. We should have been glad to continue these extracts for the benefit of our students, but they are too extensive, and perhaps rather too learned for the generality of our readers; we shall, therefore, content ourselves with giving the enunciations of the propositions and corollaries of the rest of the "Intercalary Book," recommending the whole work strongly to their attention as containing more ingenious and original thought in reference to the matters contained in the "First Book" of Euclid, than we have ever seen in any treatise or commentary on that book.

Prop. 2. Cor.: Any solid, surface, line, or figure, may be turned about any one point, or about any two points; such point or points remaining unmoved.

Prop. 8: From one of two assigned points to the other, may be described a line, which being turned about its extreme points, every point in it shall be without change of place. Such a line is called a *straight* line. A body or figure which is turned about two points in it that are also the extremities of a straight line (inasmuch as the whole of the straight line remains without change of place), is said to be *turned round such straight line*. When from any point to any other point, a straight line is described or made to pass; the two points are said to be *joined*. If to a straight line addition is made at either end, in such manner that the whole continues to be a straight line, the original straight line is said to be *prolonged*, and the part added is called its *prolongation*.

Prop. 8. Cor.: A straight line may be described or made to pass from any one point to any other point.

Prop. 9: Between two points there cannot be more than one straight line.

Prop. 9. Cor. 1: Two straight lines cannot inclose a space.

Prop. 9. Cor. 2: Any portion of a straight line is also a straight line.

Prop. 10: Two straight lines, which are not in one and the same line, cannot have a common segment.

Prop. 10. Cor. 1: If any two points in one straight line coincide with two points in another, the two straight lines shall coincide with one another to the extent of the length that is common to both, and be one and the same straight line throughout.

Prop. 10. Cor. 3: Any three points (which are not in the same straight line) being joined, there shall be formed a three-sided figure; and no point in any one side shall coincide with any one point in either of the other sides, except the points which were joined.

Prop. 10. Cor. 4: If two straight lines cut one another, they coincide only in a point.

Prop. 10. Cor. 5: Any straight line may be applied to any other, so that they shall coincide to the extent of the length common to both.

Prop. 10. Cor. 8: A terminated straight line may be prolonged to any length in a straight line. If to a plane surface, addition is made in any direction, in such manner that the whole continues to be a plane surface, the original plane surface is said to be *prolonged*, and the part added is called its *prolongation*.

Prop. 12: A surface may be described in which any two points being taken, the straight line between them lies wholly in that surface. Such a surface is called a *plane surface*; or when no particular boundaries to it are intended to be specified, a *plane*. A figure which lies wholly in one plane, is called a *plane figure*. The whole plane surface within the boundaries of a plane figure which is bounded on all sides, is called the *area* of the figure; and its whole linear boundary, of whatever kind or composition, is called the *perimeter*. When a straight line is said to be of *unlimited length*, the meaning is, that no point is assigned at which it shall be held to be terminated, but on the contrary it shall without further notice be considered as prolonged to any extent a motive may ever arise for desiring. If a given straight line in a plane be turned in that plane about one of its extremities which remains at rest, till the straight line is returned to the situation from which it set out; the plane figure described by such straight line is called a *circle*, and its boundary the *circumference*. The points in which one extremity of the straight line remains at rest, is called the *centre* of the circle. Any straight line from the centre of a circle to the circumference, is called a *radius* of the circle; and any straight line passing through the centre and terminated both ways by the circumference, is called a *diameter* of the circle. When a circle is said to be described about a given centre with a given straight line for radius, the meaning is, that it is described by the revolution of the given straight line about one of its extremities.

Prop. 12. Cor. 1: A plane surface may be prolonged to any extent in a plane.

Prop. 12. Cor. 2: If a straight line in a plane be prolonged, its prolongation lies wholly in that plane.

Prop. 12. Cor. 3: A circle may be described about any centre, and with any radius.

Prop. 12. Cor. 4: All the radii of the same circle are equal. And circles that have equal radii, are equal.

Prop. 12. Cor. 5: Any straight line from the centre of a circle to a point inside being prolonged, cuts the circumference in a point only.

Prop. 13: Any three points are in the same plane. [That is to say, one plane may be made to pass through them all.]

Prop. 13. Cor. 1: Any three points which are not in the same straight line being joined, the straight lines which are the sides of the three-sided figure that is formed, lie all in one plane.

Prop. 13. Cor. 2: Any two straight lines which proceed from the same point, lie wholly in one plane.

Prop. 13. Cor. 3: If three points in one plane (which are not in the same straight line) are made to coincide with three points in another plane, the planes shall coincide throughout, to any extent to which they may be prolonged.

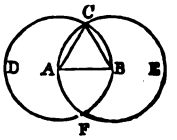
We now proceed to explain the Propositions of the First Book of Euclid in proper order. In so doing, we shall not repeat Euclid's Demonstrations in full, seeing that we have already published these in Cassell's edition (the cheapest by far that ever was given to the public); but we shall give either an abridgement of them in a form that will be useful to learners and beginners, or else a new demonstration of them altogether; especially, in those cases where the old is difficult, circuitous, or tedious. We shall then solve or demonstrate all the exercises appended to each proposition in Cassell's edition; where the corollaries in that work require either demonstration or elucidation, it shall be given; and where practical illustrations can be introduced with facility, it shall be done.

BOOK I.

PROPOSITION I.

PROBLEM.—*To describe an equilateral triangle upon a given finite straight line.*

Fig. 1.



In fig. 1, let AB be the given straight line, on which the equilateral triangle is to be described.

From the point A as a centre, and with the straight line AB as a radius, describe the circle BCD. From the point B as a centre, and with the same straight line BA as a radius, describe the circle ACE. Then, from the point C, draw straight lines to the points A and B, that is, join CA and CB; and the figure ABC having the three sides AC, CB, and BA, is an equilateral triangle; in other words, these three sides are equal to each other.

The reason of this is very plain; by the definition of a circle, all its radii are equal (*Def.* 15). Therefore, the different radii AC and BC, are each equal to the common radius AB. Wherefore (*by Axiom I.*), the two radii AC and BC, are equal to each other. It follows, therefore, that all the three radii AB, AC, BC, are equal to each other, and the triangle is equilateral (*Def.* 24).

In the demonstration of this proposition it is taken for granted that the two circles BCD and ACE must intersect each other. This case is included in the general proposition, that if the radii of two circles, and the distance between them be such, that of the straight lines which represent them, or which are equal to them respectively, any two are greater than the third, these circles must intersect each other. The demonstration of this proposition is generally either appended to the 22nd prop.

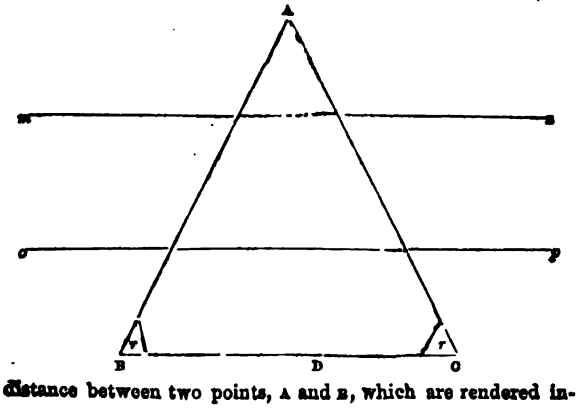
of Book I., or is included in its demonstration. In the present case, if the straight line A B be produced both ways to meet the circumferences of the two circles in the points D and E, it is plain that because A B is greater than A D, the circumference of the circle B C D will cut A E between A and E, and therefore the circle A C E cannot lie wholly within the circle B C D. Also, because D B is greater than B E, the circle B C D cannot lie wholly within the circle A C E. Neither can the two circles be wholly without each other, because A D and B E are together greater than A B. Therefore, the two circles must intersect each other.

From the construction of this problem, it is plain that upon any given straight line, there can be described two separate equilateral triangles, namely, one on each side of the straight line; because the circles intersect each other in two opposite points, C and F; where C is the vertex of the triangle A B C, and F the vertex of another triangle which would be formed by joining F A and F B. The figure formed of these two triangles would be a rhombus, but this cannot yet be mathematically demonstrated, although sufficiently obvious to the drawer of the figures. Neither can it yet be proved that the two circles must cut each other in two points, and only in two.

The exercise upon this proposition in Cassell's edition, viz., "To describe an isosceles triangle upon a given finite straight line, that shall have each of its sides double the base," has been already solved in Vol. I., p. 110, col. 1. Here we may add another which cannot be demonstrated, until we reach the 32nd proposition of Book I. In fig. 1, suppose C F to be joined; then let D C and D F be joined; and the triangle C D F shall be equilateral. Also, let E C and E F be joined; and the triangle E C F shall be equilateral, and equal to the triangle C D F.

Scholium 1.—It is obvious enough to any one that considers the nature of an equilateral triangle, that since the three sides are equal to one another, the three angles must be equal to one another, on the principle of the *sufficient reason*; viz. that whatever reason may be assigned, from the nature of the sides, to show that any two angles are *unequal*, the *same reason* may be assigned to show that any other two angles are *unequal*; therefore, all the three angles must be *equal* to one another. The fact that they *are equal*, however, follows as a natural consequence, from the demonstration of the *fifth* proposition of Book I. We shall, therefore, not forestall our reasoning much, by assuming that if the three *sides* of a triangle be equal to one another, the three *angles* of that triangle are equal to one another. The *converse* of this proposition is equally true, and is a natural consequence of the *eighth* proposition of Book I., viz. that if the *three angles* of a triangle are equal to one another, the *three sides* are also equal to one another. The principle of the *sufficient reason* will apply in this case. It may also be at once inferred that all equilateral triangles are *similar*, that is, have their angles *equal*, and their sides *proportional*.

Scholium 2.—The preceding principles being admitted as legitimate, we have a practical method, derivable from them, of measuring the length of any inaccessible distance. Suppose, for instance, that in fig. (A) we wished to know the



distance between two points, A and E, which are rendered inaccessible by reason of a river running between them, whose banks are represented by the lines *m n* and *o p*. If we place an equilateral triangle *r* (say, framed of wood) horizontally, at the point E, so that by looking along the first edge of it, we see the point A, and along the second edge of it, the point D; then, by transferring it to another point, C, in the direction of the straight line E D, and placing it horizontally at that point, we see the point A, along a *third* edge of it, and the point E, backwards, along the *second* edge of it; we are then assured that the figure A E C is an equilateral triangle, and that the distance E C is the same as the distance E A or A C; we have, therefore, only to measure the accessible distance E C, and instantly we know not only the inaccessible distance E A, which was required, but also the inaccessible distance C A. This method may be so varied as to measure perpendicular distances as well as those that are inclined at any angle whatever. The adjustments necessary for this purpose, will readily suggest themselves to the ingenious student.

LESSONS IN FRENCH.—No. XLII.

By Professor Louis Fasquelle, LL.D.

Section XCVII.

Practical Resumé of the Rules on the Past Participle.—I.

The participle past is variable under any of the following conditions:—

1. When employed as an adjective; in which case it agrees in gender and number with the noun which it qualifies:—

Des livres imprimés.	*Printed books.*
Ces femmes paraissent bien abattues.	*Those women appear very dejected.*

2. When used in the formation of the tenses of passive verbs; when it always agrees with the *subject* of the proposition:—

Elles sont bien reçues de tout le monde.	*They are well received by everybody.*

3. When employed in forming the compound tenses of neuter verbs having *être* as an auxiliary; in which place, as in the preceding case, it agrees with the *subject* or *nominative*:—

Votre sœur est partie ce matin.	*Your sister went away this morning.*

4. When employed in forming the tenses of active verbs having *avoir* as an auxiliary; in which connexion it agrees not with the subject, but with the *direct object* or *regimen*, provided that object *precedes* it:—

Les maisons que nous avons achetées	*The houses which we have bought.*

5. When used along with *être* in the formation of the compound tenses of reflective verbs, wherein the reflective pronoun is the direct object; in which position it agrees with that *pronoun* or *direct object*:—

Ces dames se sont flattées.	*Those ladies have flattered themselves.*

6. When used along with *être* (as in Rule 5) in the formation of the compound tenses of those reflective verbs, in which the reflective pronoun is not the direct, but the indirect object of the proposition; in which event it agrees with the *direct object*, provided (as in Rule 4) that object *precedes* it:—

Les histoires qu'elles se sont racontées.	*The stories which they related to each other.*

7. When forming part of a compound tense of a verb governing a succeeding infinitive, it is at the same time preceded by a direct object which is represented as performing the action denoted by the infinitive; in which condition it agrees with that direct object:—

Les dames que j'ai entendues chanter.	*The ladies whom I heard sing (singing).*

8. When in a sentence containing the pronoun *en*, the participle is preceded by another object or regimen which is direct; in which case it agrees with that *direct object*:—

Je les en ai avertis.	*I have warned them of it.*
Vous les en avez informés.	*You have informed them of it.*

Résumé of Examples.

Vous avez des livres bien reliés.	*You have well bound books.*
Vos filles sont estimées.	*Your daughters are esteemed.*
Ces terres sont bien labourées.	*Those lands are well ploughed.*
Mes voisines sont tombées d'accord.	*My neighbours have come to an understanding.*
Elles sont venues nous trouver.	*They came to us.*
La victoire que nous avons remportée.	*The victory which we have gained.*
Les champs que vous avez labourés.	*The fields which you have ploughed*
Vous vous êtes repentis de votre faute.	*You have repented (you) of your fault.*
Elle s'est souvenue de sa promesse.	*She remembered her promise.*
Les soldats que j'ai vus passer.	*The soldiers whom I saw passing.*
Les musiciennes que j'ai entendues jouer.	*The musical ladies whom I heard playing.*
L'indiscrétion que nous nous sommes reprochée.	*The indiscretion with which we reproached one another.*
Les événements qu'elles se sont racontés.	*The events which they related to one another.*
Les fruits que j'en ai reçus.	*The fruits which I received from it.*
Les nouvelles que j'en ai apportées.	*The news which I brought from it.*

Exercise 193.

A l'ordinaire, *as usual.*	Fleur, *f. flower.*	Reproch-er (se), 1. *ref. to reproach one's self.*
Avert-ir, 2. *to warn.*	Malade, *sick person.*	Ri-re, 4. ir. *to laugh.*
Boue, *f. mud.*	Merveille (à), *wonderfully, perfectly.*	Sérieux, se, *serious*
Coutume (de), *usually, usual.*	Parven-ir, 2. ir. *to succeed.*	Souri-re, 4. ir. *to smile.*
Cueill-ir, 2. *to gather.*	Port-er (se), 1. *to be, to do.*	Suivant, *according to.*
Déchiffr-er, 1. *to decipher.*	Plus tôt, *sooner, earlier.*	Tomb-er, 1. *to fall.*
Décourag-er, 1. *to discourage.*		Trou-er, *to find.*
		Vol-er, 1. *to steal.*

1. Cette demoiselle ne se trouve-t-elle pas bien fatiguée. 2. Elle est fatiguée et découragée. 3. Votre sœur est-elle allée à l'église suivant sa coutume? 4. Ma mère et ma sœur y sont allées. 5. Votre sœur est-elle revenue plus tôt que de coutume. 6. Elle est revenue plus tard qu'à l'ordinaire. 7. Cette pauvre malade est-elle tombée? 8. Elle est tombée dans la boue. 9. Ma mère est-elle parvenue à déchiffrer ma lettre? 10. Elle n'y est pas parvenue. 11. Quelles fleurs avez-vous cueillies? 12. Les fleurs que j'ai trouvées sont plus belles que celles que vous m'avez envoyées. 13. Votre cousine ne s'est-elle pas bien portée? 14. Elle s'est portée à merveille. 15. De quel livre vous êtes-vous servie, Mademoiselle? 16. Je me suis servie du vôtre. 17. Nous nous sommes servies des nôtres. 18. Quelles fautes votre fils s'est-il reprochées? 19. Les fautes qu'il s'est reprochées ne sont pas sérieuses. 20. Les avez-vous vus rire? 21. Je les ai vus sourire. 22. Les avez-vous vus voler des fruits? 23. Je les ai vus voler des pommes. 24. Les avez-vous avertis de leurs fautes? 25. Je les en ai avertis. 26. Je ne les en ai pas avertis.

Exercise 194.

1. Are your books well bound? 2. They are well bound, and well printed. 3. Did not your little girl find herself discouraged? 4. She found herself tired, but not discouraged. 5. Have your sisters come to an understanding? 6. They have not come to an understanding. 7. My brothers have come to an understanding. 8. Who came to you? 9. Your friends came to us. 10. Is not your sister gone to church? 11. My sister is gone to church as usual. 12. Did your sister return sooner than usual? 13. My sister returned later than usual. 14. Are the fields which you have ploughed large? 15. The fields which I have bought are very large. 16. Where are the gentlemen whom you saw pass? 17. The ladies whom I heard sing are in their room. 18. Did your poor sister fall? 19. Did that poor sick woman fall in the mud? 20. Did your sister succeed in reading that book? 21. She succeeded in reading it. 22. Have you warned your sisters of their danger? 23. I have warned them of it. 24. I have not warned them of it. 25. What pen has your mother used? 26. She has used mine. 27. Have not those young ladies used my book? 28. They have not used it. 29. Has your mother been well? 30. She has been perfectly well. 31. Has she remembered her promise? 32. She has remembered it. 33. Have you seen those boys laugh? 34. I have seen them smile. 35. Have you seen them play? 36. I have heard them play.

Section XCVIII.

Practical Résumé of the Rules on the Past Participle.—II.

The participle past is invariable:—

1. In active verbs, when the direct regimen follows the participle:—

Mes nièces ont étudié leurs leçons.	*My nieces have studied their lessons.*
Elles ont négligé leurs études.	*They have neglected their studies.*

2. In neuter verbs conjugated with avoir:—

Mes cousines ont disparu.	*My cousins have disappeared.*
Les cinq heures qu'elles ont dormi.	*The five hours which they have slept.*

In the latter sentence, the word *pendant* is understood after *heures*:—

Les cinq heures *pendant les quelles* elles ont dormi.	*The five hours during which they slept.*

3. In unipersonal verbs, whether conjugated with être or with avoir:—

Les chaleurs qu'il a fait cette année.	*The heat there has been this year.*
Il est arrivé bien des malheurs.	*Many misfortunes have happened.*

4. In reflective or pronominal verbs, of which the second pronoun is an indirect regimen, when no direct regimen precedes:—

Elle s'est proposé de partir.	*She proposed to herself to leave.*

5. When the participle precedes an infinitive, and is preceded by a direct regimen, and this direct regimen is not the actor, but the object acted upon. In this case the infinitive is generally rendered in English by the passive voice:—

Les chansons que j'ai entendu chanter.	*The song which I heard (being) sung.*

6. When the direct regimen preceding a participle is not the object of this participle, but of a verb following:—

La règle que je vous ai conseillé d'étudier.	*The rule which I advised you to study.*

7. The participle of faire, *fait*, followed by an infinitive, is always invariable:—

Je les ai fait raccommoder.	*I have had them mended.*

8. After the pronoun *en*, when no direct regimen precedes:—

Vous a-t-on donné des fleurs?	*Have they given you flowers?*
On m'en a donné.	*They have given me (some) of them.*

Résumé of Examples.

Elles nous ont donné de bons conseils.	*They have given us good advice.*
Elles nous en ont donné.	*They have given us some.*
Les trois lieues qu'il a couru.	*The three leagues which he ran.*
Les années que ces édifices ont duré.	*The years that those edifices have lasted.*
La belle journée qu'il a fait hier!	*What a beautiful day it was yesterday!*
C'est la plus belle fête qu'il y ait eu.	*It is the finest feast that there has been.*
Il s'est présenté deux de vos amis.	*There appeared two of your friends.*
Ces demoiselles se sont mal.	*Those young ladies have injured one another.*
Les Asiatiques se sont fait une espèce d'art de l'éducation de l'éléphant. BUFFON.	*The Asiatics have made the education of the elephant a kind of art.*
Elle s'est imaginé l'idée de pouvoir réussir.	*She conceived the idea, that she might succeed.*
Les fruits que j'ai vu voler.	*The fruits which I saw being stolen.*
Les soldats blessés que j'ai vu porter.	*The wounded soldiers whom I saw (being) carried.*
La chanson que j'ai entendu chanter.	*The song which I heard sung.*
Les pommes que je vous ai défendu de manger.	*The apples which I forbade you to eat.*
Je les ai fait partir.	*I obliged them to leave.*
Elles m'ont apporté des oranges	*They have brought me oranges.*
Elles m'en ont apporté.	*They have brought me (some) of them.*

Exercise 195.

Auberge, *f. inn.*	Jou-er, 1. *to play.*	Pièce, *f. piece.*
Bien, *m. good.*	Habill-er, 1. *to dress.*	Raconter, 1. *to relate.*
Dernier, e, *last.*	Dorm-ir, 2. *to sleep.*	Reven-ir, 2. ir. *to return.*
Disparaît-re, 4. ir. *to disappear.*	Lion d'Or, *m. Golden Lion.*	Soieries, *silk goods.*
Enterr-er, 1. *to bury.*	Mort, e, *dead.*	

1. Quelle auberge vous a-t-on recommandée. 2. On m'a recommandé l'auberge du Lion-d'Or. 3. Quelles nouvelles avez-vous apportées? 4. J'ai apporté des nouvelles agréables. 5. Vos voisines sont-elles habillées? 6. Elles ne sont pas encore habillées. 7. Ont-elles bien dormi la nuit dernière? 8. Elles n'ont pas bien dormi. 9. Quand sont-elles arrivées? 10. Elles sont arrivées à quatre heures et demie. 11. Ont-elles dormi plus de cinq heures? 12. Les six heures qu'elles ont dormi leur ont fait beaucoup de bien. 13. Vos sœurs se sont-elles amusées? 14. En jouant elles se sont fait mal au bras. 15. Se sont-elles raconté notre conversation? 16. Elles se la sont racontée. 17. Vos amies ont-elles disparu? 18. Elles n'ont pas disparu; elles sont revenues chez elles. 19. Les soldats que vous avez vus partir; sont-ils revenus? 20. Ils sont morts; je les ai vu enterrer. 21. Ne les avez-vous pas fait étudier? 22. Je les ai fait lire. 23. Avez-vous apporté des soieries? 24. Je n'en ai pas apporté. 25. Les soieries que j'en ai apportées sont superbes.

Exercise 196.

1. Have you not recommended my nieces? 2. I have recommended them. 3. Have you brought me good oranges? 4. I have brought you some. 5. Have you given any to my two daughters? 6. I have given them some. 7. I would have given them some, if I had had many. 8. Have you not neglected your studies? 9. I have not neglected them; I never neglect them. 10. The years which that church has lasted, speak in favour (*en faveur*) of the architect. 11. The ten miles which he has run, have fatigued him. 12. Have your sisters injured each other? 13. They have flattered themselves. 14. Did my friends present themselves? 15. There came three of your sisters. 16. What did they imagine? 17. She conceived the idea of reading Tasso (*Le Tasse*). 18. Have you seen them (m.) steal my apples. 19. I saw them steal your peaches. 20. Have you heard them (f.) sing? 21. I have heard them sing. 22. The songs which I heard sung are not new. 23. I found in your room the books which I had forbidden you to take. 24. The peaches which I have forbidden you to eat, are not ripe (*mûres*). 25. Have you seen those soldiers? 26. I saw them pass last week. 27. I saw them carried to the hospital (*à l'hôpital*) this morning. 28. Have you brought oranges from France? 29. I brought some. 30. The oranges which I brought from it (*en*) are good. 31. Have you brought silk goods? 32. I have brought some. 33. I have brought none. 34. Are the silk goods which you brought from that place good? 35. I brought but two pieces.

LESSONS IN ENGLISH.—No. XXXII.

By John R. Beard, D.D.

LATIN STEMS.

Language is full of instruction, because it is the embodiment, the incarnation, so to speak, of the feelings, and thoughts, and experiences of a nation; yea, often of many nations, and of all which through centuries they have attained to and won. It stands, like the Pillars of Hercules,* to mark how far the moral and intellectual conquests of mankind have advanced; only not like those pillars, fixed and immovable, but ever itself advancing with the progress of these;—nay, more, itself a great element of that advance; for "language is the armoury of the human mind, and at once contains the trophies of its past and the weapons of its future conquests." The mighty moral instincts which have been working in the popular mind, have found therein their unconscious voice, and the single kinglier spirits that have looked deeper into the hearts of things have sometimes gathered up all they have seen into some word which they have launched upon the world, and with which they have enriched it for ever—making in that new word a new region of thought to be henceforward, in some sort, the common heritage of all. Language is the amber in which a thousand precious and subtle thoughts have been safely embedded and preserved. It has arrested ten thousand lightning flashes of genius, which, unless thus arrested and fixed, might have been as bright, but would also have been as quickly passing and perishing, as the lightning. Words convey the mental treasures of one period to the generations that follow; and laden with this, their precious freight, they sail safely across gulfs of time in which empires have suffered shipwreck, and the languages of common life have sunk into oblivion. And for all these reasons, far more and mightier, in every way, is a language than any one of the works which may have been composed in it. For that work, great as it may be, is but the embodying of the mind of a single man; this of a nation. The "Iliad" is great, yet not so great in strength, or power, or beauty, as the Greek language. "Paradise Lost" is a noble possession for a people to have inherited, but the English tongue is a nobler heritage yet.†

One of the most elegant writers in our language, Mrs. Barbauld, who in her husband's school superintended the lessons in English composition, was accustomed to pursue a plan which to some extent is similar to what I recommend, and which for many years I followed in my own school. Lucy Aikin, her biographer, tells us "on Wednesdays and Saturdays the boys were called in separate classes to her apartment; she read a fable, a short story, or a moral essay to them aloud, and then sent them back into the school-room to write it out on their slates in their own words. Each exercise was separately looked over by her; the faults of grammar were obliterated, the vulgarisms were chastised, the idle epithets were cancelled, and a distinct reason was always assigned for every correction; so that the arts of enditing and of criticising were in some degree learnt together. Many a lad from the great schools, who excels in Latin and Greek, cannot write properly a vernacular (from Lat. vernaculus, *native*) letter, for want of some such discipline"‡

I recommend, and strongly recommend, the study of Mrs. Barbauld's writings. At any rate "The Evenings at Home," to which she contributed several of the best pieces, should be in the hands of all my students.

Latin Stems.

Latin words.	*Stems.*	*English words.*
curro, *I run*	*cur, curr*	incur, *curr*ent, current
cursus, *a running*	*curs, cour*	excursion, succour
datus, *given*	*dit, dat*	addition, *date*, datum, data
decor, (decōris), *grace*	*decor*	*decor*ous, *decor*ation
dens (dentis), *a tooth*	*dent*	*dent*ist, in*dent*ation
deus (dei), *a god*	*dei*	*dei*ty, *dei*fy
dexter, *right-handed*	*dexter*	*dexter*ity, *dexter*ous
dico, *I say*	*dict*	*dict*ate, pre*dict*, *dict*ion
dies, *a day*	*di*	*di*al, *di*ary, meri*di*an
medius, *middle*	*medi*	*medi*ate, *medi*ocrity
dignus, *worthy*	*digni*	*digni*ty, *digni*fy
diurnus, *daily*	*diurn, journ*	*diurn*al, *journ*al
doceo, *I teach*	*doc, doct*	*doc*ile, *doct*or, *doct*rine
doleo, *I grieve*	*dol*	*dol*e, *dol*orous, con*dole*
dominus, *a master*	*domin*	*domin*eer, *domin*ion
domus, *a house*	*dom*	*dom*estic, *dom*icile
donum, *a gift*	*don*	*don*ation, *don*or
duco, *I lead*	*duc, duct*	*duct*, induce, educate
duo, *two*	*du*	*du*al, *du*el
durus, *hard*	*dur*	*dur*able, *dur*ance
ebrius, *drunken*	*ebri*	*ebri*ety, in*ebri*ate
edo, *I eat*	*ed*	*ed*ible
ego, *I*	*ego*	*ego*tist, *ego*tism
emo, *I buy*	(e)*em*, *empt*	red(e)*em*, exemption
flecto, *I bend*	*flect*	re*flect*, in*flect*
flexus, *bent*	*flex*	*flex*ible, *flex*ile
flictus (fligo), *dashed*	*flict*	con*flict*, a*flict*
flox (floris), *a flower*	*flor*	*flor*al, *flor*ist
fluctus, *a wave*	*fluctu*	*fluctu*ate
fluo, *I flow*	*flu*	*fluent*, in*fluence*
fluxus, *a flowing*	*flux*	re*flux*, ef*flux*
foedus (foedĕris), *a treaty*	*feder*	*feder*al, con*feder*ate
foro, *I bore, pierce*	*for*	per*for*ate
fors (fortis), *chance*	*fort*	*fortuitous*, *fortunate*
fortis, *strong*	*forti*	*fortify*, *fortitude*
fossa, *a ditch*	*foss*	*fosse*
fossus, *dug*	*foss*	*fossil*
frango, *I break*	*frag, fring*	*fragment*, in*fringe*
fractus, *broken*	*fract*	*fracture*, *fraction*
frater, *a brother*	*frater, fratri*	*fraternal*, *fratricide*
frigeo, *I am cold*	*frig*	*frigid*, re*frig*eration

* The rocks on each side of the Straits of Gibraltar, were called by the ancients "The Pillars of Hercules."

† See an excellent and most instructive (though in style too ambitious) manual "On the Study of Words, by R. C. French, B.D. London, 1858.

‡ "The Works of Laetitia Barbould." Memoir, p. 35.

Latin words.	*Stems.*	*English words.*
fructus, *fruit*	*fructi*	*fructify*
fruor, *I enjoy*	*fru*	*fruition*
fugio, *I fly*	*fug*	refu*ge*, subter*fuge*
fugitum, *to fly*	*fugit*	*fugitive*
fulmen (fulminis), *lightning*	*fulmin*	*fulminate*
fundo, *I pour*	*fund*	re*fund*
fusus, *poured*	*fus*	*fusible*, in*fuse*, re*fuse*
gelu, *frost*	*gel, geal, gelat*	con*geal*, con*gelation*, *gelat*-
gens (gentis), *a nation*	*gent*	*gentile*, *gentee*l [inous
genu, *a knee*	*genu*	*genu*flexion
gero, *I carry*	*ger, gest*	belli*gerent*, *gesture*, *digestion*
exter, *outward*	*exter*	*external*, *exterior*
faber, *a workman*	*fabr*	*fabric*, *fabricate*
facilis, *easy*	*facil, facul* / *facul*	*facilitate*, *faculty* / difficult
facio, *I make*	*fact, fect, fit* / *fic, fy*	*factor*, per*fect*, bene*fit* / *soporific*, *purify*
sopor (sopōris), *heaviness, sleep*	*sopor*	*soporiferous*
fallo, *I deceive*	*fall*	*fallacious*, in*fall*ible
fanum, *a temple*	*fan*	pro*fane*, pro*fanation*
fari, *to speak*	*fa*	*fable*, ine*fable*
fatus, *spoken*	*fat*	*fate*, *fatal*
felix (felicis), *happy*	*felic*	*felicity*
femina, *a woman*	*femin*	*feminine*, e*feminacy*
fero, *I bear*	*fer*	*ferry*, in*fer*, circum*ference*
ferveo, *I boil*	*ferv*	*fervid*, e*fervescence*
fidēlis, *faithful*	*fidel*	*fidelity*, in*fidel*
fido, *I trust*	*fid*	con*fide*, dif*fidence*
filia, *a daughter* / filius, *a son*	*fili*	*filial*, af*filiate*
filum, *a thread*	*fil*	*filament*
fingo, *I feign*	*fig*	*figment*
fictus, *feigned*	*fict*	*fiction*, *fictitious*
finis, *an end*	*fin*	*final*, *finite*, *definite* / *definitive*
fiscus, *the imperial treasury*	*fisc*	*fiscal*, con*fiscate*
fissus, *cleft*	*fiss*	*fissure*
flatus, *a puff of wind*	*flat*	*flatulent*, in*flate*

"Modern languages have only one variation, and so the Latin; but the Greek and Hebrew have one to signify two, and another to signify more than two; under one variation (the former) the noun is said to be of the *dual* number, and under the other of the plural."—*Clarke*, "Latin Grammar."

"A duel, called by the Greeks monomachia (*single-fight*), and by the Latins duellum, receiving its denomination from the persons engaged in it, is properly a fight or combat between *two* persons."—*South*.

"I suppose I need not take any pains to prove the unlawfulness, nay, the sottishness of such *duellings*, when men sold their lives for a crown or an angel; and by a preposterous way of labouring not to get their living, but to procure their death."—*South*

"There is one kind of *egotist* which is very common in the world. I mean those empty, conceited fellows who repeat as sayings of their own, or some of their particular friends, several jests which were made before they were born, and which every one who has conversed in the world has heard an hundred times over."—*Spectator*.

"If a pawnbroker receives plate or jewels as a pledge or security for the repayment of money lent thereon, on a day certain, he has them upon an express contract or condition to restore them, if the pledger performs his part by *redeeming* them in due time."—*Blackstone*.

"A just, though terrible, judgment of God upon these play-hunters and *prophaners* of his holy day."—*Prynne*.

"Somewhat allied to this (blasphemy), though in an inferior degree, is the offence of *profane* and common swearing."—*Blackstone*.

"When one tossed his weaver's beam, and the other carried the gates of Gaza, they performed their prodigious feats by tender *filaments*, slighter than a cobweb, undiscernible with a microscope"—*Search*, "Light of Nature."

Definite and definitive are synonymous, that is, words which come near in meaning to each other; I say *near in meaning*, for there are few pairs of words that have exactly the same force. Definite and definitive, as coming from finis, *an end*, agree in that they both put an end to a matter: a definite answer puts an end to your question by speaking so clearly, and so exactly, as to leave no room for its repetition; but a definitive answer puts an end to the matter in issue as well as to the question. By a definite answer I leave you in no doubt as to my meaning; and by a definitive answer I put a negative on your proposal. Honest men, and clear-minded men, give definite answers; men who have come to a final conclusion pronounce a definitive judgment.

"They never have suffered, and never will suffer, the fixed estate of the church to be converted into a pension, to depend on the treasury, and to be delayed, withheld, or perhaps to be extinguished, by *fiscal* difficulties."—*Burke*, "French Revolution."

"And all their landes, goodes, and possessions were *confiscate* and seased to ye kynge's vse."—*Hall*, "Richard III."

"There are other subterraneous juts and channels, *fissures* and passages, through which many times the waters make their way."—*Derham*, "Physico Theology."

To *refuse* comes immediately from the French, refuser. But whence the French? From refutare, says Richardson; and certainly refutare, both in good and in middle-age Latin, primarily signifies to *put down*, *put back*, *refuse*, and only derivatively *to prove logically wrong*. But this view makes to *refuse* and to *refute* the same in origin. Besides, the *t* and *s* are not exchangeable. It seems less incorrect to derive *refuse* from re and fundo, (fusus, *fusion*), which thus means a *pouring* or *handing back*. *Refuse*, the noun, signifying *rubbish*, comes from the same root, only it takes its special import from a custom which prevailed in some cathedral and collegiate churches, according to which those who held the benefices were required to put together every year into a common treasury, for the common use, some portion of their income. That portion was seldom the best, and hence the refusio, as the Latin name for the common contribution was, refuse in English, came to have a bad character, and to be nearly equivalent to our *rubbish*. Rubbish, or, in an older form of the word, *rubbage*, is that which was rubbed off (Latin, *detritus*), as refuse is that which is poured or thrown back.

EXERCISES IN COMPOSITION.

HISTORICAL THEME.

The Mission of Moses to Pharaoh.

Words with their proper Prepositions..

	F. R.
Compelled to,	pello, *I drive*
Compliance with,	plica, *a fold*
Composed of,	compono, *I place together*
Concede to,	cedo, *I yield*
Conceive of,	concipio, *I take together*
Concerned at, for,	concerner, *to regard*
Concur with, in,	curro, *I run*
Condemn to,	damnum, *injury*
Condescend to,	descendo, *I go down*
Conduce to,	duco, *I lead*
Confer on,	fero, *I bear*.

Study and endeavour to reproduce the following gem from the German of Krummacher:—

THE SEVEN CHILDREN.

Early in the morning, as the day began to dawn, the devout father of a family arose with his wife from the couch, and thanked God for the day, and for their refreshing slumber.

But the glow of morning beamed into the little chamber where their seven children lay in their beds asleep.

Then they gazed at the children one by one, and the mother said, "They are seven in number; alas! it will be hard for us to find them food." Thus sighed the mother, for there was a famine in the land.

But the father smiled, and said, "See, do they not lie there, all the seven? And they have all red cheeks, and the beams of the morning stream over them, so that they appear lovelier than ever, like seven blooming roses. Mother, that shows us that He who creates the morning and sends us sleep, is true and unchangeable."

As they stepped from the chamber, they saw at the door fourteen shoes in a row, growing smaller and smaller, two by two, a pair for each child. The mother gazed at them, and when she saw that they were so many, she wept.

But the father said, "Mother, why dost thou weep? Have not all the seven received sound and active feet? Why, then, should we be anxious about that which covers them? If the children have confidence in us, should we not have confidence in Him who can do more than we can comprehend?

"See, his sun rises! Come, then, like it let us begin our day's work with a cheerful countenance."

Thus they spoke, and toiled at their labours, and God blessed the work of their hands, and they had enough and to spare, they and their seven children; for faith gives strength and courage, and love elevates the soul.

LESSONS IN GERMAN.—No. XXXII.

Section LXIII.

Auch (also) often corresponds to our word *ever* in compounds. Ex.: So groß er auch iſt, ich will es doch mit ihm aufnehmen; *however* large he is, I will enter into the contest with him, (literally, take it up with him.) Wer es auch ſein mag; *whoever* he may be. Was er auch ſagen mag; *whatever* he may say.

Sometimes it is best translated by *even*. Ex.: Wenn er auch krank iſt, ſo will ich ihm doch nicht helfen; even if he is sick, nevertheless I will not help him.

I. Selbſt, when it *precedes* the subject, or the object, is likewise generally rendered by "*even*." Ex.: Selbſt der Tod trennte ſie nicht; even death did not separate them. Selbſt das Wiederſehen ſeiner Freunde vermochte nicht ihn zu erheitern; even the meeting again of his friends was not able to enliven him.

Exercise 66.

Ab'halten, to hinder;	Dringen, to penetrate;	Ohr, *n.* ear;
Armuth, *f.* poverty;	Gefühl'voll, sensitive, feeling;	Preiſen, to praise;
Auf'nehmen to take up, to contest;	Geſang', *m.* song, singing;	Redlich, honestly;
Au'ßenſeite, *f.* exterior;	Gewinn, *m.* gain, profit;	Säen, to sow;
Aus'wählen, to select, choose out;	Hart, hard;	Sieger, *m.* victor;
Bedin'gung, *f.* condition, proviso, terms;	Hell, bright;	Sogar', even;
Beglei'tung, *f.* attend nt, escort;	Jedermann, every one;	Tapferkeit, *f.* valour;
Beharren, to persevere;	Krachen, *n.* roar;	Ton, *m.* strain, melody;
	Liſtig, cunning;	Treu, faithful;
	Muthlos, disheartened;	Unkraut, *n.* weed, tare;
		Unterſtützung, *f.* support, assistance;
		Wachſen, to grow.

An'haltend fall'ende Waſſ'ertropfen höhlen mit der Zeit ſogar' einen Stein aus.
Perpetually falling water-drops, in time hollow out even a stone.

So ſchwer auch die Prüfung für ihn war, ſo hat er ſie doch beſtan'den.
Severe as the trial was for him, he has nevertheless endured it.

Wenn auch die Welt un'tergehen ſollte, ſo will ich dennoch auf den Herrn trauen.
Even if the world should perish I will still trust on (in) the Lord.

Wer er auch ſein mag, und was er auch ſein mag, ich fürchte mich nicht vor ihm.
Whoever he may be, and whatever he may be, I do not fear him.

So viel auch die Leute über ihn ſprachen, ſo mußten ſie doch alle ſeine Hand'lungen bill'igen.
However much people spoke of (about) him, they were yet obliged to approve his actions.

1. Sogar die Sieger prieſen die Tapferkeit der Beſiegten. 2. Der Geſang rührte ſogar die härteſten Gemüther. 3. Die Töne der Muſik drangen ſogar bis an unſere Ohren. 4. Man kann ſogar hier das fröhliche Lachen der Kinder hören. 5. Wie kann man von Andern verlangen, was man ſelbſt nicht thun mag? 6. Man muß ſich ſelbſt achten. 7. Das Unkraut wächſt von ſelbſt, ohne daß man es ſäet und pflegt. 8. Die Armuth ſelbſt ſoll mich nicht abhalten, redlich zu handeln. 9. Wenn auch Sie mich verlaſſen, dann habe ich keinen Freund mehr. 10. O, wenn auch dieſe Zeit ſchon da wäre! 11. Wenn er auch eine rauhe Außenſeite hat, ſo hat er doch ein gefühlvolles Herz. 12. Wenn ihr auch dieſes thut, dann will ich euch gut belohnen. 13. So viel auch Eurer ſind, ich nehme es mit jedem auf. 14. So viel auch Heinrich arbeitet, ſo bringt er doch nichts fertig. 15. So viel er auch ſprach, ſie hörten ihn doch nicht. 16. Was auch geſchehen mag, ich werde ihm treu bleiben. 17. Was auch für Nachrichten kommen, ſie werden nicht muthlos. 18. Was auch mein Freund beginnt, er hat kein Glück. 19. Was es auch ſein mag, Niemand ſoll es erfahren. 20. Er hat ſogar nicht Geld genug, um Brod zu kaufen. 21. Wir müſſen Jedermann lieben, ſelbſt unſere Feinde. 22. Ich kann ſelbſt unter dieſen Bedingungen ihren Vorſchlag nicht annehmen. 23. Er konnte ſogar unter allen Büchern das ſchönſte auswählen.

1. Whatever he may say, I shall presevere. 2. Even with that profit they were not contented. 3. The mishap of this family was so great, that they even asked assistance of strangers. 4. Even I shall not depart with attendants. 5. The moon does not give us so much light as the sun, even when she shines the brightest. 6. Whatever your friend may be, you will not obtain it. 7. Whoever this young lady be, she is very unpolite 8. However cunning they may be, they are sometimes mistaken. 9. Great as my poverty may be, I shall not become disheartened. 10. Whatever the news may be, impart it to me. 11. Whatever advantages may be offered to him, he will not accept of them. 12. Whatever faults he may have committed, I will forgive him. 13. Even in the heat of the battle, and amidst the roar of cannons, the commander rode quietly to and fro. 14. However great my misfortune may be, nobody shall perceive it. 15. Even the king must obey the law. 16. Even my adversary praised my valour.

Section LXIV.

Pflegen, besides its primary meaning, (Sect. 47.) has in both the present and imperfect, the signification, "to be accustomed," "to be wont;" as, er pflegte zu ſagen; he used to say. Er pflegt zu reiten; he is accustomed to ride (on horseback.)

I. Achten or Acht followed by auf, is used thus: Ich achte auf das, was (Sect 70. II.) ich höre; I give attention to that which I hear. Ich werde Acht auf ihn haben; I will attend to him (have attention on him.) Er nimmt ſich in Acht; he takes care of himself. Wir müſſen uns vor dem Böſen in Acht nehmen; we must guard ourselves against the wicked (take ourselves in attention before the wicked.)

Exercise 67.

Allein', alone, but;	Hamſter, German marmot;	Schmeichler, *m.* flatterer;
Ameiſe, *f.* ant, emmet;	Kleinod, *n.* jewel, treasure;	Selbſt'erkenntniß, *f.* self-knowledge;
Appe'tit', *m.* appetite;	Lebensunterhalt, *m.* subsistence;	Sommer *m.* summer;
Chriſtus, *m.* Christ;	Müſ'ſiggang, *m.* idleness, sloth;	Sorgen, to care, to take care;
Dachs, badger;	Opfern, to offer, sacrifice;	Tugend, *f.* virtue;
Damit', therewith;	Pflegen, to foster;	Vor'tragen, to place before, present;
Ei'chenhain, *m.* grove of oak;	Regie'rungsantritt, *m.* accession, to the government;	Winter, *m.* winter;
Geburt, *f.* birth;		Wiederher'ſtellen, to restore.
Geſundheit, *f.* health;		
Glatt, smooth;		
Gut, *n.* good, gift, blessing;		

Ein guter Vater ſorgt mehr für den geiſtigen Schmuck ſeiner Kinder, als für den leiblichen.
A good father cares more for the intellectual, than for the corporeal adorning of his children.

Ein jeder Menſch trägt wegen der Zukunft Sorge.
Every man has a concern for the future.

Vor einem falſchen Menſchen ſoll man ſich mehr in Acht nehmen, als vor einer giftigen Schlange.
One should guard himself more against a treacherous person than against a poisonous serpent.

Er hat mehr Acht auf ſeine Umgebung, als auf ſich ſelbſt.
He has more concern about his neighbourhood than about himself.

Gebet Acht auf lehrreiche Geſpräche und behaltet das Beſte.
Give attention to instructive conversation, and retain the best.

Socrates pflegte zu ſagen, er wiſſe weiter nichts, außer das, daß er nichts wiſſe, und ſo pflegt noch heutigen Tags jeder Beſcheidene und ſelbſt der Geſcheidteſte zu ſagen.
Socrates was accustomed to say he knew nothing farther, than that he knew nothing; and so at the present day, every discreet person, yea, even the most discreet, is accustomed to say.

1. Derjenige, welcher in der Jugend ſorgt, braucht im Alter nicht Sorge zu tragen. 2. Habe Acht auf Dich, nicht nur in Geſellſchaft fremder Leute, ſondern auch wenn Du allein biſt, damit (Sect. 77.) Du Dich ſelbſt kennen lernſt. 3. Derjenige, welcher nicht immer auf ſich Acht giebt, kommt nie zur Selbſterkenntniß. 4. Die alten Deutſchen pflegten gewöhnlich in alten Eichenhainen ihren Göttern zu opfern. 5. Gute Kinder pflegen (Sect. 47.) ihre Eltern in ihrem Alter. 6. Meine Freunde pflegen des Morgens Waſſer zu trinken. 7. Des Morgens und des Abends pflegt er der Ruhe. 8. Wir pflegen, anſtatt des Thees, Kaffe zu trinken. 9. Seiner Geſundheit zu pflegen iſt ihm eine große Sorge. 10. Er pflegt des Morgens zu arbeiten und des Nachmittags zu leſen. 11. Derjenige, welcher des Müſſigganges pflegt, pflegt auch der Sünde. 12. Pflegen der Tugend und

nicht des Lasters. 13. Er pflegt nicht vor acht Uhr aufzustehen. 14. Man pflegt nicht in Amerika, wie in Deutschland, zu sagen: „Ich wünsche Ihnen einen guten Appetit." 15. Der Mensch sorgt oft mehr, als nöthig ist, um seinen Lebensunterhalt zu gewinnen. 16. Die Ameise sorgt schon im Sommer für ihre Nahrung auf den Winter. 17. Der deutsche Kaiser Maximilian I. trug gleich bei seinem Regierungsantritt Sorge, die innere Ruhe Deutschlands wieder herzustellen. 18. Fleißige Schüler geben Acht auf das, was ihre Lehrer vortragen, um es im Gedächtnisse zu behalten. 19. Wer (Sect. 70.) das Seinige in Acht nimmt, braucht nicht zu darben. 20. Nehmen Sie sich in Acht vor einem Schmeichler. 21. Der Schwache muß sich vor dem Starken in Acht nehmen. 22. Ich will den Schlüssel in Acht nehmen.

1. Guard yourself against those who have smooth words, or bad thoughts and a treacherous heart. 2. He cares more for his soul than for his body. 3. We are accustomed to drink tea instead of coffee. 4. The Greeks fostered art and science long before the birth of Christ. 5. He is accustomed to rise at six o'clock. 6. I will take care of this book, till you return. 7. He takes care of his health. 8 Give attention to thyself, not only when you are in society, but also when you are alone. 9. Good children give attention to that which their parents tell them. 10. We must guard ourselves against our enemies. 11. A German-marmot takes care in the summer of his food for the winter. 12 Give attention to the health of your soul and your body, for they are the noblest gifts to man and his greatest treasures.

Section LXV.

Umhin (around there) is used only in connection with können. Ex.: Ich konnte nicht umhin es ihm zu sagen; I could not (get) *around*, i. e., I could not help, or avoid, telling it to him. Ich habe nicht umhin gekonnt es zu thun; I could not help doing it.

I. „Spazieren" (to take a walk, to take an airing) signifies, in union with gehen, fahren, reiten, führen, to take a walk, to take the air in a coach, to ride out, or take the air on horseback, to lead about, or on a walk. Ex.: Eine Stunde des Tages ausgenommen, in welcher er seine Schwester spazieren führt, sitzt er beinahe immer an seinem Schreibtische und studirt, während sein jüngerer Bruder lieber spazieren geht, spazieren reitet, oder in Gesellschaft einiger Freunde spazieren fährt; one hour of the day excepted, in which he conducts his sister on a walk, he is almost alway sitting at his writing-desk and studying, while his younger brother prefers to go a walking, to ride on horseback, or to take a drive in company with a few friends.

II. „Thun" (to do) is in some phrases used impersonally. Ex.: Es thut nichts; it does or effects nothing; i. e. it is no matter. Es thut Noth; it is necessary.

III. Behüte, and bewahre, or, Gott behüte, Gott bewahre, are often used, especially in conversation, to denote aversion, abhorrence, fear, &c., and may commonly be rendered, "God forbid."

Exercise 68.

Arg, bad;
Aus'bildung, *f.* cultivation;
Behand'lung, *f.* treatment;
Beleidigen, to offend;
Bemer'ken, to observe;
Bewei'sen, to prove;
Bewer'ben, to sue for;
Blick, *m.* look, glance;
Brüsten, to be proud, to show airs;
Curgast, *m.* guest (under cure);
Danken, to thank;
Entflie'hen, to flee, escape;
Entwen'den, to purloin;
Groß thun, to boast, brag;
Hinwen'den, to turn to;
Indem, in that, while;
Italien, *n.* Italy;
Kenntniß, *f.* knowledge;
Nie'dersinken, to sink down;
Ohnmächtig, weak, swooning, fainting;
Panzern, to arm with a coat of mail;
Platte, *f.* plate, crown (top);
Rennthier, *n.* reindeer;
Schlitten, *m.* sledge, sleigh;
Schnelligkeit, *f.* rapidity;
Tadel, *m.* blame, censure;
Taunusgebirge, *n.* Taunusgebirge, a mountain near the Rhine;
Umhinkönnen, (See above);
Unglaub'lich, incredible;
Versa'gen, to refuse;
Vorsätzlich, intentionally;
Wand, *f.* wall (of a house);
Wenden, to turn, change;
Wissenschaftlich, scientifically;
Zubringen, to spend, pass away;
Zuträglich, advantageous, conducive to.

Es ist eine vortreff'liche Sache, keine Bedürf'nisse zu habe; oder wenn man nun einmal nicht umhin' kann, ei'nige zu haben, doch wenigstens nicht mehr zu haben, als man schlech'terdings haben muß.

It is an excellent affair to have no necessities; or, if now one cannot once avoid having some, nevertheless, at least, not to have more than one is absolutely obliged to have.

Es thut freilich für den Au'genblick wehe, eine Züchtigung zu erhal'ten, die wir nicht verdient' haben; aber in'dem wir uns unsrer Unschuld erin'nern, lernen wir schnell das Erlittene vergess'en.

It causes pain, indeed, for the moment, to receive a correction that we have not merited; but while we remember our innocence, we soon learn to forget what we have suffered.

Indem' er aber also gedach'te, siehe, da er'schien' ihm ein Engel.

While he thus thought, however, behold there appeared an angel unto him.

1. Diejenigen, welche zu viel spazieren gehen, gewöhnen sich endlich an den Müssiggang. 2. Eine halbe Stunde nach dem Essen spazieren gehen, ist der Gesundheit sehr zuträglich. 3. In Italien fahren Viele mit Maulthieren spazieren. 4. Man sieht gewöhnlich mehr Herren spazieren gehen, als spazieren reiten. 5. Die Curgäste in Wisbaden reiten oft auf Maulthieren auf die Platte des Taunusgebirges. 6. Reisen zu Fuß sind oft angenehmer, als zu Wagen oder zu Pferd. 7. Die Lappländer fahren auf Schlitten und bedienen sich der Rennthiere anstatt der Pferde. 8. Er verwandte beinahe kein Auge von seinen Verwandten, die er in so langer Zeit nicht gesehen hatte, und freute sich ihrer Erzählungen. 9. Für diesen jungen Soldaten haben sich die meisten Officire bei dem General verwendet. 10. Ich wandte mich in meiner Noth an meine Freunde; allein wo ich mich hinwandte, sah ich nur gleichgültige Blicke. 11. Er entwandte mir (§ 129. Obs.) meine Uhr und einige andere Gegenstände, ohne daß ich es bemerkte. 12. Derjenige, welcher mit seinen Kenntnissen groß thut, beweist damit, daß er weniger weiß, als er sich brüstet und andere glauben machen will. 13. Sie werden doch nicht (Sect. 44. IV.) glauben, daß ich Sie vorsätzlich beleidigt hätte? 14. Gott behüte! ich habe nie so etwas Arges (Sect. 15. IV.) von Ihnen geglaubt und glauben wollen. 15. Sie werden bei diesem schönen Wetter doch nicht zu Hause bleiben wollen? 16. O bewahre! ich habe nicht Lust, einen so schönen Tag zwischen den vier Wänden meiner Stube zuzubringen. 17. Es haben sich mehrere um dieses Amt beworben, und zwar (Sect. 44. IV.) folgende. 18. Ich kann nicht umhin Ihnen zu sagen, daß mir diese Behandlung nicht gefällt. 19. Ich kann nicht umhin, Ihnen recht herzlich zu danken. 20. Als ich auf den Wolf schießen wollte, versagte* mir die Flinte.

1. He could not help expressing his censure. 2. Preserve us, O Lord, from sin. 3. I could not help forgiving the wrongs which I had endured. 4. While he said this he sank down fainting. 5. We shall ride slowly to the park. 6. The queen took an airing on horseback yesterday. 7. This merchant boasts of his riches. 8. The Arabian rides on horseback with incredible rapidity. 9. When the knights of olden times rode to war, their horses were armed with a coat of mail. 10. Kings and princes are accustomed to take a drive with six horses. 11. When he could have escaped, his strength failed him. 12. The wood is used for building. 13. He has devoted the greatest part of his youth to scientific pursuits. 14. Journeys through the Rhine valley are more agreeable on foot than on horseback. 15. John leads his sister about the park, while her father rides on horseback.

LESSONS IN NATURAL HISTORY.—No. XIII.

THE CIVET CAT.

(Order *Carnivora.*)

The civet, of which we give an engraving, is somewhat more than two feet long from the nose to the insertion of the tail, and its tail is upwards of a foot in length. The colour of the animal's fur is an ash grey, and is marked with large blackish or dusky spots. The hair is of a coarse texture, and along the back stands somewhat erect, like a mane. The body is rather

* Would not go off, i. e. missed fire.

thick; the forehead is broad, the muzzle acute, and black at the tip. There are three black stripes which proceed from the back of the ear, and terminate at the shoulders and throat. Like all nocturnal animals, the civet is torpid and indolent during the day, nor does it ever display much of either intelligence or docility.

This animal is celebrated for its musky perfume, the product of a peculiar glandulous apparatus. The name civet, first applied to the odoriferous substance, is of Arabian origin, but the animal has received the same appellation. The civets are found in all the warm parts of Asia and Africa, in the island of Madagascar, and in the East Indian islands.

The perfume of the civet is so strong, that it infects every part of the creature, and so completely are the skin and hair penetrated with it, that they will retain the odour long after their removal from the body. If the animal is irritated, the scent becomes exceedingly powerful; and were a person shut up in a room with a civet, the odour would be scarcely supportable.

The peculiar substance by which it is yielded is a fatty secretion, about the consistence of honey or butter, of a lively white colour when fresh, but darker when it has been kept for some time. It is produced by both sexes, and is contained in two cavities, or pockets, placed beneath the tail; these cavities are smooth internally, and covered with numerous small pores, connected with the glands from which it is secreted.

Civet is often noticed as a perfume by our elder dramatists, and although long fashionable, was not even then adapted to every taste. Thus Massinger makes one of his characters say:—

> "Lady, I would descend to kiss your hand,
> But that 'tis gloved, and civet makes me sick."

Our poet, Cowper, gave expression to a similar feeling:—

> "I cannot talk with civet in the room,
> A fine puss-gentleman that's all perfume;
> The sight's enough—no need to smell a beau—
> Who thrusts his nose into a raree-show?
> His odoriferous attempts to please
> Perhaps might prosper with a swarm of bees;
> But we that make no honey, though we sting,
> Poets are sometimes apt to maul the thing.
> 'Tis wrong to bring into a mix'd resort,
> What makes some sick, and others *a la mort*,—
> An argument of cogence, we may say,
> Why such a one should keep himself away."

Civet was formerly much employed in medicine, but it is now seldom used except as a perfume, giving some smell to watery and spirituous liquors. The Italians use it for perfumed oils, and as oils dissolve the entire substance of the civet, they thus secure the whole of its scent. When genuine, its value is from thirty to fifty shillings an ounce.

Although the animals which produce this drug are inhabitants of hot countries, they were long kept in great numbers, and with a commercial view, at Amsterdam, sometimes called the Venice of the north, and which, in respect of situation, number of the canals, and the magnificence of its public and private edifices, certainly bears some resemblance to the Venice of the south. The practice was to feed the civets with boiled meat, eggs, birds, small quadrupeds, and fish, and thus to increase the amount of odorous substance. As soon as the receptacle of any civet was supposed to be nearly full, the animal was put into a long cage, so narrow that it was unable to turn round in it. The cage had a door behind, through which a small spoon was introduced into the pouches of the animal, which were thus carefully scraped, and their contents deposited in a proper vessel. This operation was usually performed twice or thrice a week.

In many parts of the East Indies and of the Levant, civets are reared and fed as domestic animals are with us. As, however, particularly in the Levant, they are few in number, and brought from a great distance, the perfume is increased by introducing into the pouches of the animal a small quantity of butter, or other fatty substance. The equally strange practice is then resorted to of shaking the civet violently, beating it, and, in fact, enraging it as much as possible. This accelerates the secretion; and the fat, after having imbibed a great portion of the perfume, is frequently used instead of the genuine substance. Adulteration is also practiced by mixing civet with storax, and other balsamic and odoriferous substances.

THE CIVET CAT.

In its native state, the civet feeds on birds and small animals. Though naturally savage and ferocious, it is said to be tamed without very great difficulty. In such circumstances it requires but little drink, and its food consists principally of boiled fish, eggs, and rice. Of fish it is particularly fond. Its voice is stronger than that of a cat, and resembles the cry of an enraged dog. The civet is possessed of great agility, leaps with all the nimbleness of a cat, and, like that animal, captures its prey by pouncing upon it. In its wild state it is a prolific creature, but in captivity it never breeds.

A person named Barbot, at Guadaloupe, had a tame civet,

which, through the carelessness of the servants was allowed to be without food during the day. The consequences of such neglect might have been anticipated. On the following morning the hungry animal gnawed through the wood of his cage, and went forth in quest of prey. The civet entered a room where M. Barbot was writing, and staring about with a sparkling and ferocious eye for some time, it then made a leap at a beautiful American parrot, which was perched upon a piece of wood fixed in the wall about six feet from the ground. M. Barbot jumped up instantly he was aware of the danger of his favourite bird, but he was too late for its rescue.

LESSONS IN GEOGRAPHY—No. XVII.

THE MAP OF THE WORLD.

The following are the answers to the exercises on the map of the world, proposed in our last lesson.

Latitudes.	*Longitudes.*	*Places.*	*Countries.*
38° 43′ N.	9° 8′ W.	Lisbon,	Portugal.
14 44 N.	17 31 W.	Cape Verde,	Africa.
18 56 N.	72 54 E.	Bombay,	India.
52 14 N.	21 2 E.	Warsaw,	Poland.
15 55 S.	5 45 W.	St. Helena,	(Atlantic.)
32 5 N.	118 47 E.	Nankin,	China.
14 7 N.	91 20 W.	Guatimala,	C. America.
4 36 N.	74 14 W.	S. F. de Bogota,	Colombia.
29 58 N.	90 6 W.	New Orleans,	United States.
22 54 S.	43 16 W.	Rio Janeiro,	Brazil.
33 26 S.	70 44 W.	St. Jago,	Chili.
12 2 S.	76 59 W.	Lima,	Peru.

NATURAL DIVISIONS OF THE EARTH'S SURFACE.

The whole surface of the globe contains, as we have seen (p. 222), about 200 millions of square miles. The land is considered to contain about 55 millions of square miles; and consequently, the water or sea to contain about 145 millions of square miles. This makes the proportion of the water to the land, nearly as *three to one;* or the proportion of the land to the whole surface of the earth, rather more than that of *one to four*. There is much more land in the northern hemisphere than in the southern; and considerably more in the eastern hemisphere than in the western; this may be seen at once by looking at the map of the world; but it is more clearly seen by looking at a terrestrial globe. The land in the northern hemisphere is considered to occupy rather more than *two-fifths* of the whole hemisphere; and the land in the southern hemisphere about *one-eighth* of the whole hemisphere. The land preponderates in the north-eastern quarter of the globe, and the water in the south-western quarter. Scarcely any land has yet been discovered in the south frigid zone, and the limits of the land in the north frigid zone have not hitherto been correctly ascertained. By far the greater portion of the land lies within the north temperate zone; the greater part of the remainder lies within the torrid zone; still less within the south temperate zone; and the least within the north frigid zone. The greater part of the sea lies within the torrid zone; the greater part of the remainder within the south temperate zone; still less within the north temperate zone; and the least within the north frigid zone.

On looking at a globe or map of the world, the student will perceive that all the great and continuous tracts of land, commonly called *continents*, (from Lat. continens, *holding together*) become pointed as they stretch towards the south, by which they are made to assume a pyramidal or triangular form at the extremity. The continents of north and south America and of Africa are the most remarkable illustrations of this fact. In consequence of this tendency to taper towards the south, so narrow is the connecting link or neck of land, commonly called an *isthmus*, (from Gr. isthmos, *a neck*, or *narrow-passage*) between North America and South America, that little more than 40 miles of land separate Panama from Porto Bello, on opposite sides of the Isthmus of Darien. The southern points of the other two continents are well known; Cape Horn must be considered as that of South America, notwithstanding the straits of Magellan: and the Cape of Good Hope that of Africa. Here, it may be useful to remark that when a tapering point of land projects into the sea, it is called a *cape*, (from Lat. caput, *a head*) a figurative, but very natural, expression for the extremity of the land, which may be considered as the top or vertex of the triangular shape which it assumes when jutting out *from* the continent to which it belongs. When the land thus projecting into the sea, is elevated considerably above the sea-level, it is called a *promontory*, (from the Lat. pro, *in front of;* and mons, *a mountain*) that is, mountain-land in front of the continent. The English term *head-land* is often used for capes and promontories on a small scale, connected with the land; so is also the term *naze* or *ness*, from the Saxon *nese*, or German *nase*, a nose, or projection from the face. With regard to the term *strait* or *straits* which is applied to a *narrow passage of the sea* between two continents, or between a continent and an island, or between two islands, it is evidently a substantive noun derived from the adjective *straight* or *strait*, (German, *straks*), and bears the same relation to the water that the term *isthmus* does to the land.

In reference to the continents of Europe, and Asia, there is also the general tendency to taper towards the south; in the former continent, however, this tendency is greatly obstructed by the vicinity of the African continent, so that the Iberian Peninsula (Spain and Portugal) does not so manifestly assume the triangular form. Still this tendency is partially developed in various parts of the south of this continent; as in the conformation of Italy and Greece, which taper, but very irregularly, towards the south, evidently in consequence of the feebler action of the Mediterranean or inland Sea, as compared with the full play of the great Atlantic and Pacific Oceans. In the latter continent, the tendency to taper toward the south has been divided in such a manner, as to present the three peninsulas of Arabia, India, and Malacca, of which the two former are pretty regular in form; but the latter, in combination with what is called the Eastern Peninsula, is very irregular in this respect. The term *island* is well known to signify a portion of land, whether large or small, which is completely surrounded by water; this word in Latin is called *insula* (whence our adjective *insular*), and Johnson seems to think that the former is derived from the latter; this is probably the case with the term *isle*, which comes to us through the romance languages; and the word *land* seems to have been added afterwards. The term *peninsula*, from the latin *pene* (almost), and *insula*, originally signified *land nearly surrounded by water*; that is, according to the etymology, *almost an island*; but it is now more frequently applied to the triangular-shaped portions of land, which taper in any direction, and jut out from the great continents, as in the three cases above-mentioned in Asia. The great European peninsulas have also been mentioned; viz: Greece, Italy, and Spain and Portugal combined; to these may be added the large peninsula of Sweden or Norway, and the smaller peninsula of Jutland or Denmark, the latter of which is an exception to the general rule, as it points northward. The continents of South America and Africa are justly entitled to the name of peninsulas; the former being attached to North America by the Isthmus of Panama or Darien, and the latter to Asia by the Isthmus of Suez. From the consideration of the series of islands which lies between the peninsula of Malacca and the great island of New Holland or Australia, there is reason to believe that the latter was in former ages connected with Asia, as South America now is with North America; but Australia, although reckoned an island, is from its magnitude, more entitled to the name of a continent; and the island of Van Dieman's Land to the south of it (and no doubt originally forming a part of it), then most probably constituted the apex of the great triangular-shaped peninsula (tapering to the south according to the general law), in which this vast Southern Continent once terminated. It is further worthy of remark, in speaking of the great continents which become pointed as they approach the south, that their projections most generally terminate abruptly in lofty mountain chains, which there dip beneath the waters of the ocean.

In regard to the divisions of the land on the surface of the globe, we find in the older books on geography, that is was divided into four great parts, called *quarters of the world*; namely, *Europe, Asia, Africa*, and *America*. This division, however, is very incorrect, inasmuch as it leaves out large islands nearly equal to continents, such as Australia, Borneo, &c., and vast groups of smaller islands scattered through the ocean, and valuable for their population and produce. A more common and more accurate division is that of *Europe*,

Asia, *Africa*, *North America*, *South America*, and *Oceanica*, six great portions of which the first five are *continental*, and the sixth *insular*; or, if the latter be subdivided into two parts, as commonly done by writers in this country, namely, *Australasia*, and *Polynesia*, then there are *five continental* divisions of the earth, and *two insular* divisions.

Without regarding artificial divisions, the land on the surface of the globe is naturally divided into *three* great sections, viz. 1st. *The Old World*, in the Eastern hemisphere, comprehending the vast, united, triple continent of *Europe*, *Asia*, and *Africa*, which extends from Cape Severovostochnoi in the Northern Ocean, to the Cape of Good Hope in the South Atlantic Ocean, a distance of 8400 miles; and from Cape Verde in the North Atlantic across the isthmus of Suez to the east coast of China on the Pacific, a distance of about 9000 miles. 2nd. *The New World*, in the Western hemisphere, comprehending the great, united, double continent of *North and South America*, with the interjacent and circumjacent islands, which extends from still undefined limits in the Arctic Ocean to Cape Horn, a distance of about 9000 miles; and, from the western shores of the Atlantic to the eastern shores of the Pacific, a distance varying in breadth from 25 to 3500 miles. 3d. The *groups of islands*, called *Oceanica*, comprehending the *East Indian Archipelago*, *Australasia* and *Polynesia*, the principal of which are the Sunda Isles, the Phillippines, New Holland or Australia, including New South Wales and Van Dieman's Land, and New Guinea, with the clusters of isles scattered far and wide over the Pacific.

The *Old World*, so called because its history is known for a period of more than 7000 years, is composed of the *three* great sections denominated continents, viz: Europe in the north-west, Asia in the north-east, and Africa in the south-west, taking Jerusalem as the central point. Europe is separated from Asia by a boundary composed of a chain of mountains, the Uralian: a series of rivers, of which the principal are the Wolga and the Don; and a chain of inland seas, Azoph, the Euxine, Marmora, and the Archipelago, branching from the Mediterranean and connected by the straits of the Hellespont, Constantinople and Jenikale. Asia is separated from Africa by the Arabian Gulf and the Isthmus of Suez. Europe is separated from Africa by the Mediterranean.

The *New World*, so called because its history is known only for a period of about 200 years, is composed of two great sections denominated continents, viz: *North America* and *South America*, which are connected with each other at the isthmus of Darien or Panama. Between these continents, on the eastern side, north of the equator and within the torrid zone, are situated the *West Indies*, a range of islands stretching in a curve line from the Gulf of Florida to the mouth of the Orinoco. South of Asia, and east of the Arabian sea, consisting partly of the continent and partly of the islands south of it, are situated the *East Indies*, lying almost wholly within the torrid zone, and comprehending the peninsulas of India and Chin-India, or India within and India without the Ganges, with the island of Ceylon and the group of islands denominated the East Indian Archipelago. Sumatra, Borneo, and Celebes, the principal of these islands, are situated directly under the burning line.

With regard to the natural divisions of the water, the *Sea* which surrounds the land, is divided into *three* great sections, called oceans, exclusive of the comparatively small portions lying within the polar circles, which are denominated the *Northern* and *Southern Oceans*; viz. 1st, The *Atlantic Ocean*, extending from the Arctic to the Antartic circle, a distance of 9188 miles, and from the western coasts of the Old World to the eastern coasts of the New World, varying in breadth from 1818 miles, the distance between Sierra Leone and Cape Roque, to 4135 miles, the distance between the Cape of Good Hope and Cape Horn. 2nd. The *Pacific Ocean*, also extending from the Arctic to the Antartic circle, and from the eastern coasts of the Old World to the western coasts of the New World, varying in breadth from 60 miles at Bhering's straits, to about 11000 miles at the equator, and then tapering to 5277 miles, the distance between Cape Horn and Van Dieman's Land. 3d. The *Indian Ocean*, extending from the tropic of Cancer to the Antartic circle, a distance of 6214 miles, and from the eastern coasts of Africa to the western coasts of Australasia, varying in breadth from 3491 miles at the equator, to 6126 miles, the distance between the Cape of Good Hope and Van Dieman's Land.

The ocean which rolls between Asia and America, called the *Pacific*, from the smoothness of its waves, and the *Great South Sea*, from its vast extent, exceeds the whole surface of the dry land. It is bounded *on the east* by the Western and North-western shores of America, and *on the west* by the Eastern coasts of Asia and Australasia. Towards the eastern side, and in the Torrid zone, the face of this ocean is studded with innumerable groups of islands, all remarkably small; these consist generally of coral reefs, rising up like a wall from unfathomed depths, and emerging but a little way above the level of the sea. The most noted of these groups is that called the Tahitian, or Society Islands; but all of them are the works of insects, both minute and innumerable, whose incessant labours are gradually forming new groups at the bottom of the ocean. The situation of these islands is such that although lying between the tropics, the temperature of their atmosphere is so moderated by the circumambient ocean, that they enjoy the most delightful climate in the world. On the western side, the Pacific communicates with the inland seas of Japan and Ochotsk, and the Yellow and Chinese seas; and on the eastern side, it has the inlets of California and Queen Charlotte's Sound.

The ocean which rolls between Europe and America and also between Africa and America, is usually divided into two parts by the equator, the one being called the north Atlantic, and the other the south Atlantic Ocean. The whole ocean receives the name *Atlantic*, from its washing the shores of that part of Africa where the mountains of *Atlas* (*-antis*) were situated, which the poets feigned were employed to support the heavens. The Atlantic is bounded on *the east* by Europe and Africa, and *on the west* by America; that part of it between Europe and America is called, from ancient times, the western Ocean. The Atlantic Ocean taken between the limits of the the Artic circle and the latitudes of 35° S. on the one side and 55° S. on the other, is only about half the size of the Pacific Ocean. The south Atlantic contains few islands of any size, and no inlets of consequence. The north Atlantic abounds in large islands, of which *Albion* (*England*) and *Hibernia* (*Ireland*) are the most noted; and in deep and numerous inland seas, which penetrate far into the interior of both the old and new worlds, and which have adapted it for the most extensive commercial enterprises on the face of the globe. The Mediterranean and the Baltic are but arms of the north Atlantic, on the east; and the Carribbean sea, the Gulf of Mexico, Hudson's bay and Davis' straits, arms of the same on the west. On the eastern shores, few large rivers, except the Niger, discharge their waters into its bosom; but on the western shores, it receives those of La Plata, the Orinoco, the Marānon or Amazon, and the Mississippi, the largest rivers on the surface of the globe.

The Indian Ocean, rolls between the Atlantic and Pacific, washing the eastern shores of Africa, the southern shores of Asia, and the western shores of Australasia; whence, its western, northern and eastern boundaries are manifest; on the south, it is bounded by the Pacific and Antarctic Oceans. This ocean contains many islands, the most important of which are Madagascar and Ceylon; and several bays and gulfs, such as the Bay of Bengal, the Arabian Sea, the Persian Gulf, the Red sea or Arabian Gulf, &c. The *ocean* (from Gr. okeanos, *the great outward sea surrounding the world*,) means collectively, all the water which surrounds the earth; or, individually, any very large expanse of water. The term *sea* (from Saxon, *sæ*) is used in the same sense, both collectively and individually; but it is also applied to a smaller portion of water, and is often synonymous with the term *gulf*, (from Ital. *golfo*) which is a *bay*, or opening of the sea into the land, either by a wide or a narrow opening. When the mouth of the opening into the land is wide, it is more usually called a *bay* (from Fr. *baie*); and when narrow, a *gulf*. When the sea penetrates far and wide into the land, the collection of water is then called a *Mediterranean* (from Lat. medius, *middle*; and terra, *the land*) or *inland sea*; such are the *Mediterranean Sea*, and the *Baltic Sea*, the one in the *south* and the other in the *north* of Europe.

The *Arctic* Ocean is the sea that surrounds the north pole, or rather that lies within the arctic circle; its boundaries are not exactly known, that is, it is not yet ascertained how much land lies within this zone, and consequently, the, extent of sea

is equally unascertained. Whether Greenland extends to or falls short of the north pole has not yet been discovered; and the limits of North America have not quite been determined. This sea, besides the greater part of Greenland, contains Nova Zembla, north of Europe, the isles of New Siberia, the islands lately discovered by Capt. Parry and others, and some north of Baffin's Bay. The White Sea is on the borders of the Arctic Ocean. The Antarctic Ocean, though considered to be more free of land, is still less known than the Arctic Ocean; and if both were equally free of land, they would be of the same size within the Arctic and Antarctic circles. *Lakes* are large or small portions of water wholly surrounded by water; some of these are so large as to be called seas, such as the Caspian sea, the Sea of Aral, &c. A *channel* is a narrow passage between two seas, or two parts of the same sea; as, the *English channel*, between the North Sea, or the German Ocean, and the Atlantic.

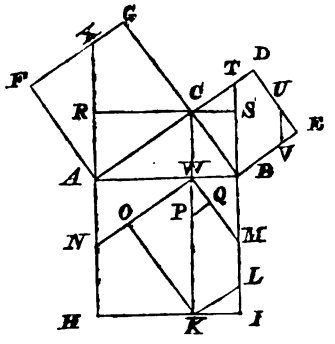
SOLUTIONS OF PROBLEMS AND QUERIES.

NEW GEOMETRICAL DEMONSTRATION OF THE PYTHAGOREAN THEOREM.

At the request of the "Mathematical Society in Manchester," forwarded to us by W. H. Squire, Esq., Sutton (under date of Jan. 5th, 1853), we insert the following new geometrical demonstration of the Pythagorean theorem, of which a palpable or ocular demonstration was given by Mr. Henry Dugdale, of Slaidburn, in vol. I., p. 239, col. 1. This demonstration would have been inserted before this time, but for an idea which occurred to us that it might be very considerably abridged. As, however, the author then informed us (July 27th, 1852) that it was placed before his valued and learned friend Dr. Henderson (astronomer), of Liverpool, for his approval, and that he expressed himself highly gratified and pleased with it, we here insert it entire, as it was sent to us; and we hope that all our mathematical readers will duly appreciate the author's ingenuity. For our own part, we prefer the ocular demonstration sent by Mr. Robinson, of Sheerness, and inserted at p. 319, col. 2, vol. I., and we consider that it will be but justice to insert his geometrical demonstration too, when it is forwarded to us.

THE 47th. PROP., BOOK I, EUCLID.

In any right-angled triangle the square which is described upon the side subtending the right angle is equal to the squares described upon the sides which contain the right angle.



On A B describe the square A H I B, and on A C, C B, the squares G A, D B, produce H A to X and I B to T; from C draw C K parallel to X H or T I, through C draw R S parallel to A B or H I, from C B cut off a part E V equal to D T and draw V U parallel to I T; from point W, on the line A B, draw W N, W M, parallel to C A, C B, or G F, D E; from point K, on the line H I, draw K O, K L parallel to B C, A C; from K W cut off a part K P equal to B T, and draw P Q at right angles to W M.

Then because the angle A C B is a right angle, and the angle B C D is also a right angle, the two straight lines A C, C D, upon the opposite sides of C B make with it at the point C, the adjacent angles equal to two right angles, therefore C D is in the same straight line with A C; for the same reason G C and C B are in the same straight line; and because R C has been drawn parallel to A W, and that N W has been drawn parallel to A C, therefore R A equal A N, and because C K has been drawn parallel to B M, therefore by Prop. 38, Book 1, Euclid, the triangle N A W is equal to the triangle A R C. Again, in the triangles A F X, A C B, we have side A F equal to the side A C and the angle A F X equal to the angle A C B; and because the angle F A C is a right angle and that the angle X A B is also a right angle, take away the common angle X A C and the remaining angle F A X is equal to the remaining angle C A B; then by Prop. 26, A X is equal to A B; but A B is equal to W K, therefore A X equal W K, and because G C, C B are in the same straight line, F A is parallel to B C, and that K O has been drawn parallel to B C, therefore K O is parallel to F A, and because W N has been drawn parallel to C A, and that W K has been drawn parallel to X H, therefore the angles O W K, O K W, are equal to the angles F X A, F A X each to each; therefore the remaining sides of the one, viz., O K, O W, are equal to the remaining sides of the other, viz., F A, F X, and the remaining angle K O W of the one is equal to the remaining angle A F X of the other, and the triangle K O W to the triangle A F X; and because K O has been shown to be equal and parallel to A F, it is therefore equal and parallel to C G, and because C K has been drawn parallel to B M, and R C parallel to H K, therefore H K is equal to R C, and the angle H K O is equal to the angle R C G; and because X R, R A, are in the same straight line, and the angle A R C is a right angle, therefore the angle X R C is also a right angle; hence the angle N H K is equal to the angle X R C; and because X A has been proved equal to A B it is also equal to A H, and part R A has been shown to be equal to part A N, therefore remaining part R X is equal to remaining part N M, and because N W has been drawn parallel to F G, and that H N, R X, are in the same straight line, therefore the angle H N O is equal to the angle R X G, and because N W has been proved equal to A C, it is also equal to F G, and part O W has been shown to be equal to part F X, therefore remaining part N O is equal to remaining part X G; and because N O, O W, are in the same straight line, and that the angle W O K is a right angle, therefore the angle N O K is a right angle equal to the angle X G C which is also a right angle, therefore in the trapeziums X R C G, N H K O, since all the lines and angles of the one are equal to all the lines and angles of the other each to each, therefore they must coincide, hence the trapezium X R C G is equal to the trapezium N H K O; and since the triangle A R C is equal to the triangle N A W, and the triangle X F A equal to the triangle W O K and the trapezium X R C G to the trapezium N H K O, therefore the square A G is equal to the rectangle A K. Again the same reasoning which proved the triangle A R C equal to the triangle N A W will also prove the triangle C S B equal to the triangle W B M, and since A C, C D are in the same straight line, and R S has been drawn parallel to H I, as also K L has been drawn parallel to A C, and hence parallel to C D, therefore C S is equal to K I and the angles L K I, L I K, equal to the angles T C S, T S C; hence the remaining two sides K L, L I, of the one are equal to the remaining two sides C T, T S of the other each to each, and the triangle C T S to the triangle K L I; and because C D is equal to B E and the part V E to the part T D, therefore the remaining part B V is equal to the remaining part C T; but C T is equal to K L, therefore B V is equal to K L, and since the trapezium X R C G has been proved to coincide with trapezium N H K O, therefore similar reasoning will prove the figure T D U V B to coincide with and therefore be equal to P Q M L K; and since the lines W C, C B, are parallel to the lines M B, M W, therefore W M is equal to C B, and hence equal and parallel to D E; but since part Q M is equal to part D U, therefore remaining part U E equal remaining part W Q, and because U V has been drawn parallel to I T, it is also parallel to P W; therefore the angles P W Q, P Q W are equal to the angles V U E, V E U; hence the triangle P W Q is equal to the triangle V U E; therefore since the triangle P W Q is equal to the triangle V U E, and the triangle W B M equal to the triangle C S B, the triangle C T S equal to the triangle K L I, and the figure T D U V B equal to the figure P Q M L K; therefore the square B D is equal to the rectangle B K. Therefore the squares upon A C, C B, are together equal to the square on A B, which was to be shown.—HENRY DUGDALE, Slaidburn.

UN MOT DU MARECHAL DE VENDOME.—Le maréchal de Vendôme fut un des plus grands capitaines que la France ait produits. A son lit de mort, on lui parlait des batailles qu'il avait gagnées, il répondit: "A cette heure, je me rapellerais avec plus de joie un verre d'eau donné pour l'amour de Jésus-Christ que toutes mes victoires, fussent-elles aussi nombreuses que celles d'Alexandre." Quand nous faisons quelque chose d'important à nos yeux, demandons-nous ce que nous en penserons au moment où nous serons sur le point de quitter cette terre.

ANSWERS TO CORRESPONDENTS.

We beg to acknowledge, in the most respectful manner, the receipt of several applications from respectable individuals for the honour of filling up or supplying the demand for several branches of learning in the P. E., particularly the Mathematical. We (Professor Wallace, Editor) have appropriated the supply of these branches (with the entire concurrence of the proprietor, Mr. Cassell,) to ourselves, as well as of the various branches of Natural Philosophy in which the Mathematical Sciences are deemed especially necessary. Applications on these subjects are, therefore, not required at present. Nevertheless, if any system of Mathematical or Philosophical Science *particularly new, simple, and ingenious*, were to be proposed to us, we should at once consider it our duty to recommend its insertion in place of our own Lectures. As to other branches—and particularly Chemistry—we are still open to offers from known and talented individuals, men who have written books, and men whose names are known in the literary and scientific world. We are happy to say to our subscribers, that it is now deemed a high honour to be permitted to write in our pages. And, why? The march of progress, the elevation of the whole people of these islands to a nobler and higher standing in intellectual and moral rank, IS OUR AIM.

As our object in the P. E. can only be attained by a rigid adherence to the principle of Popular Education, it is plain that all correspondence which has not the same end, *must be laid aside*. We receive thousands of letters upon a "thousand and one" subjects besides education; to these we *cannot possibly attend*; for, to answer all, would take up the whole of our sixteen pages in every number! Most of these letters seem, indeed, to imply that we are not the *editor of a public journal*, but the *private tutor and particular friend of* every correspondent. Now this is no doubt an honourable and an enviable post, but it is infinitely more than we can meet. We must therefore decline this honour if we are to be the editor of this journal. We do not object to do good to individuals, by giving advice, where we can, but their correspondence must not involve us in personal expenses.

ENGLISH.—ALPHA'S compositions are in general correct; avoid verbosity; study simplicity. In their very nature, the suffixes have not the same definite meanings as the prefixes. Latreia is the exact Greek form of Latria, *worship*. About for amb. is quite correct; "about the house" is round the house; "let your loins be girded about" (Luke xii. 35) means, let your loins be girded *round*.

LATIN.—DISCENS should go over the forms of the verbs until he is completely master of them; let him get a fellow-student to examine him. In learning Latin, and all languages, "two are better than one, because they have a good reward for their labour" (Eccl. iv. 9). The Key to Dr. Beard's "Latin Made Easy" is now published, and may be had, price 2s., of all booksellers.—JAMES DIXON will find full tables of the deponent and other verbs in the Supplement to the Fifth Edition of Dr. Beard's "Latin Made Easy," price 3s. 6d., just published.—NEED-HELP is informed that *Mr. Cassell's Latin Dictionary* is proceeding with as much speed as the requisite care and labour admit; intending purchasers are advised to wait. The work will, for the price, be by far the fullest, the most complete, as well as the most exact Latin Dictionary in the English language.

A POOR STUDENT (London) must learn English, Latin, Greek, and Hebrew, before he attempts to instruct others.—W. ANDERSON (West Kingsford): Received, and under consideration.—J. (Newcastle): Thanks for his letter. P. E., in the correspondents' page, always means POPULAR EDUCATOR.—J. B—— G.: To find how much a tank will hold in imperial gallons per inch of its depth, supposing it to be cylindrical or uniformly oval in form; multiply the square of the diameter of the cylinder in inches, or the product of the longest and shortest diameters of the oval in inches, by ·7854 (the area of a circle whose diameter is 1), and divide this product by 277·274 (the number of cubic inches in an imperial gallon), and the quotient will be the answer. Make yourself master of the "Series of Lessons in French" first, and then study those in the P. E. Never mind the new names of the letters; they are of no use on the continent.—G. N. (Shrewsbury): Dr. Thomson, Lecturer on Chemistry, University of Glasgow, has just published a scientific treatise on Brewing.—C. F. P. (Dunmanway): The day begins at every part of the earth as soon as the sun rises above the horizon. Your copy of the Scriptures must be different from ours, for we cannot find such an expression as the "*round world*" in them.—W. S., SUBSCRIBER (Colne): Hutton's Tables of Logarithms, &c., are still reckoned the cheapest and best; a new copy sells for about 12s. A cheap set of small logarithmic tables was published some years ago under the title of Wallace's "Mathematician's Pocket Guide," price 18d.—W. V. Z., The natives of the Isle of Man are called Manxmen and Manxwomen.—L. J. T. (Titbury): See vol. I., p. 390, last line of 2nd col.—J. D. (Basingstoke): A key is preparing. Algebra will come in turn.—D. M. (Cardiff): GIOVANNI, not decided.—R. GOODIER (Ardwick): See all the Lessons in Biography in the P. E. What inscription do you mean? *Forborne* means *not regularly paid up*. *Consols* means *Consolidated Funds*.—W. LANG (Glasgow) should become a member of a debating society, where, if attacked like Curran, he might rise and pour forth a flood of eloquence to the astonishment of all.—A. W. B. DRAPER (Hull): Show window tickets are rendered bright by the application of gum water or a weak spirit varnish.—S. and B. (Tavistock): CATO (Bilston): We doubt.—A. M. WHITE (Wood-street): We would if we could.—AMICUS: His suggestions are good, but they are all anticipated in the *Second Parts* of ...e German and French Lessons, which enter systematically into the syntax.—O. MILLAR: It would be a good plan.—BUDGET (North Shields): Scarcely.—R. E. (Newcastle): If there be any natural defect in the joint of the ring finger, it need not be curved in writing: you must in such a case dispose of it in the best way you can; your penmanship is very good.—TASSO (Truro): There is a Key to Colenso's Algebra.—R. B. H. (Staffordshire): We thank him for his useful communication; we shall avail ourselves of it.—A SUBSCRIBER (Malta) whose signature we cannot make out, wishes to know how books may be sent out to Malta at the smallest expense.—CRITO (London) is mistaken about the perfect number, &c.; let him try again.—J. P. FOWLER (Farnham): The meaning of the letter *e* at the end of some adjectives will be best explained by an example, thus: In p. 22, vol. II., inanis, e, *empty*, means *masculine*, inanis; *feminine*, inanis; *neuter*, inane.—MULET (Gloucester): "*To while* his evening leisure," should be "*to pass*," &c., or better still, "*to improve*;" instead of "*in the person*" say "*in the company*;" instead of "*better half*" say "*wife*;" instead of "*as her*" say "*as she*," &c.—J. WALTER (Steeple Ashton): *Ais, ait*, are more modern than *ais, ait*,; but the pronunciation is the same.—MATHEMATICUS (Huddersfield): His hint will be attended to.

Mathematical solutions received from W. E. WILLIAMS (Pentrebach); A. L. (St. Neots, Hunts); JOHN LOVETT (Ashfordby).—G. WILLIAMS (Bristol): Erratum in Cassell's Euclid, page 18, line 27, for *greater* read *less*.—G. W. C.; HENRY RICHARDSON (Manchester); J. J. NEWTON (Bridgewater); JOHN LOVETT, D. C. STEPHENS (Hoxton): We forget Mr. E. P. Hill's address.—A MECHANIC H. X.: His suggestions will be attended to.—TWO BROTHERS (Newbury): Latin first; then French.—INQUISITIVE (Dawsbury): The circular is very incorrect in more points than one.—ABBINO (Leeds): The question in Walkinghame must bide its time; others must be first solved.—X. Y. Z. (London) wishes to know "Why a black doll dressed in white should be a rag merchant's sign?"

S. GREENWOOD (Warley Edge): Under consideration.—R. BARLOW (Seven Oaks): Thanks; Walker improved by Smart is very good.—E. EDWARDS (Huddersfield): He is right, and we are wrong, as to the suggestion he made; but we cannot conveniently adopt it, for printing reasons which need not be explained here.—DISCIPULUS (Glasgow): We do not see his difficulties.—CONSTANT SUBSCRIBER (Shepton): We shall be happy to assist him, if we only knew how.—H. DANIEL (Hulme): Go on and prosper. Dr. Beard will explain all difficulties by and bye.—THORNLEY (Clitheroe): Consult Dr. Ure's Dictionary of Arts and Manufactures.—J. S. DRIVER (Chertsey): We shall keep his wishes in view.—G. HAMILTON (Glasgow): Thanks for his letter.—B. G. B. (Moorgate): The Greek of the "Ancient Hymns" will be found in Pott's edition of Paley's Evidences, and Horæ Paulinæ.—SCRIBO (Preston): *Disposed of* is right, *of* would be wrong.—PHILOMATHES (Morpeth) should write to R. W. Rothman, Esq., secretary to the University of London, for any additional information he may require.

G. CARTER (Leamington): Thanks.—W. S. F. (Gateshead): We recommend him at once to study Euclid, and especially the Lectures on Euclid in the P. E.—T. CARTER (Barking): Thanks.—G. WILLIAMS (Bristol): By all means, buy a Latin Testament. See vol. I., p. 230, col. 2, N. B.—A COLOUR SERGEANT (32nd Regiment): We advise him to study Whateley's Logic and Bell's Elocution, with all the T-total books he can lay his hand on.—J. A. HARRIS: See "Electric Telegraph and Clock," by Progress, 1s. 6d.

LITERARY NOTICES.

THE ILLUSTRATED EXHIBITOR AND MAGAZINE OF ART.—A new and improved Series of this work, under the title of the ILLUSTRATED MAGAZINE OF ART, has just commenced. Each Number is now enclosed in a neat wrapper, price 3d. In addition to numerous Engravings in the text, each number contains a fine Engraving, worked on Plate Paper. With Number 1, was presented, gratis, a splendid View of the Interior of St. Paul's Cathedral, during the Interment of the late Duke of Wellington, printed upon fine Plate Paper, measuring eighteen inches by thirteen. This Engraving alone is worth four times the cost of the Number of the MAGAZINE OF ART.—Part I., price 1s., will be ready February 1st. The large Engraving of St. Paul's will also be presented with every copy of this Part.

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The PATHWAY, a Religious Magazine, price 2d. each Number, enclosed in a neat wrapper. The Fourth Volume has just commenced—Vols. I. and II. price 2s. 3d. each, Vol. III., price 3s., neatly bound, are now ready.

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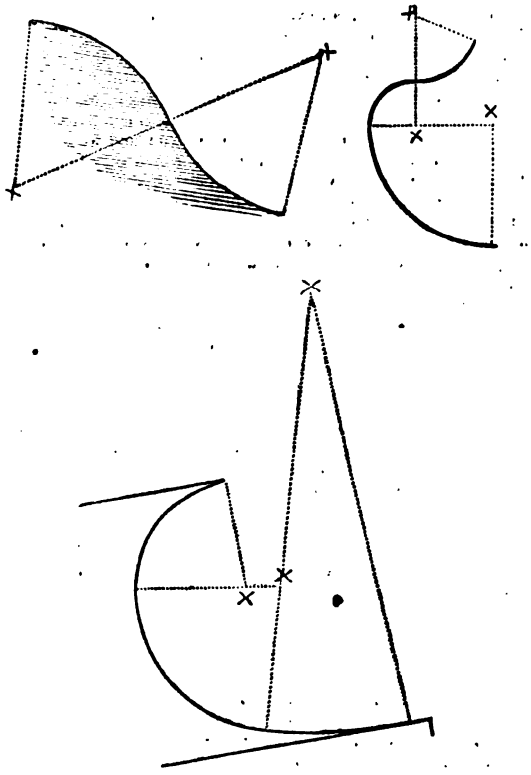
Printed and Published by JOHN CASSELL, La Belle Sauvage Yard, Ludgate hill, London.—January 22, 1853.

LESSONS IN DRAWING.—No. IV.

LINEAR DRAWING—(*Continued.*)

Curve lines, very different in appearance, may be produced by various combinations of arcs of circles. The three following illustrations (fig. 50) are examples of the outlines of architectural mouldings. The first, consisting of a waving line, in a moulding called an *ogee*. It is also called the *cima recta*, when it is concave or hollow in the upper half of the curve; and *cima reversa* when the upper half is convex. According as you imagine the white part or the shaded part to be the moulding, you may see each of these in the figure.

Fig. 50.



Architectural Mouldings.

The last of these three figures is a variety of the hollow moulding called a *scotia*. In practical works on architecture, and in Robertson's "Treatise of such Mathematical Instruments as are usually put in a Portable Case," the geometrical methods of producing these curves are shown at length.* The centres of the component circles are marked with a small cross in the figures above given. Similar combinations might be made of ellipses and of the other conic sections; but to enter into any detail on these methods would be beyond our present purpose. It is sufficient to observe that curves composed of portions of the circle, may be multiplied to any extent, by arranging them so that every two adjoining arcs of the circle shall have a common tangent at their point of junction. The waving line which is placed first, was called by the great painter Hogarth the line of beauty.

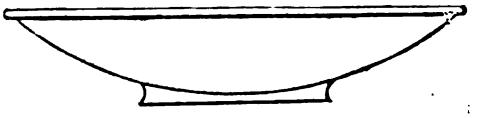
* The construction of these curves will be shown in the Lessons on Architectural Drawing.

Undulations (from Lat. undulatus, *in the form of waves*) are the characteristic of grace, whether in motion or in form; and it may be justly said that wherever the waving line is seen, there is elegance and beauty. Arrangements of straight lines are capable of much elegance; but the waving line, by itself, is beautiful.

There are two extremes to be avoided in drawing outline, viz., frigid precision and fantastical looseness; the latter is especially to be avoided; the former is of the nature of Geometry. When the pupil allows his hand to wander,—drawing lines and figures at random, he may, as it were, by accident, cause his lines, here and there, to assume a graceful appearance; but nothing like true art will ever flow from his pencil. On the other hand, if he be accustomed to draw his lines too precise, too severe and rigidly correct, they will never correspond to the lines we see in nature. And it should be deeply impressed on the pupil's mind, that "to represent nature" is, and ought to be, the aim of all art. Drawings executed in the precise style may be compared to language clothed in formal phraseology. Grammatical correctness may be there, but elegance and feeling are absent. At the same time it is of the utmost importance to have a perfectly clear and distinct idea of what you are about to do. This consideration, indeed, led us to choose artificial rather than natural forms for the pupil's early practice. These he should construct, and endeavour to know all about them; and when he can do them well, he will be prepared to engage in the more difficult task of correctly representing the outlines of natural objects, with all their elevations and depressions, without reference to rule. In drawing the following figures, no instruments are to be used. This we cannot too often repeat to those who wish to acquire freedom of hand. If you have the black board, with the notches cut as directed in the last lesson, they will sufficiently indicate the directions of a horizontal and a perpendicular line; so that even a ruler should be considered as inadmissible in drawing these figures. A sheet of paper carefully folded to a straight edge, and then doubled over on itself, will give you a right-angle which will occasionally be useful as a *test*.

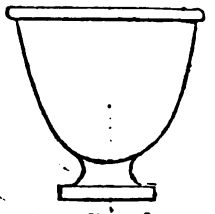
In fig. 51, which is as simple as can well be imagined, you have the outline of a shallow basin. In drawing it, mark a few points: first, one at the middle point of the edge, and then another at the

Fig. 51.



lowest point of the curve; next mark the terminal points of the edge, and a few in the curve. Drawing the lines thus indicated, and adding the lower portion of the figure, it is completed.

Fig. 52.



In fig. 52, which is the outline of a cup or vase, you will be

enabled easily to draw the form by following the same method as directed in the last. The curve employed in this outline is parabolic.

Fig. 53.

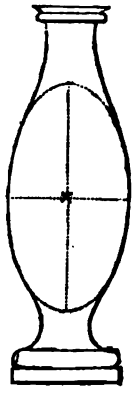
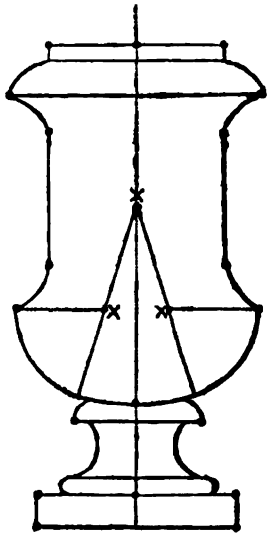


Fig. 54.



In fig. 53, which represents a vase or jar, an ellipse is employed as the basis of its form; the lines which sweep into the main curve are also elliptical. In this example you should begin by indicating the central perpendicular line by points, and having determined the length of the ellipse, point off the breadth, and draw the curve. In pointing the curves required to complete the figure, mark the extremities of each, and take care that the points which you place in the curves are opposite to each other; for placing them truly in this position will assist you greatly in drawing the curves. The round moulding at the bottom of this figure is called a *torus* (from Lat. torus, *a soft heap or protuberance*). The square tablet which supports the torus is called a *plinth*, (from Gr. plinthos, *a brick or tile*.)

In fig. 54, which is another outline of a vase, you will observe the points, the centres of the circles which combine in forming the principal curve, are marked; but, observe, these are placed in the figure only for your information, and, of course, they are not to be drawn by you in making a copy.

You should copy all the preceding figures on a large scale, and endeavour to attain both steadiness and freedom of hand in drawing them, without pedantic stiffness or geometrical rigidity.

Fig. 55.

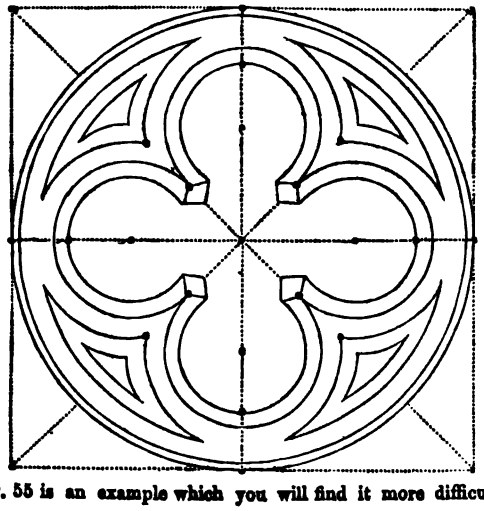


Fig. 55 is an example which you will find it more difficult to copy than any of the preceding. First mark out a square by points; then mark the points bisecting the sides of the square, as truly as you can; next draw the four lines which are dotted in the figure, joining the angles, and dividing the square into four parts; marking then the central points of the square, the other points may be considered as on the circumferences of three circles described from this centre. The whole figure is now readily seen to be entirely composed of circular lines. It is the outline of what is called a *quatre-foil*, or *quatre-feuille* (from Fr. quatre, *four*, and feuille, *a leaf*), and is very commonly employed as an ornament in Gothic architecture.

In copying the figures in this lesson, you will do well to make the copies of a larger size. Of course, unless the larger copy be drawn *in proportion*, it must be deemed a failure. By *drawing in proportion*, we mean that each part of your copy should have the same relation to any other part, that the corresponding parts of the original have to each other. The word proportion is often used in such a manner as to show that the speaker has but a vague apprehension of its meaning; an explanation of its real signification will, therefore, not be out of place in this lesson. Proportion is the equality of ratios between two pairs of objects, or the lines which represent them. The ratio of each pair is ascertained by comparison, and the comparison must be made between two things at a time. Where you have three or more things to compare together, the comparison must still be made two by two; and we must compare them in those qualities or parts in which they correspond; that is, by some property which they have in common; for until we have done this we can know nothing about their ratio to each other. As a familiar example, compare a rod of wood with a bar of iron. In comparing their respective *weights* we take a quality, gravity, or their tendency to press downwards, which is common to both. In comparing their bulk, we take the product of the length, breadth, and thickness of the one, and compare it with that of the length, breadth, and thickness of the other; we thus compare that which constitutes the bulk of the one, with that which constitutes the bulk of the other. In comparing their lengths, we find the number of feet or inches in each, and compare these numbers, which gives the ratio of their lengths; and so on with respect to any other qualities or properties which they have in common. Now, in all these comparisons, the ratio of any two things of like kind is ascertained by means of numbers. The numbers expressing the weights enable us to judge of the rod and bar with respect to weight; the numbers expressing the feet and inches in each, enable us to determine the ratio of their lengths; and the numbers expressing their respective bulks, enable us to determine the ratio of their sizes. Now, if two lines in one figure have to each other the same ratio which two lines have to each other in another figure, these four lines are said to be proportional. Hence proportion in the art of drawing is, as in everything else, a comparison between ratios, which *may be* expressed arithmetically, or by numbers.

When we say that a living or statuary figure of a man is not well-proportioned in form, we mean that his limbs have not the same ratio to each other, or to the whole body, which those of the average of men have. Perhaps his arms are too long, or his legs are too short. Now, we come to this conclusion by making a ready comparison in our own minds between the ratio of the length of his arms to that of his body, and the ratio of the length of the arms to that of the body in some *standard* or *model* figure existing in the mind's eye. For instance, the ratio of the number of feet and inches in the length of the arms of the supposed figure to those in its whole length, is greater than the ratio of the number of inches in the length of the arms of the *ideal* or *model* standard figure to those in its whole length; and the instantaneous mental comparison of these ratios in the two figures, has rendered the disagreement in the proportion self-evident. In the supposed perfect ideal figure, the length of the arms measures a certain number of inches, and the whole height of the figure measures another certain number of inches; and because the length of the arms of the other figure has not the same ratio to its whole height, it is reasonably considered as not well-proportioned. A comparison of numbers, measured by the eye, has settled the question in this instance. It is, in fact, decided arithmetically, and, whether consciously or unconsciously, it must be so decided by every one who forms a judgment in such a case.

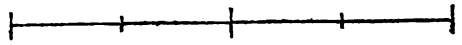
Actual measurement, or the use of instrumental methods of ascertaining proportions, is forbidden to the student of drawing. He may measure in comparing *what he has done* with his model;

but in what he is *going to do*, his eye and his hand are the only assistants which he must call to his aid; and the eye may be so trained, and become so accustomed to judge of proportions, that the use of an instrument would be far more embarrassing to the drawer than the want of it; for a just appreciation of proportion is not at all dependent on the hand. This power manifests itself in a ready perception of the mind. The eye is the instrument through which the mind operates; and a skilful hand expresses proportion in a manner which one unskilled cannot reach. Nevertheless, artists skilful in many essential points, sometimes show a great deficiency in their judgment of proportions; especially if they are debarred the use of those instrumental means by which they have been accustomed to determine them.

A just appreciation of proportion seems to be in some a natural faculty; in others, it is the growth of experience. Like the rest of our faculties, either natural or acquired, if it be judiciously developed and cultivated, it is sure to operate with readiness and accuracy. The following exercises are proposed to the pupil, in order that he may see, as has been said, how proportions are ascertained and expressed by numbers.

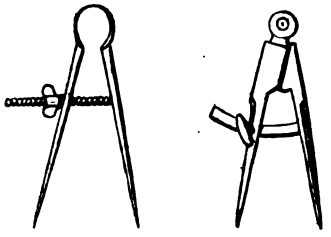
Draw a straight line in any direction, horizontal, perpendicular, or at any angle, and divide it into two equal parts by a mark at the middle point, see fig. 56. Divide each of these halves again into

Fig. 56.



two equal parts by marks at their middle points. When you are satisfied in your own mind that you have divided these by the eye as accurately as possible, then test them by a pair of compasses or dividers: a pair of spring dividers is best adapted for marking off distances. In this instrument, the spring causes one of its legs to press strongly outwards against a small head which turns on a screw passing through one leg and fixed on the other, as seen in fig. 57. The same figure shows, also, another form of the

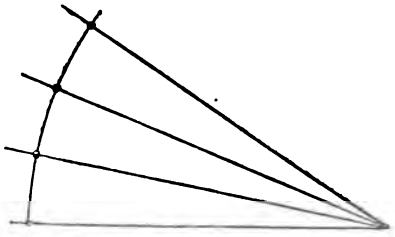
Fig. 57.



dividers, where a screw fastens one leg to a circular arc which passes through it; but the latter form does not admit of such nice adjustment as the former, which contains the spring.

You may test the four divisions of the straight line without a pair of compasses, by folding a piece of paper exactly the length of the line first into two, and then again into two, when the three division-marks will be at the folds. As another exercise, make four marks at equal distances, on a straight line, *beginning at one end*, and ending at the other; and test them by the dividers. Then, divide a straight line into *three*, *five*, *seven*, and *nine* equal parts, beginning at one end, and ending at the other. When you can do these exercises, so as to stand the test of measurement, then proceed to divide an angle into a similar number of equal parts; as an example, see fig. 58.

Fig. 58.



To test the divisions of an angle, set one leg of the compasses at the angular point, and turn an arc with the other; if your divisions of the angle are all equal, the *chords* of each of the intercepted arcs will be equal. Repeat these exercises by varying the number of parts, and endeavour to mark off any part of the whole, as, four-fifths, five-sevenths, and so on. Also, taking the plane figures, the triangles, polygons, &c., divide their surfaces into equal parts, and into unequal parts in various ratios to each other, and to the whole.

Fig. 59.

As another example: suppose you wish to copy and to enlarge such a portion of a human face as that in fig. 59, to any number of times the size; for instance, say *four times*, that is, in the ratio *of four to one*. In order to establish this ratio between the copy and the figure, you will have to double the length of each line. Now, observe the points which are placed close to the outline, and give to each distance double the length which it has in the original; then, the figure constructed according to the new points, will be enlarged or made greater than the copy, in the ratio of *four to one*. Thus you see that ratio and proportion are matters of arithmetic. Look at the nose in the above sketch; it is straight and of suitable proportion to the rest of the face. You may often hear such expressions in common conversation as the following:—"His features are *high*," or "his profile is *flat*." When speaking of features as *high*, we mean that they project more from the general line of the face than they do in the standard or average face of men; and when speaking of *flat* or *low* features, we mean that they project less from the general line of the face than in the standard face. With respect to this ideal or standard face, and indeed to the standard form generally, we conceive that no excess or deficiency whatever belongs to it; otherwise it could not be a standard of perfection. It is, in fact, the beau ideal, the *ideal fine*, the perfection of beauty in the human form. This has sometimes been realised in individual living forms; but more frequently it is only to be seen in statuary models, as in the following, called *Apollo Belvedere*,* fig. 60:—

Fig. 60.

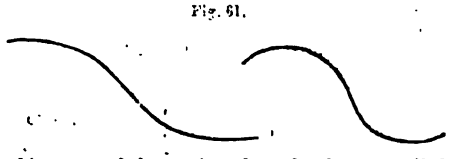
The Apollo Belvedere.

The sum of what we have said amounts to this: as proportion depends on lengths and breadths, convexities and concavities (heights and hollows), so, in order to preserve proportion in your drawings, you must observe how many times one length or breadth is contained in another; what multiple or submultiple one angle is

* This is a representation of a celebrated statue discovered at Porto-Anzio, under the reign of Nero, which takes its designation from the Belvédère (*Fine-view*) of the Vatican at Rome, where it was placed, and where it now remains.

of another; and in curves, what ratio the radius of curvature in one curve has to the radius of curvature in another.

Fig. 61.



Upon this power of observation depends what are called *full* or *delicate* outline in a drawing; as you may see by the contrast of the two curves in fig. 61, with which we at present conclude.

LESSONS IN LATIN.—No. XL.

By JOHN R. BEARD, D.D.

IRREGULAR VERBS

5. Eo, ire, ivi, itum, *to go.*

	INDICATIVE.	SUBJUNCTITE.
PRES.	ĕo, ĭs, ĭt; ĭmus, ĭtis, eunt	eam, eas, eat; eamus, eatis, eant
IMP.	ibam, ibas, ibat, &c.	irem, ires, iret, &c.
1 FUT.	ibo, ibis, ibit, &c.	iturus, a, um, sim, &c.
PERF.	ivi, ivisti, ivit, &c.	iverim, iveris, iverit, &c.
PLUPF.	iveram, iveras, iverat, &c.	ivissem, ivisses, ivisset, &c.
2. FUT.	ivero, iveris, iverit, &c.	

IMPERATIVE.	SUPINE.	PARTICIPLE.	GERUND.
SIN. 2. ĭ, ĭto, 3 ĭto	ĭtum	PRES. *Nom.* iens	N. eundum
PLU. 2. ite, ĭtōte	ĭtu	*Gen.* euntis	G. eundi
3. eunto		FUT. iturus	D. eundo, &c.

In the same way the compounds, as, exeo, *I go out;* abeo, *I go from;* re-d-eo, *I go back;* so also ven-ĕo, ven-ii, ven-ĭtum, ven-īre, *to be sold* (imperative, participle, and gerund wanting); ambīre, *to go round, surround, canvass,* is an exception, as it strictly follows the fourth conjugation, thus: ambio, ambiam, ambiebam, ambirem, ambiens; ambīvi, ambītum, ambītus (the substantive has the i short, ambĭtus, ūs), ambiendum.

The compounds in the perfect throw out the *v*, and when *s* follows, *vi;* as, abii, for abivi; abisti, for abivisti; so abiit, abierim, abisse, abissem; venii, venieram, veniero, &c.

Of the simple verb, the passive is used only in the third person singular; as, ītur, literally, *it is gone,* that is, *one goes, they go;* ibatur, *they were going;* itum est, *they went.* By the passive infinitive, iri, in union with the supine, is formed the infinitive future passive, as amatum iri. But the compounds with a transitive force, like other transitives, have a complete passive, e. g., praeterire, *to go by;* praetereor, *I am gone by;* praetereor, praeterīris, praeterītur, praeterīmur, praeterimini, praetereuntur, praeteribar, and so forth. Ambior (ambiuntur, ambiebar) in the passive, also, follows the model of the fourth conjugation.

VOCABULARY.

Adire, *to go to*; circumire, *to go round*; interire, *to go between, perish*; obire, *to die*; perire, *to perish*; transire, *to pass over*; emŏri 3, *to die*; casa, ae, *f. a cottage, hut*; angustiae, arum, *f. a narrow pass*; excessus, ūs, m. *a going out, beyond* (E. R. *excess*); praealtus, a, um, *very high*; aliquando, *some time*; foede, *foully, shamefully*; intempestive, *unseasonably, out of time*; obviam (ob and via), *in the way of, against*; īre ob, *to go to meet*; sero, *late, too late*; priscus, a, um, *old*; prisci, *the ancients*; turpitudo, ĭnis, *f. baseness*; cubĭtus, ūs, *a bed*; ire cubitum, *to go to bed.*

EXERCISES.—LATIN-ENGLISH.

Qui ad nos intempestive adeunt, molesti saepe sunt; plerăque ante oculos posita, transīmus; abeunt hirundines hibernis mensibus; corpus mortale aliquo tempore interīre necesse est; pereunt aliquando innocentes; quis neget? nocentes tamen saepius pereunt; omnes homines summâ ope niti decet ne vitam silentio transeant; quis dubitet quin ex casâ vir magnus exire possit? potius sero quam nunquam, obviam eundum est audaciae temeritatique; omnes cives militibus, qui e bello domum redibant, laeti obviam ibant; si ita naturâ paratum esset, ut ea dormientes agerent quae somniarent, alligandi omnes essent, qui cubitum irent; illud erat in Itum priscis esse in morte sensum; neque excessu vitae sic deleri hominem ut funditus interīret, angustias Themistocles quaerebat ne multitudine hostium circumīretur; Romulus ad deos transisse creditus est; Augustus obiit septuagesimo et sexto aetatis anno; mihi nunquam persuaderi potuit, animos dum in corporibus essent mortalibus, vivere, quum exissent ex iis, emŏri; quicquid transiit temporis, periit; quum rure rediero, statim te adibo; Pompeius multique alii clari viri foede perierunt; i quo te fata vocant; abiit ad deos Hercules; nunquam abisset, nisi quum inter homines esset, eam sibi viam munivisset; muros turresque urbis praealtum mare ambiebat.

ENGLISH-LATIN.

They came to me unseasonably; I will not go to my uncle unseasonably; I have passed over the book placed before my eyes; good men die, but not perish; good men will never perish; who doubts that great men may come forth from cottages? take care not to pass thy life in silence; you must go against (oppose) baseness; they have gone to the town; when they return (will have returned), they will come to your house; Romulus is said to have gone to the gods; dost thou think that Romulus went to the gods? the children will go to meet their parents; the general takes care not to be surrounded; I fear the city will be surrounded by the multitude of soldiers; they might go; they might have gone; I will go; wilt thou go? he was going home when his father was returning; I might have gone; I must go home; my father must go to meet the citizens; I am about to go to bed; dost thou not know that I am about to go to bed? they have gone to bed.

6. Queo, quire, quīvi, quĭtum, *to be able;*
nequeo, nequire, nequīvi, nequĭtum, *to be unable.*

Nequeo is merely queo and ne or non. These two verbs follow eo, ire, ivi, itum. Many parts of these verbs appear but seldom, and not at all in good prose; these parts are omitted in the following table:—

	INDICATIVE.		SUBJUNCTIVE.	
PRES.	queo	nequeo	queam	nequeam
		nequis	queas	nequeas
		nequit	queat	nequeat
		nequīmus	queamus	nequeamus
		nequītis	queatis	nequeatis
	queunt	nequeunt	queant	nequeant
IMP.		nequibam		nequirem
PERF.	quivi	nequivi	quiverim	nequiverim
PLUPF.	quivĕram	nequivĕram	quivissem	nequivissem
2. FUT.	quivero	nequivĕro		

INFINITIVE.	PARTICIPLE.
PERF. quivisse, nequivisse	nequiens

The other parts are wanting, or rarely occur.

7. Fio, fieri, factus sum, *to be made, to become.*

This verb stands as the passive of facio, *I make.*

	INDICATIVE.	SUBJUNCTIVE.	INFINITIVE.
PR.	fio, fis, fit, fiunt	fiam, fias, fiat, fiamus, fiatis, fiant	PR. fieri
IMP.	fiebam, &c.	fierem, &c.	PERF. factum esse
1. FUT.	fiam, &c.		FUT. factum iri, or futurum esse, or fore
PERF.	factus, sum, &c.		
PLUPF.	factus eram, &c.		
2. FUT.	factus ero, &c.		

PARTICIPLE.	
PERF.	factus, a, um,
FUT. PASS.	faciendus, a, um
FUT. ACT.	futurus, a, um

The other parts are wanting, or only of infrequent occurrence.

The compounds of facio formed from verbs, retain facio in the active voice, and in the passive follow fio; e. g., calefacio, calefacĕre, calefeci, calefactum, *to make warm*; calefio, calefieri, calefactus sum, *to be made* or *become warm.* The compounds with prepositions, however, have in the active ficio, ficere, feci, fectum; and in the passive, ficior, fici, fectus sum; as, perficio, perficĕre, perfeci, perfectum; in the passive, perficior, perfici, perfectus sum. Only a few compounds with prepositions, together with the regular forms, have, in the passive, forms from fio; e. g., confit for conficitur, confieri; defit, defiat.

VOCABULARY.

Exulcerare, *to make sore*, or *ulcerous*; generare 1, *to beget, generate*; retinēre 2, *to hold back, retain*; elŏqui 3, *to speak out, utter*; cogĭto, *with thought, advisedly*; crebro, *frequently*; fataliter, *according to fate*; interdum, *sometimes*; civiliter, *like a citizen, politely, elegantly*; adversus, a, um, *turned towards, opposite*; rho, *the Greek letter r*; definītus esse fataliter, *to be fore-ordained by fate.*

Exercises.—Latin-English.

Intueri solem adversum nequimus; decóri vis ea est ut ab honesto non queat separari; risus interdum ita repente erumpit ut eum cupientes tenere nequeamus; dic utrum queas an nequeas mecum Ire; quum hostes exercitum nostrum fundĕre nequirent, in castra munĭta se receperunt; quum dux precibus retinere militem nequiret, vim adhibendam censuit; saepe imperĭti medici ea quae sanare nequeunt, exulcerant; quum Demosthenes rho dicere nequiret, exercitatione fecit ut planissime diceret; ex inimico cogita posse fieri amicum; nemo fit casu bonus; si fato omnia fiunt, nihil nos admonere potest ut cautiores fiamus; nemo ignaviâ immortalis factus est; permultum interest utrum perturbatione aliquâ animi, quae plerumque brevis est, an consulto et cogitato fiat injuria; homo quod crebro videt, non miratur, etiamsi cur fiat nesciat; non ita generati a naturâ sumus ut ad ludum et focum facti esse videamur, sed ad severitatem potius et ad quaedam studia graviora atque majora; prudentior fis, accedente senectute; nego esse fortunam, et omnia quae fiunt, quaeque futura sunt, ex omni aeternitate definĭta dico esse fataliter; quâ de causâ dicebas omnia quae fierent futurane essent, fato contineri? fieri potest ut recte quis sentiat, et id quod sentit, polite elŏqui nequet.

English-Latin.

Men cannot look at the sun turned towards them (adversus sol); the virtues are so (ita) bound together (inter se), that (ut) they cannot be separated; often we cannot restrain laughter, however (quamvis with sub.) we wish it (would); say whether you can or cannot go with us; there are many diseases which cannot be healed; can Demosthenes pronounce *r*? I cannot pronounce *r*; by exercise, I hope to be able to pronounce *r*; if thou wishest to become learned, learn diligently; an enemy is often made out of a friend; men do not become good or bad by chance; if all things took place (were done) by chance, foresight would be useless; dost thou think that any one through sluggishness becomes immortal? by old age, men become wiser; some philosophers were uncertain whether all things (omnia ne) took place by fate; I am convinced that nothing takes place by fate.

We have now gone through what are generally called "The Irregular Verbs," and find them to be in number seven, namely, 1. Possum; 2. Edo; 3. Fero; 4. Volo; 5. Eo; 6. Queo; 7. Fio. If we add the compounds of volo (nolo, malo) and of queo (nequeo), we make the number ten.

LESSONS IN GERMAN.—No. XXXIII.

Section LXVI.

Los (*loose apart, &c.*) when combined with verbs, has a variety of significations. Its exact force in any given place, is best determined by the context, as, **losbinden**, to unbind; **losgehen**, to break out; **losreißen**, to tear asunder. **Ein Gewehr losbrennen**; to fire (off) a gun. **Das Gewehr iſt losgegangen**; the gun (went off) discharged (accidentally). **Der Streit geht wieder los**; the contest is beginning again.

Exercise 69.

Auf'merkſamkeit, *f.* attention;
Borgen, to lend;
Emi'lie, *f.* Emily;
Erre'gen, to excite, raise;
Gepäck', *n.* baggage, luggage;
Habe, *f.* property;
Heer, *n.* host, army;
Kalk, *m.* lime;
Losgehen, (See los above);
Loswerden, to free, disengage one's self;
Möglich, possible;
Spaß, *m.* sport;
Traurig, sorrowful;
Uebrig, over, remaining;
Ue'brigbleiben, to be left;
Un'beſchäftigt, unemployed;
Ziehen, to draw.

Der Drang, frei und ſelbſt'ſtändig zu ſein, iſt einem jeden Menſchen an'geboren, und ein Jeder beſtrebt' ſich, dieſen Drang ſo viel wie möglich zu befrie'digen.
The desire to be free and independent is innate in every human being; and this desire every one endeavours as much as possible to satisfy.

In despo'tiſchen Ländern bleibt frei'ſinnigen Männern nichts Anderes übrig, als entwe'der ihre Geſinnungen zu verber'gen und ihre Gefüh'le zu unterdrück'en, oder die Wahl zwiſchen Ketten und Flucht.
In despotic countries there remains to free-minded men nothing else, than either to conceal their sentiments and suppress their feelings, or the choice between chains and flight.

Er zufrie'dene braucht nur ganz wenig, um glücklich zu ſein.
The contented (man) needs but very little in order to be happy.

Nach Abzug aller Koſten blieb ihm nichts übrig, als einige Groſchen.
After deduction of all costs, there remained for him nothing but a few groats.

Man wird das Geld ſchneller los, als man es verdient'.
One gets rid of money faster than one acquires it.

1. Der Arzt hat mir gerathen, ſo wenig wie möglich auszugehen. 2. Emilie arbeitet ſo wenig wie möglich, um die Feinheit ihrer Hände zu erhalten. 3. Die Kinder ſollten jeder Zeit ſo wenig wie möglich unbeſchäftigt ſein. 4. Er ſpricht ſo wenig, um keine Aufmerkſamkeit zu erregen. 5. Ferdinand iſt jetzt ganz wenig zu Hauſe. 6. Auf der letzten Reiſe hatte ich ganz wenig Gepäck bei mir. 7. Wollen Sie etwas Fleiſch haben? 8. Ja, aber nur ganz wenig. 9. Es bleibt ihm nichts übrig, als zu betteln, oder zu arbeiten. 10. Es bleibt nicht Anderes übrig, Sie müſſen jetzt handeln. 11. Von all ſeiner Habe blieb ihm nichts übrig, als ein Stück Land. 12. Dieſe Roſe blieb allein von allen Blumen übrig. 13. Er blieb allein von dem ganzen Regimente übrig. 14. Ich kann dieſe traurigen Gedanken nicht los werden. 15. Um ſeine falſchen Freunde los zu werden, muß man ihnen Geld borgen. 16. Gewähren Sie ihm ſeine Bitte, damit Sie ihn los werden. 17. Jetzt ging der Spaß von Neuem los. 18. Der Kalk von der Mauer geht los. 19. Als der Krieg wieder losging, zog er mit einem großen Heere in das Feld. 20. Das Gewehr ging los, als er es ergreifen wollte.

1. The physician advised my sister to stay at home as much as possible. 2 A teacher should always keep his scholars unemployed as little as possible. 3. The orator spoke with great enthusiasm, in order to raise the attention of his auditors. 4. Most travellers take with them as little luggage as possible. 5. Will you have some apples? 6. Thank you, Sir, I have quite enough. 7. Augustus is now very much at home, hence we may go to him. 8. There is nothing left for him but submission to his destiny. 9. I had no other resource left me than to fly from the enemy. 10. Of all his property, nothing was left but a garden. 11. I cannot get rid of my cold. 12. Grant the request of this false friend, then you will get rid of him. 13. Who broke the foot of the table? 14. The servant broke it off, when she cleaned the room. 15. Frederic the Great marched at the head of his army to the war. 16. The gun went off accidentally, or he could have shot the hare.

Section LXVII.

Weiſe=way, manner; as, **auf dieſe Weiſe**, in this way (on this wise). It is often compounded with adjectives and nouns, and used adverbially. **Scherzweiſe**, jestingly. **Glücklicher Weiſe**, fortunately; in a fortunate manner. (§ 105.)

I. **Unter vier Augen**, literally, under *four eyes*; i. e. *secretly, in confidence*; between *two* persons. **Man hat es mir unter vier Augen geſagt**; it has been told to me in confidence.

Exercise 70.

Amts'geſchäft, *n.* official duty, business;
Aſien, *n.* Asia;
Ausrichten, to do, perform;
Bei'nahe, almost, near, about;
Berüh'ren, to touch, to come in contact with;
Beſchäf'tigung, *f.* business, employment, occupation;
Feu'ersbrunſt, *f.* fire, conflagration;
Flucht, *f.* flight, escape;
Friſten, to prolong;
Furchtbar, tremendous;
Gefahr', *f.* danger;
Gehorchen, to obey, to be obedient;
Gewalt'ſam, violently, forcibly;
Hinweg'ſchleppen, to draw away, to take away by force;
Hof, *m.* court;
Irrung, *f.* error, mistake;
Kleiden, to dress, clothe;
Legitimi'ren, to legitimate;
Litera'riſch, literary;
Men'ſchenleben, *n.* human life;
Miß'verſtändniß, *n.* misunderstanding, variance;
Mode, *f.* mode, fashion, custom;
Muße, *f.* leisure, ease;
Noth'gedrungen, compulsory, forcedly;
Paß, *m.* passport;
Perſer, *m.* Persian;
Perſiſch, Persian (adj.);
Römer, *m.* Roman;
Scherz'weiſe, by way of jest;
Schnee'lawine, *f.* avalanche;
Schweiz, *f.* Switzerland;
Ue'brighaben, to have more than enough;
Vergnügung, *f.* pleasure;
Verhindern, to hinder, stop from;
Verſe'hen, *n.* oversight, inadvertence;
Verun'glücken, to become unfortunate, to be lost;
Vorzugsweiſe, preferably, especially;
Weiſe, *f.* way, manner;

Wichtig, considerable, important; Wille, *m.* will, mind; Zufluchts'stätte, *f.* asylum, refuge.

Mit Güte richtet man in den meisten Fällen mehr aus, als mit Gewalt.	With kindness, one in most cases, accomplishes more than with violence.
Die Fürsten Euro'pas verfah'ren ei'genmächtig und gewalt'sam gegen ihre Un'terthanen.	The princes of Europe proceed arbitrarily and violently against their subjects.
Die Eng'länder suchten mit aller Macht die Oberherrschaft in Amerika zu gewin'nen.	The English sought with all (their) power to obtain the supremacy in America.
Durch ein solches Betra'gen muß nothwen'diger Weise ein Bruch zwischen beiden Freunden entstehen.	By such conduct, a breach between the two friends must necessarily arise.
Er bindet sich an keine besonderen Stunden, sondern ar'beitet nach Muße.	He confines himself to no particular hours, but works according to (his) leisure.
Aus Verse'hen kann oft das größte Unglück entstehen.	By inadvertence the greatest misfortune may often occur.

1. Die Franzosen eroberten Spanien mit Gewalt der Waffen. 2. Die Schneelawinen in der Schweiz stürzen oft mit furchtbarer Gewalt in die Thäler. 3. Die Einwohner dieses Landes schleppt man gewaltsam hinweg. 4. Mit aller Macht konnte er nichts ausrichten. 5. Die Griechen vertheidigten sich mit aller Macht gegen die Perser. 6. Der Schwächere muß nothwendiger Weise dem Stärkeren gehorchen. 7. Beinahe ganz Asien gehorchte dem Willen der Römer. 8. Um sein Leben zu fristen, mußte er nothwendiger Weise arbeiten. 9 Themistocles suchte nothgedrungener Weise eine Zufluchtsstätte am persischen Hofe. 10. Mein Freund vertraute mir gestern Abend unter vier Augen ein wichtiges Geheimniß an. 11. Nachdem die Schule aus war, spielten die Kinder nach Lust unter den Bäumen des Gartens. 12. Alle Anwesenden kleideten sich nach der Mode von siebenzehn hundert neun und achtzig. 13. Wegen seiner Amtsgeschäfte hatte er wenig Muße zu Vergnügungen übrig. 14. Schiller konnte sich nun nach Muße in Mannheim literarischen Beschäftigungen widmen. 15. Ich habe aus Versehen einen andern Regenschirm mitgenommen. 16. Irrungen entstehen aus Mißverständnissen und Versehen. 17. Glücklicher Weise konnte er sich vermittelst seines Passes legitimiren. 18. Glücklicher Weise hatte ich noch zur rechten Zeit die Gefahr entdeckt. 19. Glücklicher Weise traf ich ihn auf der Straße. 20. Es ist bei dieser großen Feuersbrunst glücklicher Weise kein Menschenleben verunglückt. 21. Scherzweise darf man sich schon Manches erlauben. 22 Er berührte diese Scene scherzweise. 23. Ich liebe vorzugsweise die französische Sprache. 24. Er durfte vorzugweise in das Zimmer des Fürsten gehen.

1. The inhabitants of Holstein defended themselves with all their power against the Danes. 2. William the Conqueror overcame England by force of arms. 3 Those brave soldiers forced their way with tremendous violence through the ranks of the enemy. 4. They forcibly hindered him from his escape. 5. Do you like the German language? 6. Yes, I do, but I especially like the Italian language. 7. At the present time he is especially occupied with the German and Spanish languages. 8. Fortunately I found my friend at home. 8. He is obliged to listen to the orders of his superiors. 10. Most people dress themselves after the French fashion. 11. I took unknowingly the hat of another. 12. My friend fortunately discovered the danger which threatened him. 13. By way of jest he told me many a truth. 14. Secretly you may tell many insults. 15. The princes of Germany proceed arbitrarily in ruling their dominion

Section LXVIII.

The syllables „chen" and „lein" are suffixed to nouns and form diminutives. These diminutives are always of the neuter gender, and change the radical vowel, when it admits of it: Der Hügel, the hill. Das Hügelchen, the hillock. Die Kugel, the globe or ball. Das Kügelchen, the globule or the little ball. Nearly all nouns may take these suffixes, and many drop or change their final letter. Ex.: Der Knabe, the boy. Das Knäblein, the little boy. Die Stube, the room. Das Stübchen, the little room They are used also as terms of endearment or familiarity, especially by children. Ex.: Väterchen, dear father Mütterchen, dear mother. Schwesterchen, dear sister. &c.

I. In die Höhe=in the high, on high, upward, &c., as, Er sprang in die Höhe; he sprang up. In die Höhe richten; to raise, to elevate, to direct upward.

II. Gelten is variously translated, "to be worth, to pass for," &c. Ex.: Diese Bücher werden für alte gelten, und ich werde deßhalb keinen Eingangszoll zu bezahlen haben; these books will pass for old ones, and I shall therefore have no duty to pay. Dieser Mann gilt viel in der Stadt; this man has great influence in the city. Was gilt dieses Pferd? What is this horse worth? Was gilt's? or Was gilt die Wette? is equivalent to our, "What will you bet?" "How much is the stake?" &c. Es gilt ein Leben; there is a life at stake, &c.

Exercise 71.

An'erkennung, *f.* recognition, acknowledgment; Antrieb, *m.* impulse, motive; Betrieb, *m.* business, trade; Bewundern, to admire, to wonder; Brauchbar, useful, serviceable; Brüderchen, *n.* little brother; Der'gestalt, in such a manner, so; Ein'richten, to arrange, order; Fabrik', *f.* fabric, manufactory, factory; Fischchen, *n.* little fish; Gänschen, *n.* gosling; Gärtchen, *n* little garden; Häuschen, *n.* cottage; Höhe, *f.* (See above I.); Hüpfen, to hop, jump, skip; Hütchen, *n.* little hat; Kätzchen, *n.* pussy; Keinesfalls, in no wise; Kistchen, *n.* little chest; Klatschen, to clap; Lämmchen, *n.* lambkin; Leistung, *f.* performance, accomplishment; Leutchen, little people; Niedlich, neat, nice, pretty; Prophet, *m.* prophet; Republika'nisch, republican; Samstag, *m.* Saturday; Spät, late; Thierchen, *n.* little animal; Trieb, *m.* driving, instinct, inclination.

Er traf ihn der'gestalt mit seinem Schwerte, daß er zu Boden fiel.	He struck him with his sword so (in such a manner) that he fell to the ground.
Das Bübchen freut sich sehr über sein neues Hütchen.	The little boy rejoices much over his (little) new hat.
Ich werde es so ein'richten, daß ich Sie bald besu'chen kann.	I will so arrange it, that I can soon visit you.
Der Mensch soll im Glücke wie im Leiden seine Blicke in die Höhe richten.	In prosperity, as in affliction, man should direct his look upward.

1. Haben Sie dieses niedliche Gärtchen gesehen? 2. Nein, denn ich bewunderte jenes hübsche Häuschen. 3. Es gehört zwei alten Leutchen, welche ich kenne. 4. Was sind das für niedliche Thierchen? 5. Es sind in dem Garten eine Menge ganz junger Lämmchen. 6. Dieses Mädchen spielt mit seinem Brüderchen. 7. Wollen Sie mir jenes Kistchen geben? 8. Wollen Sie dieses auf dem Tischchen haben? 9. Sehen Sie, welch ein hübsches Hütchen! 10. Das Kindchen hat große Freude an seinem Kätzchen und an seinem Gänschen. 11. Richten Sie es so ein, daß Sie bis Samstag Morgen in meinem Hause sein können. 12. Machen wir es dergestalt, daß es für beide Zwecke brauchbar ist. 13. Er soll es so machen, daß er seine Bücher mitnehmen kann. 14. Ich richte es jedenfalls so ein, daß ich bis zehn Uhr bei Ihnen bin. 15. Wir machen es so, daß wir keinenfalls zu spät kommen. 16. Sagen Sie Ihrem Bruder, er möchte es dergestalt einrichten, daß es für Jedermann zu verstehen ist 17 Ich hoffe Sie werden es so einrichten, daß Sie mit dem letzten Dampfschiffe ankommen. 18. Ein Prophet gilt nirgends weniger, denn in seinem Vaterlande und in seinem Hause. 19. Seine Stimme gilt viel im Rathe. 20. Was gilt's, in zwanzig Jahren ist der größte Theil Europa's republikanisch? 21. Der Trieb zum Bösen ist viel stärker in uns, als der zum Guten. 22 Die Anerkennung unserer Leistungen ist ein mächtiger Antrieb zum Fleiß: 23. Der Betrieb seiner Fabriken wird von Jahr zu Jahr größer. 24. Er richtete seine Augen in die Höhe. 25. Er sprang vor Freuden in die Höhe und klatschte in die Hände. 25. Die Kinder hüpften in die Höhe.

1. Dear father, will you buy me the little lambkin? 2. No, my dear daughter, but I will buy you the gosling and the little fish. 3. Have you seen that pretty cottage? 4. No, I admired that beautiful little garden. 5. Mary plays with the pussy, and

her little brother with the little fish. 6. Look, what a beautiful little chest this is. 7. Men should at all times direct their thoughts to God. 8. Arrange it so, that I may find you to-morrow at home. 9. I hope you will arrange it so, that you may arrive on Monday morning. 10. What is this garden worth? 11. It is worth more than you believe. 12. What were these books worth ten years ago? 13. What will you bet against this horse? 14. There are five pounds at stake.

LESSONS IN ENGLISH.—No. XXXIII.

By JOHN R. BEARD, D.D.

LATIN STEMS.

WORDS are undergoing constant change of signification. The changes are in general so slow as scarcely to be noticeable, except at considerable intervals. There is a certain elasticity of mind which contracts and expands, and expands and contracts. Corresponding with these internal movements is a contraction and expansion of the import of words. That term "import" furnishes an illustration. The import of a word is, according to the etymology of the term, that which the word carries in itself. That something, that load or freight, is a variable quantity; it varies in quality as well as in quantity. The vase swells with its contents, and so its capacity is augmented.

Among the changes which words undergo, two of great importance may be specified; the one is a change from good to bad, the other is a change from bad to good. On the former I add a few things here; the latter must stand over for a little space.

Words which originally had a good meaning may degenerate so as to have a bad meaning. *Conventicle* is a harmless word, signifying only a small place of meeting. Our political and religious strifes, however, have thrown around it a feeling of contempt, so that when a Churchman wants to insult a Dissenter he dubs his house of prayer a *conventicle*:—

"It behoveth that the place where God shall be served by the whole church be a publick place, for the avoiding of privy *conventicles*, which, covered with pretence of religion, may serve unto dangerous practices."—*Hooker*.

The word *cunning* derivatively denotes knowledge, and the *skill* which ensues from knowledge. In this sense it was current at the time when our present version of the Scriptures was made; e.g.:—

"If I forget thee, O Jerusalem,
Let my right hand forget her *cunning*."—*Ps.* cxxxvii. 5.

Cunning is of the same origin as *king*, and both denote mental superiority. But, as is exemplified in the slang phrase "a *knowing* one," knowledge ill-directed may issue in craftiness. The word *craft*, from which the latter is derived, was originally, too, very innocent. Its inoffensiveness is preserved in the term craft as applied to a trade:—

"A poem is the work of the poet; poesy is his skill or *craft* of making."—*Ben Jonson*.

Our *craft* is the Saxon *kræft*, or the German *kraft*, which denotes internal strength, such as comes from essential virtues or from knowledge and skill.

One or two additional instances of the depravation of words may be given.

The term *officious* is used in a bad sense; an *officious* man is constantly interfering with what does not concern him. But in the root of the word there is nothing questionable or offensive. Officium, in Latin, signifies *duty*. According to its derivation an officious man is simply a man who attends to his duty. But even so pure a virtue may be carried to excess. Excessive and perverted the attention does become if it is outward rather than inward, more apparent than real; if duty is a pretext or an excuse. A misunderstood sense of duty prompts even the sincere to meddle, and in meddling they become officious. I subjoin two instances; in the first, officious is used in a good sense; in the second, it is used in a bad sense:—

"Yet, not to earth are those bright luminaries
Officious; but to thee, earth's habitant."
Milton, "Paradise Lost."

"You are too *officious*
In her behalf that scorns your services" *Shakspeare*.

Why should the word *resentment* signify the harbouring of a desire for revenge? Its component parts are very innocuous,—re, *again*; and sentio, *I feel*. *Resentment* considered in its origin is simply a return of feeling. Are, then, ill feelings more prevalent than good ones, that a return of feeling should be equivalent to retaliation? That retaliation should involve the bad feeling of revenge is not surprising, since its root is talio, which calls to mind the lex talionis, *the law of repaying like for like*, "an eye for an eye, and a tooth for a tooth." (Exod. xxi. 24.) The idea of revenge was moulded into the term long before it became a part of the English language. Yet, while *resentment* or a return of feeling is used in a bad sense, *recompense* or *repaying* is now used exclusively in a good sense. In Scripture, however, these words are used in a strictly judicial and juridical sense, thus: "*Vengeance* is mine; I will *repay*, saith the Lord." (Rom. xii. 19.) "To me belongeth *vengeance* and *recompense*." (Deut. xxxii. 35.) In these passages, *vengeance* merely means the *penal retribution* which follows the *infraction*, or breaking, *of the law*. To attribute *vengeance* to God in the sense of *revenge* or *mere retaliation*, is the height of moral absurdity.

The word *knave* meant once no more than *lad*, nor does its original *knabe*, in German, now mean more. *Vilain* was simply *a peasant*. *A boor* was *a farmer*; *a varlet*, *a serving-man*; *a churl*, *a strong fellow*. *Time-server* was used two hundred years ago, quite as often in an honourable sense as in a dishonourable sense. *Conceits* had once nothing *conceited* in them.

LATIN STEMS.

Latin Words.	*Stems.*	*English Words.*
genitus, *begotten*	*gen, genit*	progeny, progenitor
genus (genĕris), *kind*	*gener, genera*	generation, degenerate
glacies, *ice*	*glaci*	*glacial, glacier*
gradus, *a step*	*grad, gred, gradu, gress*	graduate, retrograde, ingredient, aggression
retro, *backwards*	*retro*	retrogradation
gramen (gramĭnis), *grass*	*gramini*	graminivorous
gravis, *heavy*	*gravi*	*gravity, gravitate*
grex (gregis), *a flock*	*greg*	*gregarious, egregious*
haereo, *I stick*	*her*	adhere, coherent
haesus, *stuck*	*hes*	cohesion, adhesion
haeres (haerēdis), *an heir*	*hered, herit*	*hereditary, inherit*
halo, *I breathe*	*hal*	exhale, inhale
haurio (haustus), *I draw*	*haust*	exhaust
homo, *a man*	*homi, hum*	homicide, human
hortor, *I advise*	*hort*	exhort
hospes (hospĭtis), *a guest, a host*	*hospit, host*	hospitable, hostess
hostis, *an enemy*	*hosti*	hostile
humus, *the ground*	*hum*	inhume, exhume
idem, *the same*	*iden*	identity
ignis, *fire*	*igni, igne*	ignition, igneous
infra, *below*	*infern*	infernal
insula, *an island*	*insula*	insulate, insular
pene, *almost*	*pen*	peninsula
intra, intus, *within*	*inter, intĭ*	internal, intimate
iter (itinĕris), *a journey*	*itiner*	itinerate, itinerary
iterum, *again*	*iter*	iteration, reiterate
itum, *to go*	*it*	exit, circuit, transit, sedition
jaceo, *I lie*	*jac*	adjacent
jactus, *thrown*	*ject*	inject, conjecture
jugum, *a yoke*	*jug*	conjugate
junctus, *joined*	*junct*	*adjunct*, conjunction
juro, *I swear*	*jur*	conjure, adjure
jus (juris), *right, law*	*juris, juri*	jurisdiction, juridical
jutus, *assisted*	*jut*	adjutant, coadjutor
juvĕnis, *a youth*	*juveni*	juvenile
lacer, *torn*	*lacer*	lacerate
laedo, *I strike*	*lid*	collide
laesus, *struck*	*les*	collision
lapis (lapĭdis), *a stone*	*lapid*	*lapidary*, dilapidate
latus, *carried*	*lat*	elate, translation
latus, *wide*	*lat, latĭ*	latitude, dilate
latus (latĕris), *a side*	*later*	lateral, equilateral
legatus, *an ambassador*	*legat*	*legate*, delegation
legatio*, *a gift*	*lega*	legacy, legatee
lego, *I gather, read*	*leg, lect*	collect, legible, lecture
lenis, *gentle*	*leni, len*	lenity, lenient, relent
levis, *light*	*levi, lief, liev*	levity, relief, relieve
levo, *I lift up*	*lev*	lever, elevate
lex (legis), *a law*	*leg, legis*	legal, legislator
liber (libri), *a book*	*libr*	library
libellus, *a little book*	*libel*	libellous
liber, *free*	*liber*	liberty, liberal, libertine

* Legatio is a Latin word of the middle ages.

Latin Words.	*Stems.*	*English Words.*
licet, *it is lawful*	*licit*	*illicit*
lignum, *wood*	*lign*	*ligneous*, pyro*lignous*
ligo, *I bind*	*lig*, *liga*	*ligament*, ob*lige*, re*ligion*
linquo, *I leave*	*lingu*	re*linquish*
lictus (relictus), *left*	*lict*	re*lict*
liqueo, *I melt*	*lique*, *liqui*	*liquid*, *liquefaction*
lis (litis), *strife, law-suit*	*liti*	*litigation*, *litigious*
litera, *a letter*	*liter*	*literal*; *literature*
locus, *a place*	*loc*, *loco*	*locality*, *locomotion*
longus, *long*	*long*, *longi*	*longitude*, ob*long*
loqui, *to speak*	*loqui*, *loquy* *loqu*, *locu*	colloquial, ob*loquy*, *loquacity*, *elocution*
venter (ventris), *the belly*	*ventri*	*ventriloquist*
ludo, *I play*	*ludi*, *lud*	de*lude*, *ludicrous*
lusus, *played*	*lus*	de*lusion*, *illusion*
lumen (luminis), *light*	*lumin*	*luminary*, *illumination*
luna, *the moon*	*lun*	*lunatic*, *sublunary*
lux (lucis), *light*	*luc*	*lucid*, *pellucid*
macies, *leanness*	*maci*	*emaciate*
macula, *a spot*	*macul*	im*maculate*
magnus, *great*	*magni*	*magnify*
male, *wickedly*	*male*, *mal*	*malevolent*, *malversation*
volo (volens), *I wish*	*volen*	be*nevolent*
verto (versus), *I turn*	*vert*, *vers*	*convert*, *converse*, *versatile*
mando, *I entrust or bid*	*mand*	*mandate*, *command*
maneo, *I stay*	*man*, *main*	pe*rmanent*, re*main*
mansio, *a staying*	*mans*	*manse*, *mansion*
mano, *I flow*	*man*	*emanate*
manus, *a hand*	*manu*, *mani*	*manual*, *manipulation*
mare, *the sea*	*mari*	*marine*, *mari*time
Mars (Martis), *Mars, the Roman god of war*	*mart*	*martial*
mater (matris), *a mother*	*mater*, *matri*	*maternal*, *matricide*

The word *progenitors* has for its corresponding Saxon term *forefathers*; the term *ancestors* is used in nearly the same sense, only the latter simply points out those who have gone before us, our *predecessors*; the former includes the idea of descent; they of old were our progenitors, we are their offspring; they were our forefathers, we are their children or descendants.

The word *degenerate* denotes that which has lost the qualities of the kind (*genus*, *géneris*) or race.

"The which thing declareth that men which have caste down their minds from the dignity of their nature, are so degenerat, and growen out of kinde, that thei seeme vtterly to be brute beastes."—*Caluine*, "Foure Godlye Sermons."

To graduate is to take a degree or step in learning in one of the universities. On entering a university, a young man is said *to matriculate* (mater, *a mother*), because he becomes the child or pupil of the institution, which in regard to knowledge and discipline is his mother. After passing through a course of instruction, he, on proving fit and worthy by examination, *takes a degree*,—that is, by receiving certain tokens, as the privilege of putting after his name B.A. or M.A., which is the same as calling himself, in the one case, *Bachelor of Arts*, or, in the other case, *Master of Arts*, he is declared and made known as having made proficiency in a greater or less *degree* in university learning:—

"Invest me with a *graduate's* gown,
Midst shouts of all beholders,
My head with ample square-cap crown,
And deck with hood my shoulders." *Smart.*

Egregious (from e, *out of*; and grex, *a flock or crowd*) denotes a person who is out of, that is, does not belong to, the multitude, one who is extraordinary and distinguished. *Egregious* is generally employed in a bad sense:—

"Thus have I adventured to expose the *egregious* folly, and to unmask the extreme corruption of heart, which assume the buffoon or the philosopher indifferently, to laugh at misery and death, and make a mockery both of law and religion."—*Warburton.*

Religion is here given as from ligo, *I bind*. This seems the best etymology. Viewed in this light *religion* is the source of *obligation*. Religion, placing man in immediate connexion with the Creator, deduces from that connexion men's obligations: first, to God, from whom they are; and next, to each other, whom for God's will, and God's sake, they are to love and serve.

Delusion and *illusion* though much alike both in derivation and import, yet differ somewhat. The common idea is that of *misleading*. By *delusions* others mislead and cheat us; by *illusions* we mislead and cheat ourselves. *Delusions* are substantial shows, presented in order to mislead; *illusions* are dreams and fancies which arise in an ill-regulated mind; the former are mostly dishonest, the latter are always weak; the former are *preconcerted*, the latter are *spontaneous*.

PARSING AND COMPOSITION.

For your exercise in parsing and composition take the ensuing letter of Mrs. Barbauld's. Give an account of every part of it as well as you can. Convert it into simple sentences. And having studied it carefully, close the book and write down from memory all you recollect of it. Then correct your copy by the original. Having done so, write a letter to a friend, if possible, on similar topics:—

"July 28, 1803.

"I am glad to find that you have spent the spring so pleasantly. But when you say you made the excursion instead of coming to London, you forget that you might have passed the latter end of a London winter in town, after enjoying the natural spring in the country. We have been spending a week at Richmond, in the delightful shades of Ham walks and Twickenham meadows. I never saw so many flowering limes and weeping willows as in that neighbourhood; they say, you know, that Pope's famous willow was the first in the country; and it seems to corroborate it, that there are so many in the vicinity. Under the shade of the trees we read Southey's 'Amadis,' which I suppose you are also reading. As all Englishmen are now to turn knights-errant, and fight against the great giant and monster, Buonaparte, the publication seems very reasonable. Pray are you an alarmist? One hardly knows whether to be frightened or diverted, on seeing people assembled at a dinner-table, appearing to enjoy extremely the fare and the company, and saying all the while, with a most smiling and placid countenance, that the French are to land in a fortnight, and that London is to be sacked and plundered for three days,—and then they talk of going to watering places. I am sure we do not believe in the danger we pretend to believe in; and I am sure that none of us can even form an idea how we should feel if we were forced to believe it. I wish I could lose, in the quiet walks of literature, all thoughts of the present state of the political horizon. My brother is going to publish 'Letters to a Young Lady on English Poetry;' he is indefatigable. 'I wish you were half as diligent!' say you. 'Amen!' say I. Love to Eliza and Laura, and thank the former for her note. I shall always be glad to hear from either of them. How delightful must be the soft beatings of a heart entering into the world for the first time, every surrounding object new, fresh, and fair—all smiling within and without! Long may every sweet illusion continue that promotes happiness, and ill befall the rough hand that would destroy them!"

LESSONS IN GEOLOGY.—No. XXV.

By THOMAS W. JENKYN, D.D., F.R.G.S., F.G.S., &c.

CHAPTER II.

ON THE ACTION OF WATER ON THE EARTH'S CRUST.

SECTION IX.

ON THE REPRODUCTIVE AGENCY OF RIVERS.

RUNNING water has been shown to have a twofold power as a geological agent,—a destructive power for the abrasion and excavation of rocks, and a transporting power for the removal of the particles and fragments which it had disintegrated. I now wish to show you what running water does with the materials which it has dislodged and held in suspension.

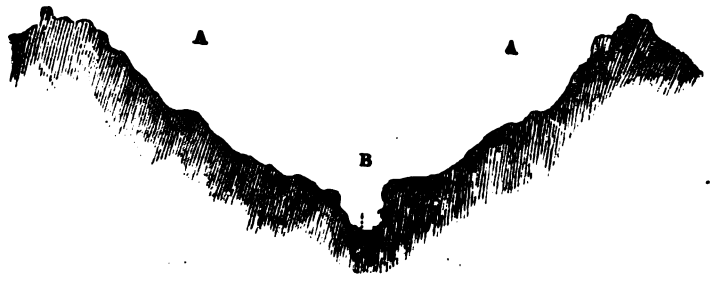
It is almost a truism to remark, that what a stream removes from one place it deposits as a sediment in another. Your last lesson gave you illustrations of the fact, that the pebbles and gravel which a river brings down a steep declivity it leaves behind on the first plain which it reaches, and that it repeats this process on every declivity and plain which lie in its course towards the sea.

To understand this agency geologically, throw your mind back to what is called geological time,—that is, time far older than any historical or traditional age. Suppose any rill or torrent to start from its spring-head, for the first time after the hardening of the earth's crust; or, it may be, after the first elevation of the mountain, where the spring gushes out, above the level of the sea. The water will seek its level by running down the declivities, fissures, dells, or valleys, which it finds in the mountain range. How the dells or valleys which form the river-beds of the present day, originated is a difficult problem in geology, and will be considered in a future lesson.

For the present, imagine a stream to gush from the mountain side,—to roll down the slopes of the naked rock,—to act chemically and mechanically in dissolving and abrading the surface of the rock,—to bear the loosened materials in suspension in its current,—and, finally, to deposit them, where its velocity has diminished, and especially where its waters come to a plain or level that would give them repose.

The first flowing of the rill or little torrent will be in the bottom of a narrow fissure existing in the rock, such as is represented in the accompanying diagram, fig. 53.

Fig. 53.



A broad Chasm or Valley in the Earth's Crust, and a narrow Fissure at its bottom forming the First Bed of a River.

A A the wide chasm between high ridges of rocks. B the narrow fissure where a stream runs.

The fissure, which B in this engraving represents, must be supposed to have the length of several miles, and to have variations of declivities, and level ground, as described in your last lesson. If the declivity of the fissure or valley be great and rapid, it is likely that the friction of a body of running water will scoop the surface, and make the bed of the stream still deeper, and that this deepening and excavating process will be for some time perpetuated.

If this fissure has the length of several miles, and if you like, of many scores of miles, it is likely that its bottom will, at many points, present a level surface or flats. On these flats or plains, the river will, as you have already learnt, leave and accumulate much of the pebbles and gravel which it had brought down from higher elevations. You can easily conjecture that, after depositing its first sediments along the breadth and the length of the first plain in its course, the river will continue to increase the amount of this deposit with every fresh abrasion or disintegration of the rocks in the higher part of its bed. The result of this repeated and continued process will be that, this part of the bed of the stream will rise by the detention and accumulation of sediments.

It is probable that, at another spot along this fissure or ravine, the bottom, instead of being a level, may be greatly indented, so as to form a deep hollow, called geologically, a trough or basin. The river will, of course, contribute its waters until it has completely filled this trough, and finds an outlet. In this case the river has formed a lake, through which all its waters must in future pass.

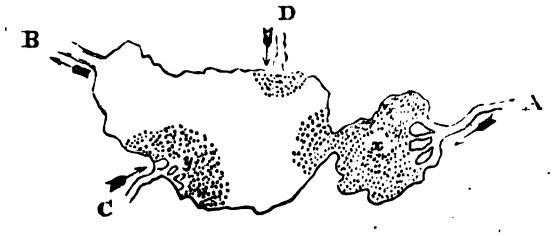
As the river passes through the lake, the solid matter which its current holds in suspension, will be deposited in it, until eventually the whole basin of the lake will be filled up with detritus of pebbles, gravel, and sand. If the rocky trough of the lake be large or long, even such lighter particles as make the water only turbid will have time to fall to the bottom as a sediment or silt.

This geological process is clearly and beautifully illustrated in the Lake of Geneva. Where the waters of the Rhone enter that lake they are extremely turbid; but at Geneva, the other end of the lake, some good thirty miles lower down, they leave the lake as clear and transparent as a stream of crystal. The reason of this is, that the waters have left all their turbid materials widespread over the bottom of the lake.

The case of the Lake of Geneva furnishes a very satisfactory illustration of the process by which alluvium is deposited by rivers. At the upper end of the lake, where the Rhone enters it, there is a tract of land eight miles long, a tract which consists altogether of the pebbles, and gravel, and mud, that the river has brought down from the Alps. On this tract, an ancient town is built, the present position of which gives us a clue to the measurement of the progress of this river deposition. The town Port Vallais was, eight hundred years ago, on the very edge of the lake, but in the course of these centuries, the Rhone has brought down to the lake so much detritus as to fill the upper end of it, so that now the town is a mile and a half inland.

Our illustration of the deposition of sediments in a lake has hitherto supposed that only one stream flows into the trough. We must now proceed to another case, in which many torrents may be rushing into different parts of the lake, and filling up different portions of the basin. This process is represented by the annexed engraving, fig. 54.

Fig. 54.



A Lake or Basin filling up by Alluvium of Rivers on opposite Shores.

In this diagram, A represents the principal river that feeds the lake, and which may be supposed to flow from a considerable distance, and to bring down a very large quantity of gravel into the lake. C and D are the short channels of two mountain streams which flow from the neighbouring heights on either side of the lake. B is the outlet of all the surplus waters of the three rivers. *x* and *y* are deltas formed at the entrance of the streams into the lake. I will explain the formation of these deltas in our next lesson.

When these different rivers and torrents first reach the edge of the lake on their respective sides, their detritus sinks into deep water. All the heavier pebbles and gravel subside at once near the shore. The finer particles of mud are carried further out in the form of turbid water, which, being heavier than that of fresh water lakes, sinks gradually in clouds towards the bottom.

These sediments become thicker and thicker with every fresh deposit, until, at length, they rise to the surface, appear first as marshes, and then as tracts of alluvial soil. In the course of ages these tracts become of considerable extent. In the meantime the detritus of different rivers are spread out further and further from the mouths of their respective rivers, and consequently nearer and nearer towards a common centre in the bed of the lake. On the supposition that this process be continued a sufficient length of time, the result will be that the entire basin of the lake will be completely filled up with these deposits which were for so long a time constantly approaching each other. For when the detritus washed down by A, C, and D had formed one tract of alluvium from C to D, the united detritus of the three rivers would be carried onward towards B, till the basin had ceased to be a lake.

This accumulation of detritus at the mouth of each river, this gradual convergence of deposits towards a centre in the lake, and this final combination of all the sediments towards the lower end of the basin, illustrate some of the most remarkable phenomena found in the geological structure of the rocks of older series, which I will immediately explain.

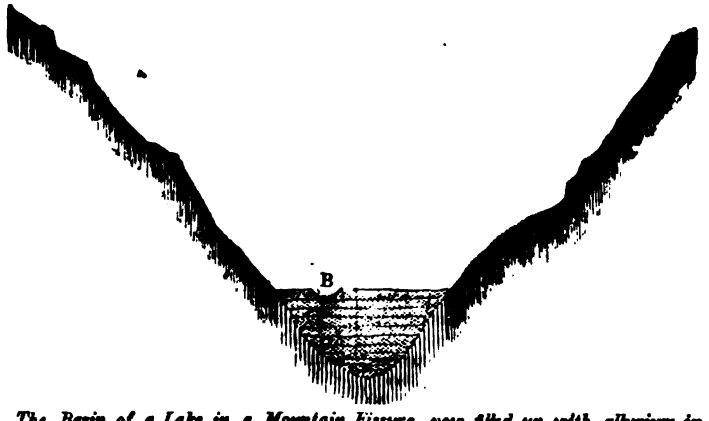
At this point, sum up the facts that have been stated. You have had a primitive fissure in the earth's crust, along which a stream of water flowed. In one part of the fissure there was a deep dent, trough, or basin, towards which several fissures and several rivers converged. The detritus washed

down by the waters, has filled up the entire lake, and has formed a lovely alluvial plain. In this case, a new sedimentary rock has been formed, and the bed of the river has been raised to a higher level. Were you ever to have a geological section of the deposits of our imagined fissure, it would appear something like what is represented in our next diagram, fig. 55.

This filling up of the basins of ancient lakes is no geological fancy. It has taken place in thousands of instances. When, in your own country, you travel through mountainous districts, and find, in the bosom of rocky hills, verdant glens and fertile bottoms, they are, in most cases, rocky basins or lakes filled up with rich alluvial soil, which has been transported thither by the stream that runs through them. If you ever ascend the valley of any river of some length, you will find that it consists of a succession of such basins, one on a higher level than the other, each of them separated by a rocky gorge that was once the barrier of the lake. The fact that explains them all is, that the river has filled the different basins or lakes, one after another, and has partially cut through the rock that formed the barrier which it is still gradually scooping to a greater depth.

I have intimated that an examination of the composition of the sediments which have filled up the deep hollows of mountain fissures, and which have obliterated several lakes, enable us to comprehend the lithological structure of some older rocks. It is constantly found that some of these ancient sedimentary rocks, though they are of the same age and formation, vary exceedingly in the character of their materials, the size and structure of their pebbles and gravels, and in the colour and texture of their sands and clays. These diversities are satisfactorily explained, when you consider the facts and the processes represented by fig. 54.

Fig. 55.



The Basin of a Lake in a Mountain Fissure, now filled up with alluvium in stratified deposits. B the bed of the present river.

Imagine the outline of fig. 54 to represent the basin of an immense lake—say Lake Superior, in North America, which is the largest body of fresh water in the world. The surface of this lake is about as large as the whole of England. Its depth varies from 400 to 1,200 feet, and its bottom is 600 feet below the level of the Atlantic Ocean. Into this lake some hundreds of rivers and torrents pour their waters. These rivers run over different kinds of rock, and must therefore wash down to the lake a great variety of detritus. Some of these rivers, running over primary rocks, sweep in large boulders, pebbles, and gravel, of granite and trap rocks, which they may again cover with white sand derived from the abrasion of granite. Another river may have its waters blackened by holding in suspension the clays of dark slate mountains between which they have flowed. Another may be coloured by an ochreous sediment derived from red sandstone, or from rocks abounding with iron. Another may hold the carbonate of lime in solution. When these different deposits would be examined at the mouths of their respective streams, they would each form distinct beds of pebbles, gravel, sand, limestone, marl, or other materials. But after the different deposits had, by their convergence towards each other in the lake, formed a conjunction, a new chemical combination would be the result; the deposits would appear of distinct colour, and the smaller particles, having been conveyed towards the outlet of the lake, the rock, in that direction, would become of a finer structure.

These finer particles of detritus seem to have been spread over the whole breadth and length of the bottom of the lake. By numerous soundings, it has been ascertained that, everywhere, the bottom consists generally of a very fine and adhesive clay, but which is of different colours in different parts of the lake. In one district the clay is blue, in another red, and in a third white, hardening into a substance like pipe-clay. This is accounted for by the separate character of the different rocks from which the rivers bring down detritus.

The study of fig. 55 will help you to understand the stratification of sedimentary rocks. You have scarcely ever taken a fragment of free sandstone in your hand without perceiving that it is laminated almost like the leaves of a book, and that sometimes the laminæ have different colours. Some portions of these stratifications are a conglomerate of various-sized pebbles; others are laminated sands; and others are thinly foliated clays or shales. This diversity in the structure of the stratification is occasioned by the variations in the velocity of the river at different times of the year. Its current has not always the same power to sweep particles of certain weight and dimensions over a large extent of surface. As the force of the current augments or decreases, the materials are borne and scattered or limited to particular places, and are sorted according to their forms, dimensions, and weight.

These natural divisions, which are observed in the stratification, are also occasioned by the intervals of time which may transpire between the different seasons of periodical rains, of melting of snows, and of other agencies, which may occasion floods in a river. It is possible that the sediments deposited at one flood may have acquired a considerable degree of consistency and hardness, before the silt of another flood will be precipitated in layers upon the surface of the preceding bed. There may also be a great variety of circumstances occurring periodically which will occasion some variations either in the colour or in the fineness of the articles deposited, and indeed in both.

Such variations will again give rise to alternations of strata which are distinct from each other, both in mineral ingredients and in mechanical texture. It would be endless to enumerate all the circumstances which may contribute to such variations and alternations of strata in the same rock. At one time there may be a sudden flood, when the velocity of the turbid current will be in greatest force, and when it will bear along pebbles and sand which it will spread over a large area, on the top of which, when the waters are low and less agitated, the finer materials will settle as a sediment of sand or clay. At another period there may be excessive rains and extensive inundations, which will carry down soft mud and drifted wood and animals, and thus form a rock of a character very different from that of the underlying stratum. At different periods the several streams also, as represented in fig. 54, may be charged with several materials respectively. One river may be charged with calcareous matter from limestone rocks; a second, with argillaceous matter from slate formations; a third may wash down sand and gravel; and a fourth brings down impalpable mud. These variations and alternations may be repeated with much regularity, until a bed of rocks several scores of feet in thickness may be formed in alternating beds of different colour and of distinct chemical structure.

Bernard Palissy, fut le premier qui, vers le milieu du seizième siècle, osa dire que les coquilles fossiles n'étaient pas des jeux de la nature, mais qu'elles avaient été déposées par la mer dans les localités où elles se trouvent aujourd'hui.

LESSONS IN ARITHMETIC.—No. XXI.

(*Continued from* p. 232.)

PROBLEMS IN VULGAR FRACTIONS.

14. In our last lesson, we intentionally omitted the answers to three of the exercises, in order to bring out the skill of our students. We now give the solutions of them for comparison with their own. In Ex. 12, the greatest common measure of the terms of the fraction is 1, therefore the fraction is already in *its lowest terms*. In Ex. 13, the fraction $\frac{4000}{10000} = \frac{4}{8}$; so that the individual holds three-eighths of the whole concern. In Ex. 14, the fraction $\frac{2000}{21000} = \frac{2}{5}$; so that *three-fifths* of the ship belongs to the contributor.

Problem II.

To reduce given fractions having different denominators into fractions of equal value having a common denominator.

Definition 6.—When fractions have all *the same denominator*, they are said to have a *common denominator;* the meaning is, that since the denominator *belongs to them all*, it is therefore *common to them all*. Thus, the fractions $\frac{3}{8}$, $\frac{5}{8}$, $\frac{8}{8}$, $\frac{7}{8}$, have all the *same denominator* 8; therefore these fractions are said to have a *common denominator*, that is, they all express various parts or portions of a unit, but these, though *different in number*, are all *of the same kind*. The *first* expresses *three-eighths* of a unit, the *second* expresses *five-eighths* of a unit, &c.; but they all contain parts of the same kind, that is, *a certain number of eighths*.

Rule 1.—*Multiply both terms of each fraction by the product of the denominators of all the other fractions, and the results will be the fractions required.*

The reason of this rule is evident from the principle (p. 134, art. 10) that a fraction is neither increased nor diminished in value by multiplying both of its terms by the same number; and also, from the principle (p. 95, col. 2, prin. 2) that the continued product of the factors of any number will be the same in whatever order they may be taken.

Example.—Reduce the fractions $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{3}{4}$ to fractions of equal value, but having a common denominator.

Given fractions.	Products of the denominators.	Fractions required.
$\frac{1}{2}$	$3 \times 4 = 12$	$\frac{12}{24}$
$\frac{2}{3}$	$2 \times 4 = 8$	$\frac{16}{24}$
$\frac{3}{4}$	$2 \times 3 = 6$	$\frac{18}{24}$

Explanation.

In this example, both terms of the *first given fraction* $\frac{1}{2}$ are multiplied by 12, which is the product of the denominators 3 and 4 of all the *other* given fractions, and the result is $\frac{12}{24}$, the *first fraction required*. Next, both terms of the *second given fraction* are multiplied by 8, which is the product of the denominators 2 and 4, of all the *other* given fractions, and the result is $\frac{16}{24}$, *the second fraction required*. Again, both terms of the third given fraction $\frac{3}{4}$ is multiplied by 6, which is the product of the denominators of all the *other* given fractions, and the result is $\frac{18}{24}$, which is the *third fraction required*. Hence, the answer is $\frac{12}{24}$, $\frac{16}{24}$, and $\frac{18}{24}$, for these fractions have the common denominator 24. And the reason of this is plain, from the second principle above mentioned, and from the manner in which they were produced: for

1st	Denominator	$24 = 12 \times 2 = 3 \times 4 \times 2$
2nd	,,	$24 = 8 \times 3 = 2 \times 4 \times 3$
3rd	,,	$24 = 6 \times 4 = 2 \times 3 \times 4$

In this scheme, you see very plainly that the three factors, 2, 3, and 4, all enter into the formation of each denominator in a *different order;* but, of course, they produce the same result in each case, namely, the *common denominator* 24.

In some books on Arithmetic, the operation is exhibited in the following form, which is more addressed to the eye than to the mind, and though cumbrous, it has its advantages to a beginner:—

Given fractions.		Given fractions with multipliers.		Fractions required.
$\frac{1}{2}$	$=$	$\frac{1 \times 3 \times 4}{2 \times 3 \times 4}$	$=$	$\frac{12}{24}$
$\frac{2}{3}$	$=$	$\frac{2 \times 2 \times 4}{3 \times 2 \times 4}$	$=$	$\frac{16}{24}$
$\frac{3}{4}$	$=$	$\frac{3 \times 2 \times 3}{4 \times 2 \times 3}$	$=$	$\frac{18}{24}$

Here, the operation of multiplying *each* fraction by the product of the denominators of all the *other* fractions (or, rather, by these denominators themselves), is exhibited in the middle column by indication of the factors; and the necessity of the common denominator 24, being the result of the same factors in each case is rendered more manifest.

When the given fractions are numerous or large, the process may be shortened by the following method:—

Rule 2.—*Multiply all the denominators of the given fractions together for the common denominator. Then, divide this common denominator by each of the denominators, and the quotients will be the multipliers for both terms of the fractions to which these denominators belong, which being multiplied thereby will give the fractions required.*

The reason of this rule is evident from the fact that the common multiple of any set of numbers is divisible (without a remainder) by each of them (p. 57, col. 1); and that the quotient multiplied by the divisor reproduces the dividend; not forgetting the principle that when both terms of a fraction are multiplied by the same quantity its value is not altered.

Example.—Reduce the fraction $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{4}{5}$ to fractions of equal value having the same denominators.

$3 \times 4 \times 5 = 60$ Common denominator.

$60 \div 3 = 20$
$60 \div 4 = 15$ } Multipliers.
$60 \div 5 = 12$

Given fractions.		Given fractions with multipliers.		Fractions required.
$\frac{2}{3}$	$=$	$\frac{2 \times 20}{3 \times 20}$	$=$	$\frac{40}{60}$
$\frac{3}{4}$	$=$	$\frac{3 \times 15}{4 \times 15}$	$=$	$\frac{45}{60}$
$\frac{4}{5}$	$=$	$\frac{4 \times 12}{5 \times 12}$	$=$	$\frac{48}{60}$

Explanation.

Here, the product of all the denominators of the given fractions is 60, which is the common denominator. Next, the quotients arising from the division of this *common denominator* by each of the denominators in succession, are 20, 15, and 12. Lastly, these quotients being employed as multipliers to both terms of the fractions whose denominators respectively produced them, give the middle column of the above operation by indication of the factors, and the third and last column as the results, which are the fractions required. Hence, the answer to the question is $\frac{40}{60}$, $\frac{45}{60}$, and $\frac{48}{60}$.

Note.—When fractions are given to be reduced to fractions of equal value having a *common denominator*, it is necessary and proper, in order to save labour in the operation, always to reduce any of them that will admit of it, to their lowest terms before you apply either of the preceding rules. For instance: if the fractions $\frac{12}{144}$, $\frac{18}{168}$, and $\frac{4000}{10000}$ were given to be reduced to a common denominator, and you were at once to apply either of the preceding rules to the reduction of these fractions, the operation would be needlessly laborious, and the results would assume the following cumbrous form:—$\frac{2}{24}\frac{4}{1}\frac{3}{4}\frac{8}{4}\frac{0}{0}\frac{0}{0}$, $\frac{24}{24}\frac{24}{1}\frac{0}{6}\frac{8}{8}\frac{0}{0}\frac{0}{0}$, and $\frac{12}{24}\frac{18}{1}\frac{24}{6}\frac{0}{8}\frac{0}{0}\frac{0}{0}$. Now, if the given fractions had been reduced to their lowest terms by Problem I., they would have assumed the forms of $\frac{1}{12}$, $\frac{3}{14}$, and $\frac{1}{25}$; then, by either of the preceding rules, when reduced to a common denominator, they become $\frac{12}{24}$, $\frac{16}{24}$, and $\frac{9}{24}$, for the fractions required.

It frequently happens, however, that fractions are given to be reduced to a common denominator, whose denominators have some common factors, and in such cases the operation of reducing to a *common denominator* can be greatly abridged. The method of performing this abridgement will be best understood by proceeding according to the following rule:—

Rule 3.—*Find the least common multiple of all the denominators of the given fractions. Then, divide this least common multiple (which is called the least common denominator) by each of the denominators, and the quotients will be the multipliers for both terms of the fractions to which the denominators belong, which being multiplied thereby will give the fractions required.*

Example.—Reduce the fractions $\frac{1}{6}$, $\frac{2}{7}$, $\frac{3}{8}$, $\frac{4}{9}$, $\frac{5}{6}$, and $\frac{9}{10}$ to fractions of equal value having a common denominator.

Here, the denominators are 2, 4, 5, 6, 8, and 10; rejecting 2, 4, and 5, as submultiples of 4, 8, and 10, we have to find the least common multiple of 6, 8, and 10 (p. 57, col. 1). This, by the rule formerly given, is 120, as follows:—

$$\begin{array}{r} 2)\,6,\ 8,\ 10 \\ \hline 3,\ 4,\ 5 \end{array}$$

$2 \times 3 \times 4 \times 5 = 120$, least common denominator.

Observe here, that as there is no common measure to any two of the quotients 3, 4, and 5, it is unnecessary to divide by any other numbers.

Now, dividing the least common denominator, by each of the denominators of the given fractions, we have the quotients as follows:—

$$\left.\begin{array}{l} 120 \div 2 = 60 \\ 120 \div 4 = 30 \\ 120 \div 5 = 24 \\ 120 \div 6 = 20 \\ 120 \div 8 = 15 \\ 120 \div 10 = 12 \end{array}\right\} \text{quotients and multipliers.}$$

And multiplying both terms of each of the fractions to which these quotients belong, we have the fractions required, as in the following operation:—

Given fractions.		Given fractions with multipliers.		Fractions required.
$\frac{1}{2}$	=	$\frac{1 \times 60}{2 \times 60}$	=	$\frac{60}{120}$
$\frac{3}{4}$	=	$\frac{3 \times 30}{4 \times 30}$	=	$\frac{90}{120}$
$\frac{4}{5}$	=	$\frac{4 \times 24}{5 \times 24}$	=	$\frac{96}{120}$
$\frac{5}{6}$	=	$\frac{5 \times 20}{6 \times 20}$	=	$\frac{100}{120}$
$\frac{7}{8}$	=	$\frac{7 \times 15}{8 \times 15}$	=	$\frac{105}{120}$
$\frac{9}{10}$	=	$\frac{9 \times 12}{10 \times 12}$	=	$\frac{108}{120}$

Here, the column entitled *fractions required* is the answer to the question, as in the preceding examples.

The principal use of this problem in Vulgar Fractions, is to prepare any set of given fractions for *addition* or *subtraction*; and the reason why this rule is necessary is simply this: that it is only *like things* which can be added or subtracted. Now, unless that fractional parts or denominations of any sort are precisely of the same kind, they cannot be added together or subtracted; for if this were done the answer would have no meaning. Thus, for instance, we could not add $\frac{1}{2}$ to $\frac{1}{3}$, or subtract $\frac{1}{3}$ from $\frac{1}{2}$, because the denominators of these fractions are different; neither could we tell by any numerical comparison of which they are at present capable, which of the two is the greater. But if these two fractions, $\frac{1}{2}$ and $\frac{1}{3}$, be brought or reduced to fractions of equal value, having a *common denominator*, then we can immediately institute a comparison between them, and tell not only which of the two fractions is the greater, but also what is the sum of and the difference between the two fractions. Thus, by reducing $\frac{1}{2}$ and $\frac{1}{3}$ to a common denominator by any of the preceding rules, we find that they become $\frac{3}{6}$ and $\frac{2}{6}$. Now here it is manifest that $\frac{3}{6}$ is greater than $\frac{2}{6}$; therefore $\frac{1}{2}$ is greater than $\frac{1}{3}$; and if the question be asked *how much* is $\frac{1}{2}$ greater than $\frac{1}{3}$, the answer is plainly $\frac{1}{6}$; because $\frac{1}{2} - \frac{1}{3} = \frac{3}{6} - \frac{2}{6} = \frac{1}{6}$; for taking *two-sixths* from *three-sixths*, leaves *one-sixth*. In like manner, if the *sum* of the two fractions be required, we have $\frac{1}{2} + \frac{1}{3} = \frac{5}{6}$; that is, that *three-sixths* and *two-sixths* added together make *five-sixths*. In this case, as in every other of a similar kind, it is plain that the *sum* or *difference* between the two fractions when reduced to a *common denominator* by this problem, is found at once by *adding* together the numerators, or by *subtracting* the one numerator from the other; and then putting the *common denominator* under the *sum* or the *difference* thus obtained, for the answer.

Example.—Which of the two fractions $\frac{7}{8}$ and $\frac{9}{10}$ is the *greater*? What is the *difference* between them? And what is their *sum*?

Here, by reducing the two fractions to a common denominator by Rule 1 or 2, we have

Given fractions.		Equivalent fractions.
$\frac{7}{8}$	=	$\frac{70}{80}$
$\frac{9}{10}$	=	$\frac{72}{80}$

But from this operation, it is plain that $\frac{72}{80}$ is *greater than* $\frac{70}{80}$; therefore, the fraction $\frac{9}{10}$ is greater than $\frac{7}{8}$. Moreover, the *difference* between $\frac{72}{80}$ and $\frac{70}{80}$, is $\frac{2}{80}$; therefore $\frac{9}{10}$ is greater than $\frac{7}{8}$ by the fraction $\frac{2}{80} = \frac{1}{40}$. Next, to find their *sum*, we have $\frac{72}{80} + \frac{70}{80} = \frac{142}{80} = 1\frac{62}{80}$; whence the sum of the two fractions is $\frac{142}{80}$ or $1\frac{62}{80}$, which by reduction is the same as $1\frac{31}{40}$. In like manner you may find the greatest or the least of any number of given fractions; for, by reducing them to a common denominator, you will see at once that the fraction whose numerator is then the greatest, is the greatest fraction; and the fraction whose numerator is the least, is the least fraction. You can also find the sum of any number of fractions, and the difference between any two of the same.

Exercises.

Reduce the following given fractions to fractions of the same value, and having a common denominator:—

1. $\frac{2}{3}$ and $\frac{4}{5}$.
2. $\frac{3}{4}$, $\frac{5}{7}$ and $\frac{6}{8}$.
3. $\frac{1}{2}$, $\frac{2}{4}$, $\frac{5}{6}$, $\frac{7}{12}$ and $\frac{9}{16}$.
4. $\frac{1}{11}$, $\frac{10}{20}$, $\frac{9}{30}$ and $\frac{24}{40}$.
5. $\frac{4}{5}$, $\frac{6}{7}$, $\frac{7}{9}$ and $\frac{8}{11}$.
6. $\frac{1}{3}$, $\frac{2}{7}$, $\frac{4}{14}$, $\frac{12}{21}$ and $\frac{3}{7}$.
7. $\frac{33}{170}$ and $\frac{28}{67}$.
8. $\frac{4}{15}$, $\frac{6}{100}$ and $\frac{6}{1000}$.
9. $\frac{1}{3}$, $\frac{1}{9}$, $\frac{1}{27}$, $\frac{1}{81}$ and $\frac{1}{243}$.
10. $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$ and $\frac{1}{64}$.

11. Which of the two fractions $\frac{9}{10}$ and $\frac{11}{12}$ is the greater; what is the difference between them; and what is their sum?

12. Two persons, A and B, are shareholders in different companies; A has £320,000 of stock in a company worth £560,000; and B has £480,000 of stock in a company worth £840,000; which of them has the largest fraction of the concern to which he belongs?

N.B.—The answers to these twelve questions will be given in our next lesson.

LESSONS IN FRENCH.—No. XLIII.

By Professor Louis Faequelle, LL.D.

Section XCIX.

EXAMPLES ILLUSTRATING THE VARIOUS USES OF THE PRINCIPAL CONJUNCTIONS.

A MOINS QUE.

Il n'en fera rien, à moins que vous ne lui parliez.	*He will do nothing of the kind, unless you speak to him.*
A moins que vous ne preniez bien votre temps, vous n'en viendrez pas à bout.	*Unless you choose your time well, you will not accomplish it.*
Quel indigne plaisir peut avoir l'avarice.	*What unworthy pleasure can avarice offer?*
Et que sert d'amasser, à moins qu'en ne jouisse? Boursault.	*What is the use of hoarding up unless we enjoy.*

AUSSI.

Aussi, ils n'ont aucune force pour le posséder surement. Pascal.	*Therefore, they have no strength to possess it safely.*
Ma douleur serait trop médiocre, si je pouvais la dépeindre; aussi je ne l'entreprendrai pas. Mme. de Sevigne.	*My grief would be too trifling if I could depict it; so that I will not undertake it.*

AU RESTE.

C'est ce qu'il y a de plus sage; au reste, c'est aussi ce qu'il y a de plus juste. Marmontel.	*This is the wisest way; besides, it is also the most just.*

CAR.

Voila les périls, voici le moyen de les éviter; car enfin, le bras de Dieu n'est pas raccourci. Massillon.	*Those are the dangers, this is the way of avoiding them; for finally, the influence of God is not less powerful.*

Le peuple se figure une félicité imaginaire dans les situations de vie, où il ne peut atteindre, et il croit (car tel est l'homme) que tout ce qu'il ne peut avoir, c'est cela même qui est le bonheur qu'il cherche. MASSILLON.

The people picture to themselves an imaginary happiness in elevated stations which they cannot reach, and (for so we believe (?)) that they cannot obtain, forms the very happiness which they seek.

COMME—QUE.

Comme l'ambition n'a pas de frein, et que la soif des richesses nous consume tous, il en résulte, que le bonheur nous fuit à mesure que nous le cherchons. TH. CORNEILLE.

As ambition has no limits, and as the thirst of riches devours us all, the result is, that happiness avoids us, as we proceed in our search after it.

La reconnaissance est le plus doux, comme le plus saint des devoirs. THOMAS.

Gratitude is the sweetest as well as the holiest of duties.

Comme il sonna la charge, il sonne la retraite. LA FONTAINE.

As he sounded the charge, so he sounds the retreat.

DONC.

Votre maître vous aime; donc, vous devez l'aimer.

Your master loves you; therefore, you should love him.

Je suis, donc, un témoin de leur peu de puissance. RACINE.

I am, therefore, a witness of their want of power.

Et d'où peut donc venir ce changement extrême? VOLTAIRE.

Whence, therefore, can this extreme change proceed?

Si ce n'est toi, c'est donc ton frère.—Je n'en ai pas.—C'est donc, quelqu'un des tiens. LA FONTAINE.

If it is not you, then it is your brother. I have none. Then it must be some one of your family.

Allons donc! répondit on, et la transaction n'eut pas lieu. DE CUSSY.

"Well done!" replied they, and the affair did not take place.

DE MEME QUE.

De même que le soleil brille sur la terre, de même le juste brillera dans les cieux. L'ACADEMIE.

As the sun shines upon earth, so will the just shine in heaven.

ET.

C'est être faible et timide que d'être inaccessible et fier. MASSILLON.

To be inaccessible and proud is to be weak and timid.

Une famille vertueuse est un vaisseau tenu pendant la tempête par deux ancres, la religion et les mœurs. CHATEAUBRIAND.

A virtuous family is a vessel strengthened during the tempest by two anchors, religion and morals.

Quel carnage de toutes parts!
On égorge à la fois les enfants, les vieillards,
Et la sœur et le frère,
Et la fille et la mère,
Le fils dans les bras de son père.
RACINE, "Esther."

What carnage on all sides!
They murder at once the children and the old men, the sister and the brother, the daughter and the mother, the son in the arms of his father.

LORSQUE—QUAND.

Lorsque l'innocence habitait la terre. BOSSUET.

When innocence inhabited the earth.

Quand vous me haïriez, je ne m'en plaindrais pas. RACINE.

If even you hated me I would not complain.

Quand nous n'aurions égard qu'au repos seul de notre vie, quand nous n'aurions point d'autre intérêt ici-bas que de nous préparer des jours heureux, quel bonheur de prévenir d'avance et d'étouffer dans leur naissance tant de passions violentes. MASSILLON.

If even we considered merely the repose of our lives, if even we had no other interest here than to prepare for ourselves happy days, what happiness it would be, to prevent beforehand, to stifle in their birth, so many violent passions.

MAIS.

C'était déjà la puissance impériale qu'on lui a vue depuis, mais avec l'assentiment universel des peuples, avec des formes moins royales, mais plus dignes peut-être. THIERS.

It was already the imperial power of which we have since seen him possessed, but with the consent of the people, with forms less regal, but perhaps more worthy.

L'harmonie ne frappe pas simplement l'oreille, mais l'esprit. BOILEAU.

Harmony does not only strike the ear but the mind.

C'est un parti sage à la guerre de se tenir sur la défensive, mais ce n'est pas le plus brillant. LA ROCHEFOUCAULD.

To keep on the defensive is a wise resolution in war, but it is not the most brilliant.

Il n'y a point de mais qui tienne; je ne donnerai point ma fille à un muet. BRUEYS.

There is no "but" in the matter; I will not give my daughter to a mute.

NI.

Heureux celui qui sait se contenter de peu! Son sommeil n'est troublé ni par les craintes, ni par les désirs honteux de l'avarice. TRAD. D'HORACE.

Happy is he who can content himself with little! His sleep is disturbed neither by the fears, nor by the shameful desires of avarice.

Vous perdez ainsi la confiance de vos amis, sans les avoir rendus ni meilleurs ni plus habiles. VOLTAIRE.

You lose thus the confidence of your friends without having rendered them either better or more skilful.

On n'est jamais si heureux, ni si malheureux qu'on se l'imagine. LA ROCHEFOUCAULD.

We are never so happy nor so unhappy as we fancy.

Cette loi sainte ne connaît plus, ni pauvre, ni riche, ni noble, ni roturier, ni maître ni esclave. MASSILLON.

That holy law knows no longer either poor or rich, noble or plebeian, master or slave.

OR.

Or sus, mettons nous à l'ouvrage.

Now, then, let us go to work.

Or ça, Gil Blas, me dit il un jour, le temps de ton enfance est passé. LE SAGE.

"Now, then, Gil Blas," said he to me one day, "the time of your childhood is over."

OU.

La fortune, soit bonne ou mauvaise, soit passagère ou constante, ne peut rien sur l'âme du sage. MARMONTEL.

Fortune, be it good or evil, be it transient or constant, has no power over the soul of the wise.

La liberté de publier ses pensées, ou la liberté de la presse, doit être réglée sur la liberté même d'agir. B. DE ST. PIERRE.

The liberty of publishing one's thoughts, or the liberty of the press, should be regulated upon the liberty of action itself.

PARCEQUE.

Les grands hommes entreprennent de grandes choses parcequ'elles sont grandes, et les fous parcequ'ils les croient faciles. VAUVENARGUES.

Great men undertake great things because they are great; and fools because they believe them easy.

Là tout est beau, parceque tout est vrai. J. J. ROUSSEAU.

Every thing there is beautiful, because everything is true.

POURTANT.

Le style le moins noble a pourtant sa noblesse. BOILEAU.

The least elevated style has, nevertheless, its elevation.

PUISQUE.

Pourquoi le demander, puisque vous le savez? RACINE.

Why ask about it, since you know it?

Ne vous lassez jamais d'examiner les causes des grands changements; puisque rien ne servira jamais tant à votre instruction. BOSSUET.

Never be weary of examining into the causes of great changes; for nothing will ever be of so much service to your instruction.

Puisque vous le voulez, je vais changer de style. BOILEAU.

Since you will have it so, I will change my style.

QUE.

Jamais on ne vit un si grand exemple, que le courage n'est point incompatible avec la mollesse. VOLTAIRE.

Never was such a striking example seen, that courage is not incompatible with effeminacy.

Nous n'avons que peu de temps à vivre, et loin d'en profiter, nous ne cherchons qu'à le perdre. LAVEAUX.

We have but little time to live, and instead of improving it, we only seek to waste it.

A quoi vous servira d'avoir de l'esprit, si vous ne l'employez pas, et que vous ne vous appliquiez pas? BOSSUET.

Of what use will be your wit, if you do not employ it, and do not apply yourselves?

Toutefois que sert-il de me justifier? RACINE.

However, what is the use of justifying myself?

Qu'il fasse ce qu'il lui plaira.

Let him do what he pleases.

Que le monde est grand! Qu'il est magnifique! MASSILLON.

How great is the world! How magnificent!

Que de beaux jours n'ont pas de beaux soirs! BOISTE.

How many fine days have not beautiful evenings!

Sais tu quelque chose de plus?

Do you know anything more?

Oh! que oui. BRUEYS.

That I do!

C'est une maladie d'esprit, que de souhaiter des choses impossibles. FENELON.

Wishing for impossible things is a disease of the mind.

Il n'y aura jamais de meilleur directeur que l'Evangile. GANGANELLI.

There will never be any better guide than the Gospel.

La véritable conversion du cœur fait autant aimer Dieu qu'on a aimé les créatures. PASCAL.
The true conversion of the heart makes us love God as much as we have loved the creatures.

Crois tu que dans son cœur, il ait juré ta mort? RACINE.
Do you believe that he has sworn your death in his heart?

Ce n'est pas que j'eusse mieux fait que vous. MME. DE SEVIGNE.
It is not that I might have done better than you.

Il a fallu que mes malheurs m'aient instruit, pour m'apprendre ce que je ne voulais pas croire. FENELON
It was necessary that my misfortunes should instruct me, to teach me what I would not believe.

QUOIQUE—QUOI..QUE.

Quoique Dieu et la nature aient fait tous les hommes égaux en les formant d'une même boue, la vanité humaine ne peut souffrir cette égalite. ROSSUET.
Although God and nature have made all men equal in forming them from the same earth, human vanity cannot bear that equality.

Quoi quê vous écrivies, évitez la bassesse. BOILEAU.
Whatever you may write, avoid vulgarity.

Quoi que ce soit qu'elle dise, elle ne me persuadera pas. GIRAULT-DUVIVIER.
Whatever she may say, she will not persuade me.

SI.

Si vous le vouliez, nous partirions ensemble.
If you wished it, we would go together.

Si vous le prenez sur ce ton, je me retire.
If you go on in this way, I withdraw.

Nul empire n'est sûr, s'il n'a l'amour pour base. RACINE.
No empire is safe, unless it has affection for its basis.

S'il le faut, nous partirons.
If it must be so, we will go.

Votre esprit a toujours en réserve quelque si, quelque mais. DESTOUCHES.
Your mind has always in reserve some 'if,' some 'but.'

SINON.

Ils répondirent, qu'il fallait rétablir l'équilibre européen rompu, qu'il fallait le rétablir sinon sur le continent, ou il était tout à fait détruit, au moins sur l'Océan. THIERS.
They replied, that it was necessary to re-establish the disturbed European balance; that it was necessary to restore it, if not on the continent, where it was entirely destroyed, at least on the ocean.

SOIT.

Soit qu'il le fasse, soit qu'il ne le fasse pas.
Whether he does it, whether he does it not.

Soit la hardiesse de l'entreprise, soit la seule présence de ce grand homme, soit la protection visible du ciel, il étonne par sa résolution. FLECHIER.
Be it the boldness of the enterprise, be it the presence alone of this great man, be it the visible protection of heaven, he astonishes by his resolution.

Soit en bien, soit en mal, mon ami, la prudence dit, qu'il faut rarement juger sur l'apparence. CHERON.
Be it for good, be it for evil, my friend, prudence says, that we must rarely judge from appearances.

Vous le voulez? ainsi soit il!
You will have it so? So be it?

Un mal funeste et contagieux se répandit dans les principales villes de la Normandie; soit que l'intempérie des saisons eût laissé dans les airs quelque maligne impression, soit qu'un commerce fatal eût apporté des pays éloignés, avec de fragiles richesses, des semences de maladie et de mort, soit que l'ange de Dieu eût étendu la main pour frapper cette malheureuse province. FLECHIER.
A fatal and contagious disease spread in the principal cities of Normandy; be it that the inclemency of the season had left in the air some malignant impression, be it that a fatal commerce had brought from distant countries, with perishable riches, the seeds of disease and death, be it that the angel of God had stretched forth his hand to smite that unfortunate province.

SECTION C.

The following is a list of the most usual abbreviations employed in French:—

ABBREVIATIONS.	MEANINGS.
A. P. A protester.	*To be protested.*
A. S. P. Accepté sous protêt.	*Accepted under protest.*
A. S. P. C. Accepté sous protêt pour a-compte.	*Accepted under protest on account.*
Bon. Baron.	*Baron.*
Cer. Chevalier.	*Chevalier, knight, sir.*
Cte. Comte.	*Count.*
Cesse, Comtesse.	*Countess.*

ABBREVIATIONS.	MEANINGS.
Dr. Docteur.	*Doctor.*
Dr. Mn. Docteur-médecin.	*Doctor of medicine.*
E. Est.	*East.*
J. C. Jésus-Christ.	*Jesus Christ.*
LL. AA. II. Leurs Altesses Impériales	*Their Imperial Highnesses.*
LL. AA. RR. Leurs Altesses Royales.	*Their Royal Highnesses.*
LL. AA. SS. Leurs Altesses Sérénissimes.	*Their Most Serene Highnesses*
LL. Em. Leurs Eminences.	*Their Eminences.*
LL. Ex. Leurs Excellences.	*Their Excellencies.*
LL. HH. Leurs Hautesses.	*Their Highnesses.*
LL. MM. Leurs Majestés.	*Their Majesties.*
LL MM. II. Leurs Majestés Impériales.	*Their Imperial Majesties.*
LL. MM. RR. Leurs Majestés Royales.	*Their Royal Majesties.*
M. ou Mr. Monsieur.	*Sir, Mr.*
Mtre. Maître.	*Master.*
M. A. Maison assurée.	*House insured.*
M. A. C. I. Maison assurée contre l'incendie.	*House insured against fire.*
Md. Marchand.	*Dealer, shopkeeper, m.*
Mde. Marchande.	*Dealer, shopkeeper, f.*
Mlle. Mademoiselle.	*Miss.*
Mgr. Monseigneur.	*My lord.*
Mis. Marquis.	*Marquis.*
Mise. Marquise.	*Marchioness.*
MM. Messieurs,	*Messrs. Gentlemen.*
Mme. Madame.	*Madam. Mrs.*
Mst. Manuscrit.	*Manuscript.*
N. B. Nota bene.	*Nota Bene.*
N.-D. Notre-Dame.	*Our Lady.*
N.-N.-E. Nord-nord-est.	*North-north-east.*
N.-N.-O. Nord-nord-ouest.	*North-north-west.*
Nt. Négociant.	*Merchant.* m.
Nte. Négociante.	*Merchant, f.*
No. Numéro.	*Number.*
N. S. Notre-Seigneur.	*Our Lord.*
N. S. J.-C. Notre-Seigneur Jésus-Christ.	*Our Lord Jesus Christ.*
O. Ouest.	*West.*
O.-N. Ouest-nord,	*West-north.*
O. S. Ouest-sud.	*West-south.*
P. S. Post-scriptum.	*Postscript.*
R. P. Révérend père.	*Reverend father.*
S. Sud.	*South.*
S. A. I. Son Altesse Impériale.	*His or Her Imperial Highness.*
S. A. R. Son Altesse Royale.	*His or Her Royal Highness.*
S. A. S. Son Altesse Sérénissime.	*His Most Serene Highness.*
S. E. Sud-est.	*South-east.*
S. Em. Eminence.	*His Eminence.*
S. Ex. Son Excellence.	*His Excellency.*
S. G. Sa Grandeur.	*His Grace* (to a Bishop).
S. H. Sa Hautesse.	*His Highness* (the Turkish Emperor).
S. M. Sa Majesté.	*His or Her Majesty.*
S. M. B. Sa Majesté Britannique.	*His or Her Britannic Majesty.*
S. M. C. Sa Majesté Catholique.	*His Catholic Majesty.*
S. M. I. Sa Majesté Impériale.	*His Imperial Majesty.*
S. M. R. Sa Majesté Royale.	*His Royal Majesty.*
S. M. S. Sa Majesté-Suédoise.	*His Swedish Majesty.*
S. M. T. C. Sa Majesté Très Chrétienne.	*His Most Christian Majesty.*
S. M. T. F. Sa Majesté Très Fidèle.	*His Most Faithful Majesty.*
S. O. Sud-ouest.	*South-west.*
S. P. Saint Père.	*Holy Father.*
SS. PP. Les Saints Pères.	*The Holy Fathers.*
S. S. Sa Sainteté.	*His Holiness.*
S. S. E. Sud-sud-est.	*South-south-east.*
S. S. O. Sud-sud-ouest.	*South-south-west.*

[We have now arrived at the end of the FIRST PART of our course of LESSONS IN FRENCH, and next week we shall begin the SECOND PART. As this Second Part was constantly referred to in the First Part, by sectional references, thus [§ 13, (2.)], see page 31, vol. I., col. 1, line 11; and as it contains a systematic treatise on FRENCH GRAMMAR, with all the usual rules of Etymology and Syntax, it will be not only a necessary sequel to that part, but an essential desideratum in order to render our students complete French scholars. They will do well, therefore, to revise all their past lessons, and re-examine all their former difficulties by the new light which will thus be thrown upon the study of the French Language, and particularly upon its very peculiar idioms, &c.]

CORRESPONDENCE

MANLY SPIRIT.

SIR,—Permit me to offer you my sincere and hearty thanks for the benefit I have derived from the POPULAR EDUCATOR, and to assure you that I am extremely happy in availing myself of the advantages of your exertions in the cause of learning. I study with great ardour, and am possessed with so keen a relish of learning, that *animum in literis perpetuo intendo*. Being only a journeyman shoemaker, some of my acquaintances consider that "college larnin" is above me. Truly so, and therefore I will climb up to it. This I find, that be a man's position in society as humble as it may, learning makes him feel himself a gentleman, and confers upon him genuine respectability.

The inclosed poem may interest some of your students of Latin. It was written by Sir Thomas More, Lord High Chancellor of England, in 1530, and addressed to a friend of his who was in search of a wife. The regularity of the measure will partially assist the right pronunciation of the words. Each student can make a translation for himself; and some one will perhaps send you a poetical translation.

Yours sincerely, DOMINIC DIVERS.

Christmas day, 1852.

DE UXORE.

"Proculque stulta sit,
Parvis libellulis;
Semper loquacitas;
Proculque rusticum
Semper silentium.
Sit illa, vel modo
Instructa literis;
Vel talis, ut modo
Sit apta literis,
Felix quaevis bene
Priscis ab omnibus
Possit libellulis
Vitam beantia
Haurire dogmata;
Armata cum quibus,
Nec illa prosperis
Superba turgeat;
Nec illa turbidis
Misella lugeat,
Prostrata casibus.
Jucunda sic erit
Semper, nec unquam erit
Gravis, molestave
Vitae comes tuae;
Quae docta parvulos
Docebit, et tuos
Cum lacte literas
Olim nepotulos.
Jam te juvaverit
Viros relinquere;
Doctaeque conjugis
Sinu quiescere:
Dum grata te fovet;
Manuque mobili
Dum plectra personat;
Et voce (quâ nec est
Progne, sororculae
Tuae suavior)
Amoena cantillat,
Apollo quae velit
Audire carmina.
Jam te juvaverit
Sermone blandulo
Docto tamen, dies
Noctesque ducere;
Notare verbula
Mellita, maximis
Non absque gratiis,
Ab ore melleo
Semper fluentia:
Quibus coerceat,
Si quando te levet
Tuane gaudium;
Quibus levaverit
Si quando deprimat
Te moeror anxius.
Certabit in quibus
Summa eloquentia,
Jam cum omnium gravi
Rerum scientia.
Talem olim ego putem
Et vatis Orphei
Fuisse conjugem;
Nec unquam ab inferis
Curâsset improbo
Labore foeminam
Referre rusticam:
Talemque credimus
Nasonis inclytam,
Quae vel patrem queat
Aequare carmine,
Fuisse filiam:
Talemque suspicor
(Qua nulla charior
Unquam fuit patri,
Quo nemo doctior)
Fuisse Tulliam:
Talisque, quae tulit
Graechos duos, fuit;
Quae quos tulit, bonis
Intruxit artibus;
Nec profuit minus
Magistra, quam parens."

CONSTRUCTION OF THE VIOLIN.

SIR,—In answer to John Stocking's inquiry, "What is the best deal for the belly of a violin?" I would say, for the belly, good Swiss pine cleft from the heart to the bark. The wood should be cut in the month of December or of January, and only the south side of the tree should be used. It must be split in such a manner as to leave each piece an inch thick at the bark-side, and a quarter of an inch at the heart of the tree.

The back of the best Cremonese are as often made in one piece as in two. When jointed, the wood cuts to more advantage. But John Stocking should buy "Otto on the Structure of the Violin" (Cocks and Co., price 3s.), where he will find a diagram for striking a fine model for violins, and all the information that he wants.

I am only an amateur, but am well acquainted with the violins of the old makers. I beg to remain, your constant reader,

H. B. BUSH.

Long Wittenham, Abingdon, Berks., Jan. 2, 1853.

CO-INSTRUCTION SOCIETIES.

A "Young Man's Commercial and General Improvement Society" has been formed in Dublin, having for its objects—(1), Education (by lectures, formation of classes, and conversation) in the principles and practice of trade and commerce; (2), the study of special branches of knowledge likely to be useful to young commercial men; and (3), the mutual improvement of all by means of friendly meetings and intellectual intercourse.

The main object of the society is avowed to be—the association of young men connected with the mercantile and commercial offices and establishments in Dublin; but no young man desirous of advancement in life will be excluded from the society. The greater variety of avocations represented in such a society, the more it will resemble the business world, and, therefore, the more useful will it be.

Several literary gentlemen of eminence in Dublin have rendered advice and assistance; particularly the editor of the *Commercial Journal*.

13, Anglesea-street, Dublin.

LITERARY NOTICES.

THE ILLUSTRATED EXHIBITOR AND MAGAZINE OF ART—A new and improved Series of this work, under the title of the ILLUSTRATED MAGAZINE OF ART, has just commenced. Each Number is now enclosed in a neat wrapper, price 3d. In addition to numerous Engravings in the text, each number contains a fine Engraving, worked on Plate Paper. With Number 1, was presented, gratis, a splendid View of the Interior of St. Paul's Cathedral, during the Interment of the late Duke of Wellington, printed upon fine Plate Paper, measuring eighteen inches by thirteen. This Engraving alone is worth four times the cost of the Number of the MAGAZINE OF ART.—Part I., price 1s., will be ready February 1st. The large Engraving of St. Paul's will also be presented with every copy of this Part.

THE ALTAR OF THE HOUSEHOLD; or, DOMESTIC WORSHIP. Part I. is now ready, price 1s. This work will contain a Series of Services for the Family, adapted for every morning and evening throughout the year, viz., portions of Scripture, Prayers and Thanksgivings, suitably adapted to each other, to which will be added short practical comments to explain the subjects read, or enforce the duties enjoined. This work is edited by the Rev. Dr. Harris, Principal of New College, assisted by a band of eminent divines in London and the country. Part II. will be ready Feb. 1st.

THE LADIES DRAWING-ROOM BOOK, in which are introduced the choicest Engravings from the "Illustrated Exhibitor and Magazine of Art," and the "Ladies Work Book;" the whole forming a beautiful Volume for the Drawing-room. The work is printed on fine Plate Paper, and got up in the first style of Art. Price 10s. 6d.

ANSWERS TO CORRESPONDENTS.

[illegible] (Exeter): 1, 2: Bagster's Miniature Bible, at the beginning of the introduction, you will find the chronological order of all the books of the Bible. The manner in which they came to be arranged in the order in which we find them, is explained in the second chapter of that introduction. 3. The plan on which they have been divided into chapters and verses, and the inventors of the same, are mentioned in the same place. Here, indeed, it may be useful to mention, that this "Miniature Quarto Bible" will be found of very great assistance both to the private student, and to the head of a family.—Another correspondent has asked us to tell him how he may complete the reading of the Scriptures in a year. There are 1,189 chapters in the Old and New Testament; now, if he reads 23 chapters *every week* of the year *except the last*, and 16 chapters *the last week*, he will finish the reading of the Bible in one year. This will give him, if he chooses, *three* chapters *every work-day*, and *five chapters every Lord's day*, in order to complete the task, when it will be finished between *Midwinter* and *New-year's-day*.—J. WOODS (Spalding): We don't know.—H. WILLIAMS (Clapham): Right, and thanks.—TH. DRIVER (Silsden): See vol. I., p. 388, col. 2, line 49.—GULIELMUS (Bantry): We really have not room at present for so many questions; besides, they are more curious that useful. The terms Whig, Tory, Radical, and Conservative, can only be properly understood by reading the History of England; especially during the last half century.—J. B. (Malton): Thanks.—C. HENNEBERRY (Waterford): As soon as possible.—INDUSTRY: His explanations are very good.—R. A. (Dublin), and J. B. REED (Blagdon): Thanks.—COAL MINER (Durham): Right on the Dean's riddle; persevere.—E. DAWSON (Bathgate): Thanks.—J. HANSON (Rochdale) will find answers to his queries in those given to another correspondent. The Newhaven edition of Webster in two vols. is likely to be the best; but the date 1838 is against it. Whateley's Logic has been enlarged by the author, and sells at a higher price than 4s. 6d.—J. SNAPE (Liverpool): See vol. I., p. 230, col. 2, N.B.—FRENCH STUDENT (Devon): Let those laugh who win; many have been already taught much by the "Series of Lessons in French," and we hope many more will be equally successful.—ALPHA (Huddersfield): Right; as soon as we can.—J. LANGLEY: We differ from him.

THOS. BODOCK (Great Warley) tenders his sincere thanks for our extract from Thompson's work (*Geometry without Axioms*); he considers that he rose from its perusal with a greater knowledge of geometry than he possessed before, as well as of the requirements necessary for a successful study of it. This is exactly as it should be; indeed it is the very point we aimed at; and we rejoice that in his case it has been successful. We have received his solutions, and shall notice them in due time.—PYTHAGORAS (Woolwich): We have very considerable difficulty in reading his letter; may we recommend our Lessons in Penmanship to his notice? His inquiries are both good and useful; but they must be deferred for the present.—A. B. (Manchester): The burred and clouded appearance of several of the engravings in the P. E., is the fault of no individual, but of the method of *printing by machine*, which is not yet so well adapted for *fine work*, as the ordinary *hand-press*.—B. P. (Islington): Cassell's Arithmetic.—WILLIAM VINCENT can get the back numbers of the P. E. from any bookseller or news-agent by an order for the same.—THOS. MORGAN (Clapham): Solutions received.—IOAN AP IOAN (Swansea): See vol I., p. 388, col. 2, line 49.—W. H. (Newark): We have not seen "The Imperial Lexicon."—G. B. (Armagh): The P. E. is the book.—F. BURDITT (Cambridge): He should try.—M. M'E. is quite right.—D. HARPER (Whitewell): The meaning of the words to which he refers is disputed.—THEOLOGUS had better let sermon-writing alone, and study the Scriptures in their original tongues *first*.—LOVER OF KNOWLEDGE: 1. The attraction of the earth is always the same at the same distance; but if that force is counteracted by another force, the result will be a change in the effect. 2. It is quite proper to say *peoples* as the plural of *people*; this word is nearly synonymous with *nation*, and is equally entitled to have a plural. 3. *Neat* and *net* are no doubt the same word originally; but the latter is used in a business sense to denote the exact weight of an article free from that of packages, dross, and allowances of various kinds, for loss in transmission, &c., and is taken from the Italian *netto*; its origin is very peculiar, as it comes from the Latin nix, *snow*, through niteo, *I shine*, clear and bright as snow; and, therefore, *pure*, *clean*, &c.—S. H. (Northampton): We cant tell.—T. G. WILLIAMS (Chelsea): It is plain that in binding the P. E. every man may use the liberty of a free-born Englishman, and bind it to his own taste, either in *half-yearly or whole yearly* volumes!

JOEL LEVY (London) misunderstands the rule in page 340. By *removal* is not meant *taking away altogether*, but *shifting* or *pushing* a figure *to the left* by adding a figure or cipher *to the right*; thus by annexing a cipher to 1852 it becomes 18520, which is ten times more than 1852.—J. D., A LEARNER (Hawick): We cannot give advice on Life Insurances, the circumstances of individuals are so various. On mental philosophy, read Locke, Reid, Stewart, Brown, &c. On the evidences of Christianity read Addison, Jenyns, West, Paley, Chalmers, &c.—SOUKERIES: His queries are not of general interest; we are glad that he is one of our attentive students.—J. PORTER (Clitheroe): Lessons in Rhetoric will be given. For small *i* when writing in the *first person*, always use capital I.—J. F. L. O. (Toole's Castle): right; his suggestions are good and will be kept in view.—H. E. (Ramsgate): Answered before.—A STUDENT: Read Keightley's History of England, and Cassell's Euclid; they are sufficient for the Matriculation Examination.—YOUTHFUL STUDENT (Northmolton): See the course required for Matriculation at the London University.—D. W.: We do not know the price of the dictionary he refers to.—R. H. and J. O. (Bedford New Mills): The sentence "You write better than I" is correct. For chemical apparatus, apply to J. J. Griffin, Baker-st., London.—J. G. AULDEAR wishes to know the cost of sending a part of the P. E. monthly to Ceylon.—ISAK: His exercises are very good, but require a few corrections.—W. L. (Elton) wishes to know where he can get a Medical Vocabulary, containing explanations of all the terms used in medicine.—D. E. wishes to know the value of a coin of Edward VI's. reign, rather larger in circumference than the current half-crown.—C. (Greenock): His note is an advertisement for which we should [illegible] to pay the duty.—D. MILLS (Lowestoft): Yes.—R. C. H. (N. Lancashire): [illegible] E. is not the *Illustrated Exhibitor*! The patentees object to [illegible] the particulars of the machine.—T. P. (Dumfries): Genesis chap. IX verse 3.—WOULD-BE-RIGHT should buy a Pronouncing Dictionary.—E. HART, is right; we shall keep his idea in view.—P. THOMPSON (Manchester): Received.

CARTER (Canterbury): See No. 39, p. 196, Vol. 2, col. 1, line 75. [illegible] ration and Timber Measuring *may be learned* and practised, [illegible] *mere rules*, without Mathematics; but they will never be properly [illegible] stood without this aid; and they [illegible] should [illegible] knowledge of this kind.—J. W. (Liverpool): Take St. Paul's for an example; the Composite order is placed above the Corinthian.—J. DUGUID (Aberdeen) is right, the marks in the German Lessons, as well as in the French, refer to lessons *in prospectu*, or *second part* which is to come, and which will be quite as systematic as he could desire.—A. CONYNGHAM (Cheltenham) will find a Key to the Latin Lessons inserted in the P. E. by consulting the index to vol. I. Keys to the French and German are rendered so far unnecessary by the particular arrangement and correspondence of the lessons with each other.—A. H. (Belfast): See answer above to J. Duguid.—H. WILSON (Berwick): See vol. I., p. 368, col. 1, line 36.—W. COSSAR: *Animos* is the acc. plur. of animus, *the mind*; but *varia* may be the nom. acc. or voc. plur. neut. of varius, *various*; the latter may also be one or other of the cases of the fem. sing. which end in *a*.—F. SMITH (Old Change): Under consideration.—J. L—N (Broughton Astley): Should study the P. E. Lessons in Latin *first*; and wait for Dr. Beard's dictionary to be published by Mr. Cassell. *Necessary* (Lat. necessarius) and *necessity* (Lat. necessitas) both come from ne, *not*, and cedo, cessi, cessum, cedere, *to yield*; the former, therefore, means *unyielding*, and the latter *unyieldingness*. The suffix *ary*, from the Latin *arius*, means *possessing the quality expressed by the stem*; and *ity*, from the Latin *itas*, means *that quality considered in the abstract state*.

GERMAN.—DEVON VALE: To oblige you, I give you the translation:—"And I feel myself bound to my companion to release him of these troubles. No sooner was the word said, than the ass was torn to pieces."—BOBUS: A noun or pronoun, which is the subject of a sentence, must be in the nominative, and a noun or pronoun which is the immediate object of an active transitive verb, is put in the accusative; and the pronoun must agree with the noun or pronoun which it represents, in person, number, and gender. I cannot avoid recommending you to read the Lessons in English, Nos. VI. and VII., in which you will find a very plain explanation. Attentive, and attentively, *aufmerksam*; the former is an adjective, the latter an adverb.

E. Y. (Nottingham), and PYTHAGOMENOS (Rugby): Thanks; we have not yet taken the subject of Italian into consideration.—H. SEALE (Leeds): Thanks.—T. S. DRIVER (Chertsey): We advise that the *procedure* recommended in the Lessons on Drawing be adopted.—A SUBSCRIBER (Kirkdale): Received.—T. B. (E. Wood): We strongly recommend to him Cassell's Arithmetic.—T. WILLIAMS (Oldham): See Cassell's Arithmetic, p. 101.—GRATEFUL ADMIRER (Tottenham): His request shall be remembered.—AN ENGINEER should really master the propositions of Euclid so as to remember them; the best way of doing this is, to solve as many exercises or problems as he can, both those given in Cassell's Euclid, Pott's Euclid, and others.—IRISH HOD CARRIER (Liverpool) will find his suggestions attended to by this time.—F. H. BRIGHTWELL: Received.—H. ROBINSON (Queenhead): Many thanks.—J. S. W. (Plymouth): Under consideration.—T. A. (Sowerby Bridge): He may get scores of volumes well bound for the cost of the machinery required in binding.—W. E. WILLIAMS (Merthyr): The solutions of some have been given, and the rest will follow.—W. E. (Dudport) should, of course, most exactly follow the course pointed out in the regulations, see p. 213, vol. II., No. 41.—J. G. GALE (Leeds): Unless a pupil be very careful, indeed, the study of *Phonography* is almost sure to injure his spelling of the English language.—R. P. S.: "Go to the ant, thou sluggard," is a poetic inversion for *Thou sluggard, go to the ant*. Thus, thou sluggard is in the vocative case, or the case of direct address; go, is an intransitive verb in the second person singular, imperative mood; to, is a preposition; the, the definite article, and ant, a common noun dependent on the preposition to.

JOHN SMITH (Gt. Trinity-lane): 1. M.B. means either *Bachelor of Medecine* or *Bachelor of Music*; we believe the latter degree cannot be taken at the University of London. 2. The name of the royal family is *Guelph*. 3. A *conservative*, from the Latin conservo, *I preserve*, is one who wishes to preserve the existing state of things, either without reform, or with reform partial and slow. 4. The duty of a searcher at the Custom-house is evidently, as the name implies, one who searches packages or persons for contraband goods.—EARNEST INVESTIGATOR (Salford): The rule for the multiplication of fractions will soon be explained in the Lessons in Arithmetic. English and Latin Grammar might be conveniently and usefully studied together; and though Greek may be studied without a knowledge of the Latin, yet the latter is a great help.

A. RICHARD (Crowhurst) can obtain the *Shilling Euclid* from any bookseller, by giving an order; or he can have it sent by post from this office by transmitting 1s. 6d. worth of stamps. The easiest way to solve the question *as it stands*, is, to use algebra. Let x be the breadth of the walk *all* round; then $100-x$ and $80-x$ are the length and breadth of the inner half; and $(100-x)\times(80-x)=8000-180x+x^2=4000$, by the question; solving this quadratic equation, by transposing and completing the square, you have $x=90-10\sqrt{41}=90-64$ nearly=nearly 26 feet.

ERRATA.

P. 356, line 7, vol. I. The pluperfect tenses of the subjunctive mood of the verb *moneo*, has been omitted; it is as follows: *Sing.* monuissem, monuisses, monuisset; *plur.* monuissemus, monuissetis, monuissent.

Vol. II., page 201, col. 2, line 53, for *insolecnt* read *insolent*.
" " 166, col. 1, line 48, for *fabulo* read *fabula*.

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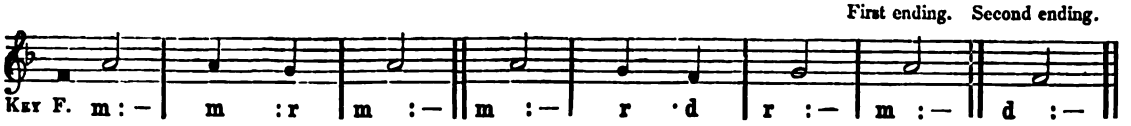
LESSONS IN MUSIC.—No. XV.

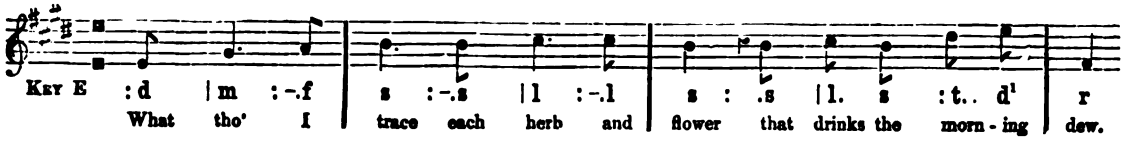
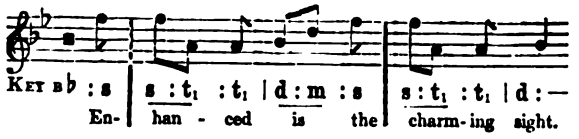
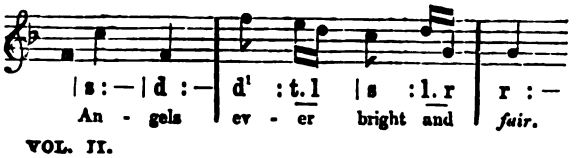
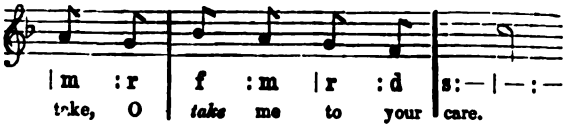
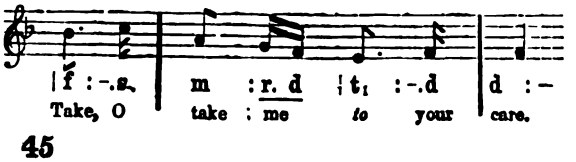
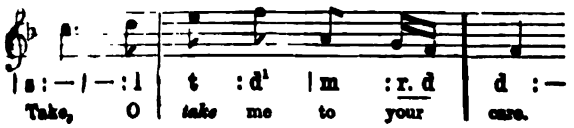
By JOHN CURWEN.

We have now to complete our study of the "scale of all nations and all times" by examining the two notes which are, at once, the most difficult to sing correctly, and the most difficult to understand,—the seventh (TE) and the second (RAY).

1. These are the only notes of the scale which do not sound well with the key-note. They are its dissonances. It is generally confessed by teachers of singing that RAY and TE are the most difficult, "the most artificial," notes of the scale. This is especially noticeable, in uncultivated voices, on the note TE in ascending the scale, and on RAY in descending. The mathematical musician who writes the article "Scale" in the "Penny Cyclopædia" states, that a note sharper than the present RAY and one flatter than TE would be more *natural*. Colonel Perronet Thompson, however, seems to have come nearer the practical truth in his discovery of what he calls "the *duplicity* of the dissonances." He believes these notes to be "duple" or *double*, and asserts that a good ear and voice will intuitively choose that one of the two which best accords with the accompanying notes. RAY, for instance, in any near fellowship with FAH and LAH will be slightly flattened, but to tune well with SOH will remain in its sharpened form. He has constructed instruments upon these principles which have approached more nearly the "just intonation" of the good singer or violinist than anything before attempted. We have heard musicians say, that to hear Mr. Purkis play on Colonel Thompson's organ in "the Great Exhibition" was the most delicious treat imaginable to true and delicate ears. Unfortunately his key board looks discouragingly complex. We shall have to speak of these points more definitely when we come to treat of harmony. We have mentioned the difficulties connected with these notes that the pupil may understand why they are placed last in the order of illustration. It was necessary to make him familiar with the simpler and easier notes of the scale before he advanced to any *characteristic* or *difficult* use of these two. Our pupils will also see the mistake of the ordinary methods of developing the voice, by practising it at once on the *scale* of successive degrees, instead of the *chord* of easily recognised intervals, to which the more difficult notes may be afterwards added.

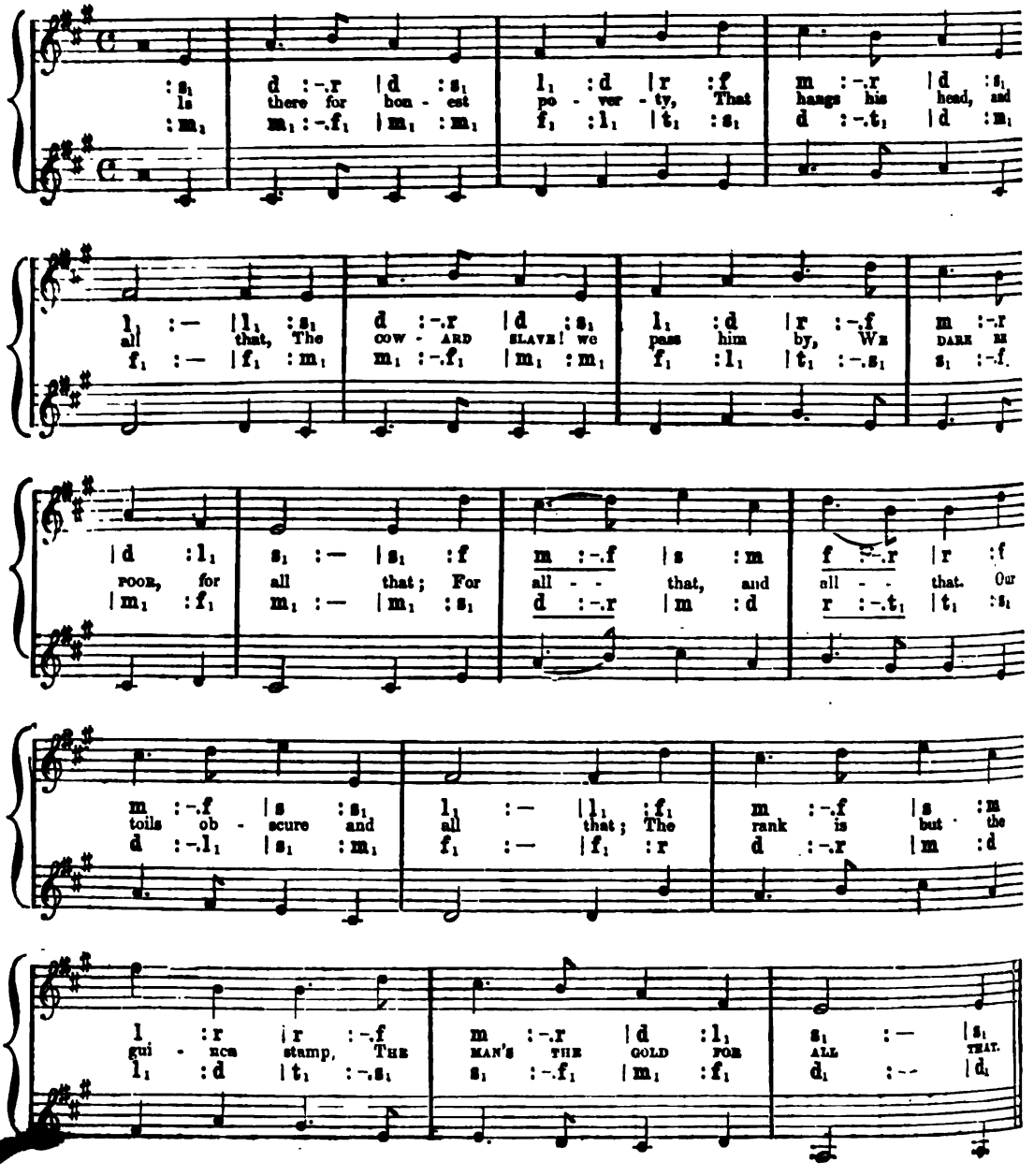
2. The note TE, when heard at length, and after the ear has been filled with the other notes of the scale, inspires the mind with a feeling of suspense accompanied with a strong desire for its resolution in the key note. Hence, it is generally called the "leading note"—*leading* the ear to the key-note. Sing the notes of the scale either up or down, and *try* whether the ear can be satisfied by resting on TE.

3. The note RAY, when heard in similar circumstances, excites a feeling of suspense almost as strong as TE, but does not so decidedly indicate its resting note. The ear is pleased by its rising to the third of the scale (ME), but more satisfied by its falling on the key-note. Try the well-known Gregorian Tone with these two endings :—

4. The musical effects of TE and RAY carry a strong appeal to the mind's emotions, but do not touch so directly those softer and gentler feelings which FAH and LAH affect. There is more of hope and energy about them. TE may be called the SENSITIVE or *piercing* note, and RAY the HOPEFUL or *rousing* note.

The touching and elegant effect of both these notes is beautifully shown in the opening of Handel's song, "What tho' I trace."

Another beautiful example of the effective use of TE you find in Haydn's "With verdure clad :"—

But the finest examples of these mental effects you will be able to enjoy, by studying Handel's song, ("Angels, ever bright and fair." The character of RAY preceded by LAH is shown in the opening on the word "*fair.*"

Then follows the *soft* appeal of ME, seconded by the *urgency* of FAH, on the words "Take, O *take* me, to your care."

This is repeated and again varied with the introduction of lower TE, thus :—

And when desire has risen to the intensity almost of despair, it is expressed by the piercing voice of the higher TE, thus:—

After several repetitions and variations of the softer theme referred to, the whole piece closes with this last piercing appeal. Indeed, examples from the great masters might be multiplied easily, but space forbids us to enlarge.

5. It may easily be noticed that every tune is divisible into parts which correspond with a line in poetry. The notes most frequently used for the close of these phrases are DOH, MI, SOH, the resting notes of the scale. Next to these in frequency are RAY and TE. But the more emotional notes, FAH and LAH, are but seldom found in that position. Let our pupils test this interesting fact by examining the previous exercises. They are now invited to study the following lessons.

EXERCISE 29. **THE MAN'S THE GOLD FOR ALL THAT.** KEY A. M. 80.

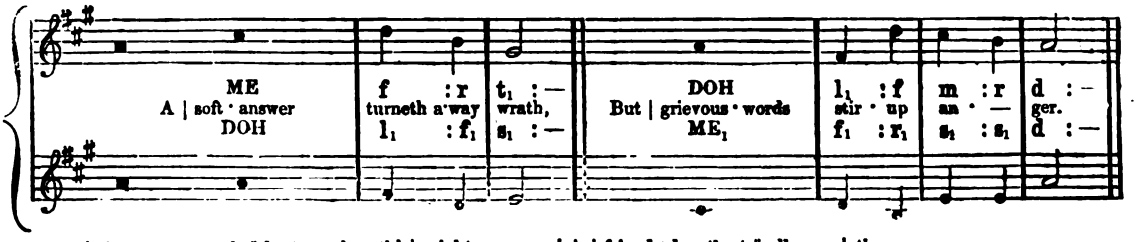
(The Words by BURNS—Anglicised.)

: s₁ | d : -.r | d : s₁ | l₁ : d | r : f | m : -.r | d : s₁
Is there for hon - est po - ver - ty, That hangs his head, and
: m₁ | m₁ : -.f₁ | m₁ : m₁ | f₁ : l₁ | t₁ : s₁ | d : -.t₁ | d : m₁
l₁ : — | l₁ : s₁ | d : -.r | d : s₁ | l₁ : d | r : -.f | m : -.r
all that, The cow - ard slave! we pass him by, We dare be
f₁ : — | f₁ : m₁ | m₁ : -.f₁ | m₁ : m₁ | f₁ : l₁ | t₁ : -.s₁ | s₁ : -.f₁
| d : l₁ | s₁ : — | s₁ : f | m : -.f | s : m | f : -.r | r : f
poor, for all that; For all - - that, and all - - that. Our
| m₁ : f₁ | m₁ : — | m₁ : s₁ | d : -.r | m : d | r : -.t₁ | t₁ : s₁
m : -.f | s : s₁ | l₁ : — | l₁ : f₁ | m : -.f | s : m
toils ob - scure and all that; The rank is but the
d : -.l₁ | s₁ : m₁ | f₁ : — | f₁ : r | d : -.r | m : d
l : r | r : -.f | m : -.r | d : l₁ | s₁ : — | s₁
gui - nea stamp, The MAN'S THE GOLD FOR ALL THAT.
l₁ : d | t₁ : -.s₁ | s₁ : -.f₁ | m₁ : f₁ | d₁ : — | d₁

2. *A king can make a belted knight*
A Marquis, Duke, and all that;
AN HONEST MAN'S ABOVE HIS MIGHT,
For kings they can't do all that;
For all that, and all that,
Their dignities, and all that,
The pith of sense and honest worth
Are better far than all that.

3, *Then let us pray that come it may,*
As come it will for all that,
That sense and worth o'er all the earth,
May bear the palm and all that.
FOR ALL THAT, AND ALL THAT,
IT'S COMING YET, FOR ALL THAT,
That man to man, the wide world o'er,
SHALL BROTHERS BE FOR ALL THAT.

NOTE.—Our Scottish friends must pardon the Anglicisms and sing the Scottish words. This true and noble song should be sung with expression, or not at all The tune illustrates the mental effects of LAH, rather than of RAY and TE. It would have been inserted in the last lesson if there had been room.

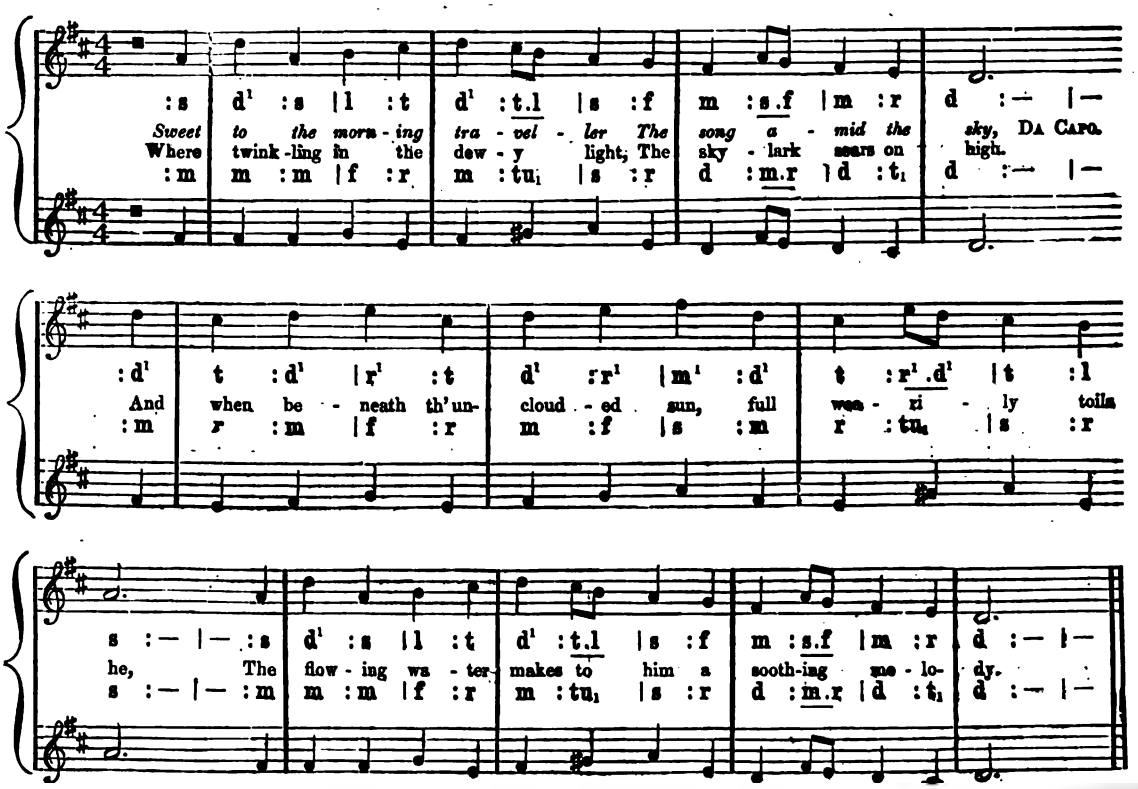
EXERCISE 30. **NARE'S CHAUNT.** KEY A. M. 72.



· He that is | slow to · anger is ‖ better · than th' | mighty,
· And he that | ruleth his · spirit than ‖ he · that | taketh · a | city.
· He that | covereth a trans · gression ‖ seek · eth | love,
· But he that re | peateth a · matter ‖ sepa · ra | teth · very | friends.
A | friend · loveth at ‖ all · — | times,
And a | brother · is ‖ born · for ad | ver · si | ty.
A | man that hath · friends must ‖ show him · self | friendly,
· And there is a | friend that · sticketh ‖ clo · ser | than a · brother.

NOTE.—Be careful to sing with great accuracy the elegant phrase ME, FAH, RAY, TE, at the opening.

EXERCISE 31. **DELIGHTFUL SOUNDS.** KEY D. M. 66.

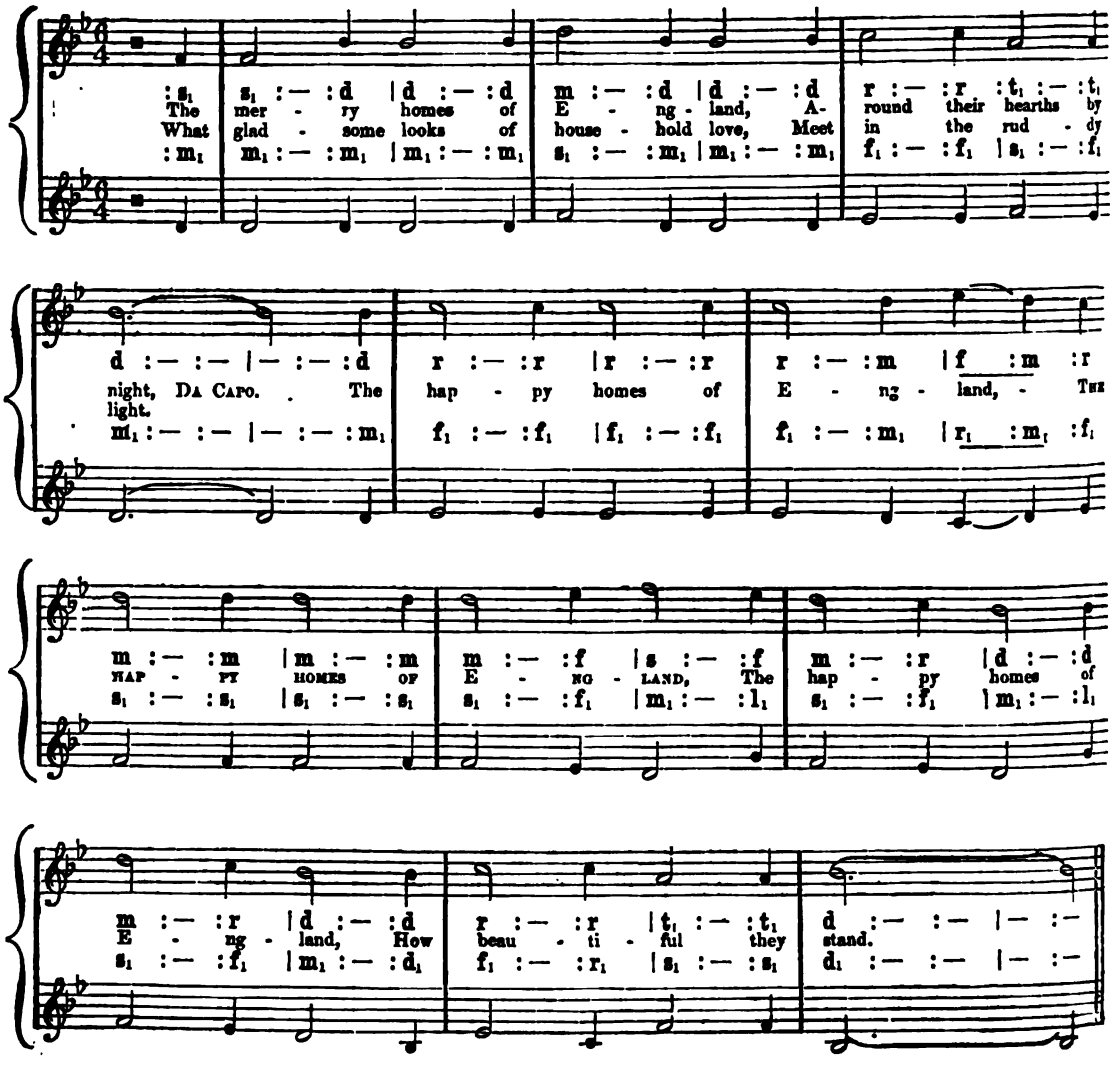
(The Words by SOUTHEY.)

:s d1 :s |l :t d1 :t.l |s :f m :s.f |m :r d :— |—
Sweet to the morn-ing tra-vel-ler The song a-mid the sky, DA CAPO.
Where twink-ling in the dew-y light, The sky-lark soars on high.
:m m :m |f :r m :tu1 |s :r d :m.r |d :t1 d :— |—
:d1 t :d1 |r1 :t d1 :r1 |m1 :d1 t :r1.d1 |t :l
And when be-neath th'un- cloud-ed sun, full wea-ri-ly toils
:m r :m |f :r m :f |s :m r :tu1 |s :r
s :— |— :s d1 :s |l :t d1 :t.l |s :f m :s.f |m :r d :— |—
he, The flow-ing wa-ter makes to him a sooth-ing me-lo-dy.
s :— |— :m m :m |f :r m :tu1 |s :r d :m.r |d :t1 d :— |—

2. *And when the evening light decays,*
And all is calm around;
There is sweet music in his ear,
From distant sheep-bell's sound.

3. But oh! of all delightful sounds
Of evening or of morn,
The sweetest is the voice of love
That welcomes his return.

Note.—Both TE and RAY are effectively illustrated here, at the opening of the second verse.

Exercise 32. **THE MERRY HOMES OF ENGLAND.** Key B flat. M 80.

(The Words by Mrs. Hemans.)

: s1 | s1 : — : d | d : — : d | m : — : d | d : — : d | r : — : r | t1 : — : t1
The mer - ry homes of E - ng - land, A- round their hearths by
What glad - some looks of house - hold love, Meet in the rud - dy
: m1 | m1 : — : m1 | m1 : — : m1 | s1 : — : m1 | m1 : — : m1 | f1 : — : f1 | s1 : — : f1
d : — : — | — : — : d | r : — : r | r : — : r | r : — : m | f : m : r
night, Da Capo. The hap - py homes of E - ng - land, - The
light.
m1 : — : — | — : — : m1 | f1 : — : f1 | f1 : — : f1 | f1 : — : m1 | r1 : m1 : f1
m : — : m | m : — : m | m : — : f | s : — : f | m : — : r | d : — : d
HAP - PY HOMES OF E - NG - LAND, The hap - py homes of
s1 : — : s1 | s1 : — : s1 | s1 : — : f1 | m1 : — : l1 | s1 : — : f1 | m1 : — : l1
m : — : r | d : — : d | r : — : r | t1 : — : t1 | d : — : — | — : —
E - ng - land, How beau - ti - ful they stand.
s1 : — : f1 | m1 : — : d1 | f1 : — : r1 | s1 : — : s1 | d1 : — : — | — : —

2 *There woman's voice flows forth in song,*
Or childish tale is told:
Or lips move tunefully along
Some glorious page of old.

3 The blessed homes of England,
How softly on their bowers
Is laid the holy quietness,
That breathes from sabbath hours

4 The cottage homes of England,
By thousands in her plains,
Are smiling o'er the silvery brooks,
And round the hamlet fanes.

5 Oh! green for ever be the groves,
And bright the flow'ry sod,
Where first the child's glad spirit loves
His country and his God.

Note.—The "rousing" effect of RAY, in the second strain, cannot fail to be noticed.

LESSONS IN LATIN.—No. XLI.

By JOHN R. BEARD, D. D.

THE DEFECTIVE VERBS.

DEFECTIVE verbs are those which are *deficient in*, or want, certain parts which belong to the model verbs. Already we have met with verbs, as queo, which had not all the usual parts. But there are some which, being very or specially defective, are called "the defective verbs." The distinction may not be very rigid, but in grammar you must not expect the exactitude of geometry.

1. Aio, *I say "aye" or "yes," I affirm, maintain*:—

IND. PRES. aio, ais, ait, and aiunt.
SUB. PRES. aias, aiat, and aiant.
IND. IMP. aiebam, bas, bat, bamus, batis, bant (no subj.)
PART. aiens, aientis (as an adj.).

2. Inquam, *I say*:—

IND. PRES. inquam, inquis, inquit, inquimus, inquitis, inquiunt.
SUB. PRES. inquiat.
IND. IMP. inquiebat or inquibat (no subj.).
FUTURE inquies and inquiet.
IND. PERF. inquisti and inquit.
IMP. inque, inquito.

3. Memini, meminisse, *to remember* (with gen. and acc.)
Odi, odisse, *to hate*.
Coepi, coepisse, *to begin*.
Novi, novisse (nosse), *to know*.

These four forms are perfect tenses. Thus, novi is the perfect tense of nosco. In signification the perfect may denote the result of the act spoken of in the present, and that result may in English be expressed by another verb. Thus, as the result of inquiry is knowledge, so novi the perfect of nosco, *I inquire into, I became acquainted with*, signifies *I know*.

These four perfects, together with the parts derived from them, are regular. Observe that the meaning of the perfect form being in English present, the meaning of the pluperfect will be imperfect, and so on.

PERF. IND.	memini, *I remember*	odi, *I hate.*	coepi, *I begin*	novi, *I know*
PERF. SUBJ.	meminerim, *I may remember*	oderim, *I may hate*	coeperim, *I may begin*	noverim, *I may know*
PLPF. IND.	memineram, *I remembered*	oderam, *I hated*	coeperam, *I began*	noveram, *I knew*
PLPF. SUBJ.	meminissem, *I might remember*	odissem, *I might hate*	coepissem, *I might begin*	novissem, *I might know*
FUT. IND.	meminero, *I shall remember*	odero, *I shall hate*	coepero, *I shall begin*	novero, *I shall know*
IMP.	memento, *remember thou*	none		
	mementote, *remember ye*	none		
INF. PERF.	meminisse, *to remember*	odisse, *to hate*	coepisse, *to begin*	novisse (nosse), *to know*
INF. FUT.	none	osurum esse, *to be about to hate*	coepturum esse, *to be about to begin*	none
PART	none	osus, *hated*	coepturus, *about to begin*	none
			coeptus, *begun*	

Osus passes into the compounds exosus and perosus, *greatly hated*. Instead of coepi, coeperam, and so on, coeptus sum, coeptus eram was used when the connected infinitive was of the passive voice, as urbs aedificari coepta est, *the city began to be built*,—that is, *they began to build the city*. The same takes place with desino, *I cease*, as urbs aedificari desita est, *they have discontinued the building of the city*.

VOCABULARY.

Abominari, *to deprecate as ominous, to curse*: commemorare 1, *to make mention of, remind*; evanesco 3, *to disappear, vanish*; hebesco (no perf., no sup.) 3, *to grow dull, stupid*; proferre 3, *to bring forward*: sapio, ii, (no sup.) 3, *to taste, be wise*; probrum, i, *a crime, disgrace*; haruspex, icis, *one who foretells events by looking into the entrails of sacrificed animals, a diviner*; bellus, a, um, *beautiful* (hence the French *beau, bel, belle*); consentaneus, a, um, *correspondent, suitable*; invidus, a, um, *envious*; sive (seu)—sive (seu), *whether—or*; dum, *while* (provided that, with subj.); dimidium, i, n, *a half*; desiderium, i, n, *a desire for, feeling of the loss of*; occupo 1, *I seize, take possession of*.

EXERCISES.—LATIN-ENGLISH.

Contraria ea sunt quorum alterum ait quid, alterum negat; Cato mirari se aiebat quod non rideret haruspex haruspicem quum vidisset; sus, ut aiunt, docet Minervam; tu ais, ego nego; negat Epicurus quenquam qui honeste non vivat, jucunde posse vivere; quasi ego id curem quid ille aiat aut neget; illud quaero quid ei qui in voluptate summum bonum putat, consentaneum sit dicere; sive tu hoc ais, sive negas, ego tuebor sententiam meum; negantis contraria sunt aientibus; aio, (for aisne) tu? quum res occultissimas aperueris in lucemque protuleris; negabis esse rem ullam quae cognosci possit? aisne? aio; negas ne? nego; Agricola serit arbores quae alteri seculo prosint, ut ait ille in Menandri Comoedia; non credimus, inquitis, vera esse quae dicimus; tu vero, inquisti, mihi molestus nunquam eris; amicus meus, inquies, nonne est homo bellus? Praeclare Plato, beatum, inquit, cui etiam in senectute contigerit ut sapientium verasque opiniones assequi possit; Meminerimus etiam adversus infimos justitiam esse servandam; animus meminit praeteritorum, praesentia cernit, futura providet; beneficia meminisse debet is, in quem collata sunt, non commemorare qui contulit; illud semper memento; qui ipse sibi sapiens prodesse nequit, nequiequam sapit; quod tu mihi dixisti pulchre meminero; qui patriae beneficia meminerint, semper pro ejus salute arma capessere parati erunt; memento mori! omnes oderunt eum qui immemor est beneficii; libertatis inimicos effici non potest quin (ut non) oderim; invidi virtutem et bonum alienum oderunt; virtus necesse est res sibi contrarias aspernetur atque oderit; probos amamus, improbos odimus; non dubito quin mali me oderint; vox dira et abominanda, oderint dum metuant; Cicero penitus oderat Clodium; judicem neque studere cuiquam decet, neque odisse neque irasci; non ita amare debemus ut si aliquando osuri simus; Romani regum nomen perosi sunt; dimidium facti, qui bene coepit, habet; oracula evanuerunt, postquam homines minus credili esse coeperunt; postquam divitiae honori esse coeperunt, et eas gloria imperium, potentia sequebatur, hebescere virtus, paupertas probro esse coepit; turpe est rem bene coeptam male finire; undique in murum lapides conjici coepti sunt; urbs obsideri coepta est; Deum colit qui novit; nihil mihi stultius videtur quam existimare eum studiosum tui quem non noris (noveris); qui se ipse norit (noverit) aliquid sentiet se habere divinum, tantoque munere Dei semper dignum aliquid et faciet et sentiet; quam quisque norit artem in hac se exerceat.

ENGLISH-LATIN.

I deny what thou affirmest; when I say "yes" he says "yes;" when I say "no" he says "no;" thou hast, they say, left the city; I do not know whether thou affirmest or deniest the thing; affirmative opinions (sentiae) are contrary to negative (ones); thy father, they say, will travel to Rome (acc); sweet and comely it is, says Horace, to die for one's country; never, you say, is a friend troublesome to me; forget benefits conferred, remember benefits received; I will remember thee when absent (simply the participle); if we remember the benefits conferred on us by our parents, we shall never be unthankful towards them; as often as I remember the good teaching of my teachers, a desire for those excellent men takes possession of me; we hate men who are unmindful of benefits; who is there but (quin) hates the enemies of freedom? we know not why they hate us; men love the brave and hate cowards (ignavi); I do not doubt but bad men hate me; a friend is not acceptable (gratus) to me who loves, as if he may some time hate; it is known that the name of kings was very hateful to the Romans; unhappy is he whom all good men hate; thou began the thing well but hast ended it ill; scarcely had the soldiers began to fortify the camp when the enemy was seen; already had the enemies begun to storm the city when suddenly our soldiers came to the assistance of the citizens; I know not if (an appended to the verb) thou knowest my friend or not; if thou knewest my friend thou wouldst love him.

Aesopii Fabulae.

VULPES ET UVA.

Vulpes uvam in vite conspicata, ad illam subsilit omnium virium suarum contentione, si eam forte attingere posset. Tandem defatigata inani labore, discedens dixit; "At nunc etiam acerbae sunt, nec eas in via repertas tollerem." Haec fabula docet multos ea contemnere quae se assiqui posse desperent.

VULPES ET LEAENA.

Vulpes leaenae exprobrabat quod non nisi unum catulum pareret. Huic dicitur respondisse, "Unum sed leonem."—Haec fabula, non copiam sed bonitatem rerum aestimandam esse docet.

Mures.

Mures aliquando habuerunt consilium quomodo a fele caverent. Multis aliis propositis, omnibus placuit ut ei tintinnabulum annecteretur; sic enim ipsos, sonitu admonitos, eam fugere posse. Sed quum jam inter mures quaereretur qui feli tintinnabulum annecteret, nemo repertus est.—Fabula docet in suadendo plurimos esse audaces, sed in ipso periculo timidos.

Vocabulary.

Vitis, is, *f.* a vine; contentio, ónis, *f.* a struggling or struggling; catulus, i, m. a whelp; felis, is, *f.* a cat; omnibus placuit, it pleased all,—that is, it was resolved; tintinnabulum, i, n. a bell.

LESSONS IN GERMAN.—No. XXXIV.

Section LXIX.

The word eigen, (*own*) is often used with an article, as also with a pronoun preceding. Ex.: Er hat ein eigenes Pferd; he has (an own horse) a horse of his own. Eigen has also the kindred signification, "*peculiar, singular.*" Ex.: Er ist ein eigener Mensch, he is a "*peculiar*" man, &c.

I. Finden, (to find) often answer to our verbs "*to think*" or "*consider.*" Ex.: Ich finde den Wein sehr gut; I (find) *think* the wine very good. Ich finde es unrecht, daß er das gethan hat; I *think* or *consider* it wrong, that he has done that.

II. Halten (to hold) with its proper case, followed by für, has, like finden, the sense "to think" or "consider;" as, er hält mich für seinen Feind; he thinks me (literally, *holds me for*) his enemy. Followed by auf, halten also means, "to esteem, regard;" as, ich halte viel auf ihn; I think much of him. For Aufhalten, to hinder, See Sect. 38.

Exercise 72

Ab'weichen, to deviate, diverge;
Acht, *f.* care; sich in Acht nehmen, to beware of;
Bekom'men, to get, receive, obtain;
Berei'sen, to travel over;
Eben, so eben, even, just;
Frage, *f.* question;
Hüten, to guard, keep watch;
Interessant', interesting;
Je, ever, always;
Je'denfalls, in any case, at all events;
Merk'würdigkeit, *f.* remarkableness, curiosity;
Miethen, to hire, rent;
Ob, whether;
Schließen, to shut, lock, close;
Unterscheiden, to distinguish, discriminate, discern;
Verbessern, to improve;
Vergessen, to forget.

Nichts ist so sehr unser eigen, als unsre Gedan'ken; alles An'dere ist außer uns.	Nothing is so much our own, as our thoughts; all else is exterior to us.
Die meisten Menschen sind von Empfin'dung ihres eignen Werths auf'geblasen, weil sie nicht wissen, was der wahre Werth des Menschen ist.	Most men are puffed up by a feeling of their own worth, because they do not know what the true worth of man is.
Wer hat je den herben Trank des Schicksals gern und willig genommen?	Who has ever cheerfully and voluntarily taken the bitter cup of fate?
Der Graf kommt so eben mit seinem Gefolge von der Jagd.	The count is just coming, with his retinue, from the chase.
Halte ja fest an dem Glauben an Gott, den Lenker deines Schicksals.	Hold (Sect. 44. IV.) fast to thy (the) faith in God, the disposer of thy destiny.
Wir beur'theilen die Menschen in vielen Fällen nur nach dem Schein, und halten manche für klug — weil sie an'maßend, und andere für un'wissend, weil sie bescheiden sind.	We estimate men in many cases only by the appearance, and regard many as wise because they are assuming, and others as ignorant because they are modest.

1. Sagen (Sect. 83. I.) Sie mir, ob das Ihr eigenes Pferd ist? 2. Haben diese Kinder viel eigenes Vermögen? 3. Ihre Eltern waren sehr reich. 4. Ich finde es sehr eigen, daß er nicht seine eigenen Pferde benutzt, sondern mit andern fährt. 5. Ich habe kein eigenes Haus. 6. Ist dies sein eigener Wagen, oder hat er ihn nur gemiethet? 7. Diese Frage finde ich sehr eigen. 8. Es ist dies (Sect. 86. III.) meine eigene Ueberzeugung, nach der ich handle. 9. Dieser alte Kaufmann ist ein sehr eigener Mensch. 10. Jeder Mensch hat seine eignen Fehler. 11. Sind Sie je in diesem Hause gewesen? 12. Ich bin nie da gewesen. 13. Ich halte es für meine Pflicht, mich nicht über ihn aufzuhalten. 14. Ich werde nie von meinen Grundsätzen abweichen. 16. Sind Sie noch nicht bei meinem Bruder gewesen? 16. Ich habe ihn so eben gesehen. 17. Ist Deine Tochter schon in meinem Garten gewesen? 18. Sie ist noch nicht ausgegangen. 19. Haben Sie je ein so interessantes Land bereist? 20. Ich habe schon viel Schönes gesehen, aber nie vergesse ich die reizende Schweiz. 21. So eben habe ich schon wieder einen Brief bekommen. 22. Sind Sie so früh gekommen, daß Sie schon wieder gehen? 23. Gehen Sie ja (Sect. 44. IV.) nicht zu nahe an das Feuer. 24. Kommen Sie ja bald zurück. 25. Ja, ich werde es jedenfalls thun. 26. Wagt es ja nicht, ohne Begleitung in den Wald zu gehen. 27. Ich werde mich ja hüten, ihm Geld zu leihen. 28. Diese Merkwürdigkeit will ich ja sehen 29. Hast Du die Thüre ja gut geschlossen? 30. Nehmen Sie sich vor diesen Leuten ja in Acht. 31. Unterscheiden Sie ja das Wahre vom Falschen. 32. Ich habe mich längere Zeit in Berlin und Leipzig aufgehalten. 33. Er hat mich über eine halbe Stunde an meiner Arbeit aufgehalten. 34. Meine Freunde halten viel auf mich, weil ich mich über Niemanden aufhalte.

1. The reflecting man never deviates from the path of virtue. 2. Have you ever travelled over such a beautiful country as Italy or Switzerland? 3. No, but I shall never forget the beautiful valleys of the Rhine. 4. Do not believe everything they tell you. 5. The father is just coming with his son and the uncle from their journey. 6. Does the teacher think much of his scholars? 7. Yes, he considers them very good. 8. He thinks much of a comfortable life. 9. This man regards his abilities too much. 10. John is his enemy, but he thinks he is his friend. 11. I have a house of my own, and my brother has none. 12. Is this your own invention? 13. Yes, it is, but I consider this a very singular question. 14. This man has a peculiar notion. 15. Do you not find your friend a peculiar man? 16. Yes, I do, he finds fault with every body. 17. Have you ever been in the museum? 18. Yes, I have been there several times. 19. Have you already been in the garden of my uncle? 20. To procure repose to others, he sacrifices his own. 21. My friends hindered me very much in my employment. 24. A prince can improve the laws of his forefathers as well as his own.

Section LXX.

Wer, as a relative, stands at the head of its clause; the word which it represents always coming *after*. Ex.: Wer zufrieden ist, „der" ist glücklich; he who is contented, is happy, Sometimes, however, wer, like in English, is employed as a double relative. Ex.: Wer auf dem Wege der Tugend wandelt, ist glücklich; who (or he who) walks in the path of virtue, is happy. Wer dich genau kennt, muß dich verlassen; who knows thee well, must quit thee. (Byron.)

I. Was, is employed like the corresponding English word. Ex.: Was schön ist, kann auch schlecht sein; what is beautiful, can also be bad. Er ist was ich sein möchte; he is what I would (wish to) be.

II. *After* an antecedent used in a general and indefinite sense, was is often employed as a simple relative. Ex.: Er glaubt Alles, was er hört; he believes all *that* he hears. Ich thue Alles, was ich kann; I do all *that* I can. Er glaubt nur das, was er sieht; he believes only that *which* he sees. When, however, the antecedent is particularly specified, welches, (not was) is to be employed; as, das Buch welches Sie mir geliehen haben; the book which you have lent me.

III. Was is, likewise, sometimes used instead of warum. Ex.: Was lachen Sie? Why (warum) do you laugh? or, what are you laughing at?

IV. Gebürtig, and geboren, correspond commonly to our words "native" and "born." Ex.: Er ist ein geborner Deutscher; he is a *native* German. Wo sind Sie gebürtig; Where were you born? Ich bin aus Berlin gebürtig; I was born in Berlin. Er ist

ein geborner Fürst; he is a prince by birth. Frau N. war eine geborne G.; Mrs. N. was a Miss G.

Exercise 73.

Amerikanerin, *f.* (See § 14. 1.); Auszeichnung, *f.* distinction; Beistand, *m.* assistance, succour, support; Blutgerüst, *n.* scaffold; Darin, therein, in it; Ebenbild, *n.* image, exact likeness; Eintritt, *m.* entrance; Erfechten, to win in fight, conquer; Erleiden, to suffer; Finster, dark; Gebo'ren, born; Gebürtig, native (See IV.); Göttlich, divine; Hochverrath, *m.* high-treason; Kleinigkeit, *f.* trifle, small matter; Lustig, merry, sportive; Musiklehrer, *m.* music-master; Narr, *m.* fool; Nie'derlage, *f.* discomfiture, defeat; Nordamerika, *n.* North America; Schlüssel, *m.* key; Spiegel, *m.* looking-glass, mirror; Stehlen, to steal; Stemmen, to resist, oppose, stem; Streiten, to fight, combat; Um'kommen, to perish; Un'bedeutend, unimportant; Unklug, imprudently; Unterdrücken, to oppress; Verzweifeln, to despair, despond; Wiese, *f.* meadow; Zweifeln, to doubt.

Wer das Gute liebt, der liebt auch Gott und verach'tet Alles, was ihn nicht zur Vollkom'menheit beför'dert.	He that loves goodness, also loves God, and contemns all that does not advance him towards perfection.
„Was quälen Sie mich mit Ihrer Gelehrsamkeit?" (Gellert.)	Why do you torment me with your erudition?
Der Mensch glaubt leicht, was er hofft, und sieht leicht, was er sehen will.	Man easily believes what he hopes, and sees easily what he wishes to see.
Das große Haus, welches (not was) Sie dort sehen, ist (Sect. 59. I.) unser.	The large house, that you see yonder, belongs to us.
Ei'nige meiner Freunde sind aus Dresden gebür'tig.	Some of my friends are natives of Dresden.
Dieser Mann ist ein gebor'ner Ameri'ka'ner.	This man is a native American.

1. Wer sich das Göttliche will, und das Höchste im Leben erfechten, scheue nicht Arbeit und Kampf. (Körner.) 2. Wer gewinnen will, muß wagen. 3. Dieses Buch ist mir lieb, wer es stiehlt, der ist ein Dieb. 4. Wer nichts lieben will als sein Ebenbild, hat außer sich nichts zu lieben. 5. Wer zweifelt, verzweifelt. 6. Wer gegen das Vaterland streitet, ist ein Verräther. 7. Wer sich in Gefahr begiebt, kommt darin um. 8. Wer dem Unterdrückten nicht beisteht, verdient auch keinen Beistand. 9. Wer sich gegen das Schicksal stemmen will, ist ein Thor. 10. Sind Sie ein geborner Engländer oder Amerikaner? 11. Ich bin keins von beiden, (Sect. 83. II.) ich bin ein geborner Deutscher. 12. Wer ist ihre Freundin? 13. Sie ist eine Amerikanerin, gebürtig aus New-York. 14. Wo ist Ihr Freund gebürtig? 15. Er ist aus England gebürtig. 16. In welchem Lande wurden Sie geboren? 17. Ich bin in den Vereinigten Staaten von Nordamerika geboren. 18. Ich mache mich über diesen Mann lustig. 19. Sie sollten sich nicht über ihn lustig machen. 20. Er macht sich über Jedermann lustig. 21. Es giebt auch Narren, welche sich über Andere lustig machen. 22. Dieser Mensch hält sich über jede Kleinigkeit auf (Sect. 81.). 23. Es ist unklug, sich über eine unbedeutende Sache aufzuhalten oder lustig zu machen. 24. Wer zu viel anfängt, vollendet wenig. 25. Ich freue mich über meinen artigen Neffen. 26. Der römische Kaiser Augustus kränkte sich (Sect. 38.) über die Niederlage, welche Varus von den Deutschen erlitten hatte. 27. Er hat mich über diesen Gegenstand gesprochen. 28. Wer aus Liebe zu Gott der Menschheit Pflichten entsagt—sitzt im Finstern und hält immer den Spiegel vor sich.

1. He who assists the poor will receive divine assistance. 2. He who would have entrance everywhere, must have golden keys. 3. He who fights for his country, deserves distinction. 4. He who wishes to learn German, must give himself some trouble 5. He who dies for his king, dies with glory. 6. He who commits high treason dies mostly upon the scaffold. 7. They are born under a happy star. 8. In which country were those ladies born? 9. They were born in Italy, in the year 1795; but their mother was born in England. 10. Are these ladies natives of Germany? 11. No, they are natives of France. 12. Our music-master is a native of Italy, and was born in Florence. 13. I will do what I have promised. 14. Show me what you have found. 15. What enhances the glory of this hero, is his modesty. 16. Let us grant him what we at first refused. 17. Thou hast never told us what they have trusted you with. 18. Why do you make yourself merry at the misery of the oppressed? 19 The fruits, which we saw in the garden of our neighbour, were not so good as those which grow in yours.

LESSONS IN PHONETIC SHORT-HAND.—No. IV.

By Alex. Melville Bell, F.R.S.S.A.

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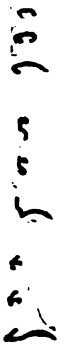
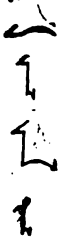
Affixes or Terminations.

s or es (plural or verbal, as in "he fish*es* for fish*es*.")



A *hook*. The *s* or *es* being only pronounced as a syllable after hissing sounds, this causes no confusion. The advantages of the contraction are great. It preserves a correspondence to the eye between the singular and plural of nouns, and the different persons of verbs; while it, at the same time, furnishes a means of distinguishing such words as "sees" and "seize," "chews" and "choose," "caws" and "cause," "prays" and "praise," &c., which would otherwise present the same "articulate skeleton." The illustrations are, "*see, sees, seize,*"—"*chew, chews, choose,*"—and "*pray, prays, praise.*"

est (adjective, or [2nd person] verbal.)



A very small *s* (not a hook) with a *t* written upwards. This preserves a correspondence between the simple adjective and its superlative, and between the second and the other persons of verbs. The mode of writing also distinguishes between the terminations in "findest" and "find'*st*," in the latter of which the *s* would be a hook, and the *t* would be written downwards. The illustrations are "*pratest*" and "*protest*,"—"*findest*" and "*find'st*."

able, ible — A small instead of a full *b*.

ical — A small instead of a full *cl*, and the *l* written upwards.

full — A small instead of a full *l*.

less — A small instead of a full *s*.

The illustrations are "*commendable*," "*polemical*," "*thoughtfully* and "*heedless*."

ibility, icality, &c. — Add *t* to the *l* of "ible" and "ical." The illustrations are "*tangibility*" and "*whimsicality*."

fore, self — An *f* crossing the *middle* of last articulation. The use of the same mark for these two terminations can cause no confusion, as they are, in no instance, preceded by the same radical word. The illustrations are "*therefore*," "*himself*," and "*themselves*."

ment — *Two dots* (significant of the two ring letters) written at the most prominent angle to the end of the last articulation. This is an arbitrary but most convenient symbol. The illustrations are "*shipment*" and "*fragment.*"

ments — *dot* and *comma*

mental — *dot* and *l*

mented / menting — *dot* and *d*. / *dot* and *ring*

mentor, er, &c. — *dot* and horizontal *r* (for "mentary" add *dot* after the *r*)

mentarily — *dot* and *r l*

mentator — *dot* and *t r*

mentative — *dot* and *t v*

mentatively — *dot* and *t v l*

Written, like the preceding, at the most prominent angle to the end of the last articulation. The illustrations are "*ornaments*" and "*ornamental*" "*lamented*" and "*lamenting;*" "*fragmentary;*" "*elementarily;*" "*commentator;*" "*argumentative,*" and "*argumentatively.*"

ness — A *ring, in a vowel position.* The same mark as for "circum" and "mis;"—from which it is distinguished by its position: "circum" and "mis" being always *before*, and "ness" always *after* the rest of the word. The plural "nesses" has a hook after the ring. The illustrations are "*whiteness*" and "*witnesses.*"

ne sses

tial, cial, &c. — A very small double curve (*sh* and *l*) crossing the end of the last articulation at the most convenient angle. The illustration is "*nuptial.*"

ential, incial, &c. — *ring* before "tial"

tiality — *t* after "tial"

antiality — *t* after "ential"

Written, like the preceding, across the last articulation. The illustrations are "*essential,*" "*partiality,*" and "*circumstantiality.*"

sion, tion, &c. — A small curve (*sh*) crossing *convexly* the end of the preceding character—written *thin* when pronounced "*sh*un" as in "*auction,*" and *thick* when pronounced "*zh*un" as in "*lesion.*" When no vowels are written, the curve should be made double size to indicate a preceding vowel, as in "ation, ition," &c. The illustrations are "*option*" and "*opposition,*" "*exceptions*" and "*exhibitions.*"

tiona — *l* after "tion"

tionate — *t* after "tion"

tionately — *t l* after "tion"

tionable — *b l* after "tion"

tionar-er — *r* after "tion"

Written, like the preceding, at any angle across the end of the last character. The illustrations are "*conditional,*" "*extortionate,*" "*affectionately,*" "*exceptionable,*" and "*confectioner.*" For "tionability" add *b* to "tionable."

ension / ansion, &c. — *Ring* before "tion." For "entional" "entionable," &c., add *l, b l,* &c., in the same way as after "tion." The illustrations are "*dimensions,*" "*mentionable,*" and "*conventionalities.*"

gion — *d* before "zhun." The illustration is "*contagion.*"

tious / scious, &c. — A curve crossing *concavely* the end of the last articulation. This is the converse of "tion." The illustrations are "*anxious*" and "*vexatious.*"

entious — *ring* before "tious"

tiously — *l* after "tious"

entiously, &c. — *l* after "entious"

The illustrations are "*licentiousness*" and "*sentiously.*"

gious, geous, / giously, &c. — *d* before "tious," "tiously," &c. The illustrations are "*religious*" and "*gorgeously.*"

ward-s, &c. — A *w* crossing the middle of the last character. For "wards" add a *hook*; for "warded," add *d*; for "warder, add *r*; for "wardly," add *l*; for "warding," add a *ring*, &c. The illustrations are "*inwards,*" "*outwardly,*" "*rewarded,*" "*forwarding,*" and "*forwardness.*"

44. The following is a Recapitulation of the rudimental Prefixes and Affixes. There are but thirteen of each. Let these be committed to memory. All the others being derivatives from these, and formed by simple alphabetic additions, the learner can have no trouble in remembering them.

PREFIXES.

circum / mis	ring, in vowel position	super ...	hook, r.
com / con	k, crossing end	trans ...	t r } in vowel position.
counter	k. ring, in vowel position	under ...	d r }
exter	curve crossing end, convexly	dis ... / pos ... / ex ... / sub ... / cal ...	contracted instead of full letters.
inter	curve crossing end, concavely		

The negative *in* or *un* before any of these prefixes, expressed by *crossing* the *end* of the contraction.

AFFIXES

s or es (plural or verbal)	hook	fore / self	f, crossing middle
est / able / ical / full / less	contracted instead of full letters	ment	two dots
		ness	ring in vowel position
		tial	double curve crossing end
		tion	curve crossing end, convexly
		tious	curve crossing end, concavely
		ward	w crossing middle

45. In arranging our abbreviations, two principles have been constantly before us, viz., simplicity and distinctiveness, that the contractions might be easily remembered, and that they might be in no danger of being confounded with fully written words. Merely arbitrary marks have been almost altogether excluded, and an *alphabetic* basis has been maintained, in all but a few cases where a more simple and distinctive form was suggested by association or analogy; as in a "*ring*" for "*circum;*"—a *curve* crossing *convexly*, or externally, for "*exter;*"—and crossing *concavely*, or internally, for "*inter;*" *two dots* for the two ring letters in "*ment,*" &c., &c. Simplicity has also been

preserved by a uniform extension of the contractions to all their *derivatives* and *compounds*; as, from "*con*," (k,) "*accom*," (uk,) deriving "discom," "incom," "unaccom," "recom," "irrecon," &c., by prefixing *d*,—*ring*,—*r*, &c., to "com" or "accom;" and from "*ment*," deriving "mental," "mented," "mentator," "mentative," &c., by similar alphabetic additions to "ment."

46. The same principles will be found to be carried out through all the abbreviations that follow, so that *a thorough knowledge of the alphabet* will enable the student to master the majority of them at a glance. We cannot too strongly impress upon the learner the necessity of a perfect acquaintance with the fundamental principles of notation as explained in the first lesson. Simple alphabetic writing should be practised until the characters come to the hand as readily as the ordinary forms of the "long-hand" letters do. The eye, too, will, by practice, become accustomed to the outlines of syllables and words, so as to decipher them as wholes, with progressively increasing facility. It will very speedily learn to recognise *letters*, and the reader will *spell* his words, that is, by sound; next, it will combine the elements of *syllables* at sight, and he will read *syllabically*; and, by degrees, it will recognise the forms of *entire words* at a glance, and he will decipher *verbally*, and attain to fluent reading with facility exactly proportioned to the amount and regularity of his practice.

47. This process is an exact counterpart of the child's progress in learning to read. He first *spells*;—then *syllables*;—then reads *verbally*, or *pictorially*, as his eye becomes accustomed to the outlines of frequently-recurring words. Ordinary fluent reading depends greatly on the *pictorial* principle, as may be proved by the general tendency of readers to confound such words as "commendation" and "condemnation," "conversation" and "conservation," pronouncing the more familiar term instead of that to which the eye is less accustomed.

48. If our learners, then, would make rapid progress, and make stenography really a *short*-hand to them, in a short time, they must MASTER THE FIRST LESSON, and, by steady application, acquire expertness in FULL SYLLABIC WRITING. We recommend them *not to write sentences* at this stage, as the next lesson will introduce a new principle of notation for all subordinate words; and alphabetic exercise in the writing of these would therefore be only labour thrown away. Unconnected words will form the most useful exercise in the meantime. Let the learner select the *nouns*, *verbs*, and important *adjectives* and *adverbs* from any book, and gain as much facility as possible in the *accurate* writing of these, and leave the inferior classes of words to be subsequently dealt with. To the ungrammatical learner this direction may be translated—"write the big words and pass over the little ones."

KEY TO THE EXERCISES IN LESSON II., *par.* 33.

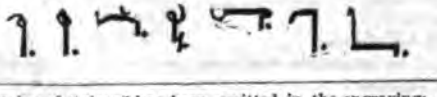
I. *First line.*—Page, chapter, paragraph, knowledge, ignorance, hundred, thousand, million, breakfast.

Second line.—Dinner, supper, sleep, labour, study, cricket, character, handkerchief, phlegmatic.*

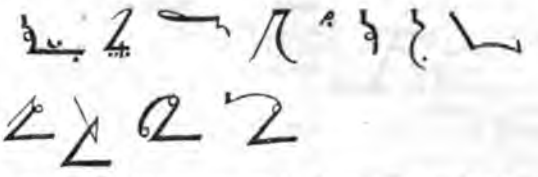
Third line.—Unintelligible, uproarious, improbability, parallelogram, reprehensible, intermeddle, hallelujah, phonetic short-hand writing.

NOTE.—The general error of beginners is to make the difference too little manifest between letters with vowels preceding (*full-size*) and those that have none (*contracted*). To secure easy and certain legibility, observe the following proportions:—When a word contains any full-sized character (any consonant with a vowel before it), its contracted letters *cannot be made too small*; they should never exceed *one-fourth* of the full size: when a word contains no full-sized character, its consonant may extend to, but must never exceed, *half-size*.

II.—1. Days of the week:—



2. Months of the year:—



3. Books of the Old Testament. In "Exodus" and "Lamentations," *the contracted prefixes and affixes are introduced*:—

* The hook-*s* of "sleep" has been omitted in the engraving: the *b* of labour is cut *thin* instead of thick; and the first letter of "chapter" (*t*) and of "labour" (*l*) are too long.

LESSONS IN ENGLISH.—No. XXXIV.

By JOHN R. BEARD, D.D.

LATIN STEMS.

LANGUAGE, in one point of view, is a silent record of human errors. If we believed language, we should have still to believe that the sun rises and sets; that upwards and downwards denote fixed relations, and that heaven is upwards alike at midnight and mid-day; that good humour and bad humour are the offspring of certain liquids (humr Lat., *moisture*) in the material frame; that temper and distemper were the results of the due or undue mingling of these diverse liquids; that a jovial man was born under the planet Jupiter (Jovis), the emblem of a jolly god; that a man of saturnine disposition owed his dull moroseness to his evil genius, Saturn; and that a mercurial fellow jumped about and frisked away, because he had in him too much of the pagan god Mercury, the swift-footed messenger of Olympus. However, men suffer disasters (dis, *not*, *bad*; astron, *a star*) without imputing the blame to their stars; though many are still under the vulgar delusions that our lot here depends on good luck and bad luck. Portents and prodigies in the skies and on the earth are words which show how men were once alarmed by any unusual phenomenon. Even so late as the reign of Charles II., Englishmen had faith in portents. During the plague, the vision of a flaming sword, reaching from Westminster to the Tower of London, seemed nightly to be present to the excited fancy of many of the residents in the metropolis, like the meteor-sword that hung over Jerusalem during the siege. The appearance of a comet, some months before, had caused superstitious feelings of alarm in the weak-minded, by whom it was regarded with scarcely less terror than that with which the Anglo-Saxons had beheld the comet which visited our hemisphere in the year 1066, on the eve of the Norman invasion.

However, these false fears and vulgar errors are rapidly disappearing. Lunacy is preserved amongst us in the close embrace of Westminster-hall, but we hence cease to believe that mental alienation is caused by the moon (luna, Lat. *moon*), and if we still in good Saxon speak of the *moon-stricken*, we do so as we speak of *star-gazers*, without ascribing any influence to the heavenly bodies. Even Lancashire-*witches*, though they *charm* and *enchant* us,* can no longer affect our reason or shorten our lives.

* This is a wicked pun! The Dr. means *bewitchers*.—ED

LATIN STEMS.

Latin words.	*Stems.*	*English words.*
mel (mellis), *honey*	*melli*	*mellifluous*
melior, *better*	*melior*	*meliorate*, amelioration
memor, *mindful*	*memor*	*memorable*, *memorial*
mens (mentis), *the intellect*	*ment*	*mental*, *dementate*
mergo, *I plunge*	*merg*	*immerge*, *emerge*
mersus, *plunged*	*mers*	*immersion*, *emersion*
metior, *I measure*	*met*	*mete*, *meter*, *meteyard*
mensus, *measured*	*mensu*	*commensurate*, *mensuration*
mille, *a thousand*	*mill*	*millenium*, *millenary*
miror, *I gaze, wonder*	*mir*	*mirror*, *admire*
miser, *wretched*	*miser*	*miserable*, a *miser*
mitis, *mild*	*miti*	*mitigate*
mitto, *I send*	*mit*	*remit*, *commit*, *permit*
missus, *sent*	*miss*	*missionary*, *missive*
modus, *a measure*	*mod*	*mode*, *modify*
mola, *a millstone*	*mol*	*emolument*, *molar*
moles, *a mass*	*mol*	*demolish*, a *mole*
molestus, *troublesome*	*molest*	*molestation*
mollis, *soft*	*molli*	*mollify*, *emollient*
moneo, *I warn*	*mon*	*admonish*
monitus, *warned*	*monit*	*monitor*
mors (mortis), *death*	*morti*, *mort*	*mortify*, *immortal*
mos (moris), *a manner*	*mor*	*moral*, *moralist*
multus, *many*	*multi*	*multiform*, *multitude*
munitus, *fortified*	*munit*	*munition*, *ammunition*
munus (munĕris), *a gift*	*muner*	*remunerate*
murus, *a wall*	*mur*	*immure*, *mural*
muto, *I change*	*mut*	*mutable*, *commute*
natus, *born*	*nat*	*native*, *natal*
navis, *a ship*	*nav*	*naval*, *navigate*
ago, *I drive*	*ag*	*agile*, *agitate*
necto, *I tie, bind*	*nect*	*connect*, *disconnect*
nexus, *a bond*	*nex*	*annex*, *connexion*
nego, *I deny*	*neg*	*negative*, *negation*
nihil, *nothing*	*nihil*	*annihilate*, *nihility*
nomen (nominis), *a name*	*nomin*	*nominal*, *denominate*
non, *not*	*non*	*nonentity*, *nonage*
norma, *a rule*	*norm*	*enormous*, *normal*
novus, *new*	*nov*	*novice*, *innovate*
nox (noctis), *night*	*nox*, *noct*	*equinox*, *nocturnal*
nubo, *I marry*	*nub*	*connubial*
nuptus, *married*	*nupt*	*nuptials*
nudus, *naked*	*nud*	*nudity*, *denude*
nugae, *trifles*	*nug*	*nugatory*
numerus, a *number*	*numer*	*numeration*, *innumerable*
nuncio, *I tell*	*nunci*, *nounc*	*annunciation*, *renounce*
nutrio, *I nourish*	*nutri*	*nutriment*, *nutritious*
octo, *eight*	*oct*	*octagon*, *octave*
oculus, *an eye*	*ocul*	*oculist*, *ocular*
oleo, *I smell*	*ol*	*olfactory*, *redolent*
omnis, *all*	*omni*	*omnipresent*, *omnibus*
onus (onĕris), *a burden*	*oner*	*onerous*, *exonerate*
opto, *I wish*	*opt*	*adopt*, *option*
opus (opĕris), *work*	*oper*	*operose*, *operation*
orbis, *a circle*	*orbi*	*orbicular*, *orbit*
orno, *I deck*	*orn*	*ornament*, *adorn*
oro, *I beg*	*ora*	*oration*, *orator*
os (oris), *the mouth*	*or*	*oral*, *adoration*, *orifice*
os (ossis), *a bone*	*oss*	*ossify*, *osseous*
otium, *ease*	*oti*	*otiose*, *negotiate*
ovum, *an egg*	*ov*	*oval*, *oviform*
pactus, *having agreed*	*pact*	*compact*, *pact*, *paction*
pando, *I spread*	*pand*, *pans*	*expand*, *expanse*
passus (passus), *spread*	*pass*	*compass*, to *pass*
par, *equal*	*par*	*parity*, *imparity*
pareo, *I appear*	*par*	*apparent*
pario, *I bring forth*	*par*	*parent*, *vivi parous*
vivus (vivi), *alive*	*viv*	*vivify*, *vivid*
paro, *I prepare*	*par*, *pair*	*reparation*, *repair*
pastus, *fed*	*past*	*repast*, *pasty*
pater, *a father*	*pater*, *patri*	*paternal*, *patrimony*
	parri	*parricide*
patior, *I suffer*	*pati*	*patient*, *impatient*
passus, *suffered*	*pass*	*passive*, *passion*
pauci, *few*	*pauci*	*paucity*
pax (pacis), *peace*	*paci*	*pacify*, *pacific*
peccо, *I sin*	*pecc*	*impeccable*, *peccadillo*
pectus (pectŏris), *the breast*	*pector*	*expectorate*
peculium, *private property*	*pecul*	*peculation*
pecunia, *money*	*pecun*	*pecuniary*
pello, *I drive*	*pel*	*expel*, *impel*
pulsus, *driven*	*puls*	*repulsion*, *expulsion*
pendo, *I hang, weigh*	*pend*	*depend*, *pendulum*, *stipend*
pensus, *hung*	*pens*	*pensive*, *compensate*
pene, *almost*	*pen*	*peninsula*
peto, *I seek, aim at*	*pet*	*centripetal*, *competition*
centrum, *a centre*	*centr*	*central*, *centrifugal*
pictus, *painted*	*pict*	*depict*, *picture*
piscis, *a fish*	*pisc*	*piscatory*,
placidus, *pleasing*	*placid*	*placid*, *placidly*
placo, *I appease*	*plac*	*placable*, *implacable*

The word *nonentity* recalls the days of the schoolmen, or monkish philosophers of the middle ages, who subtilly, profoundly, and perseveringly speculated on metaphysical topics, striving to invest the dogmas of the Church with a philosophical dress and certitude. *Entity* or *being*, and *nonentity* or *no-being*, were among the counters with which they played their clever intellectual game; which, like most other games, secured little else than amusement.

"Fortune is no real *entity*, nor physical essence, but a mere relative signification."—*Bentley.*

"With real *munition* he did fortify
His heart."—*Daniel.*

"They must have the assistance of some able military man, and convenient arms and *ammunition* for their defence."—*Bacon.*

The word *adoration*, etymologically considered, signifies a kissing of the mouth to a visible object of worship—in token of reverence and as expressive of worship.

The term *peculation* means the making of that your own which is not your own. *Peculation*, as derived from peculium, *private property*, wears a socialist aspect, and seems to say, "la propriété, c'est le vol;" that is, "private property is plunder," a truly monstrous and *anti*-social doctrine.

"A real circular motion is always accompanied with a *centrifugal* force, arising from the tendency which a body always has to proceed in a right line."—*Maclaurin*, "Account of Newton's Philosophical Discoveries."

LESSONS IN FRENCH.—No. XLIV.

By Professor LOUIS FASQUELLE, LL.D.

SECOND PART.

[IN commencing the SECOND PART of our Complete Course of the French tongue, we may just answer one question which has been often put to us by very many of our students, viz.: "Will the LESSONS IN FRENCH in the POPULAR EDUCATOR be sufficient to enable one to become master of the French language?" Our answer now is, that by comparing the FIRST PART constantly with this SECOND PART, according as the references direct, and studying the two parts *together*, as the lessons regularly appear in the POPULAR EDUCATOR, the student, with the help of a good French dictionary, and the use of some good French books, for reading and translating lessons, may become a perfect adept, a complete scholar, in this elegant language; and may, with a few living instructions in pronunciation (to many the "Lessons in French" reprinted from the "Working Man's Friend," would be enough), be enabled to travel over the continent, and find his way, by means of this language, through every country in Europe.]

§ 1.—PARTS OF SPEECH.

(1.) THERE are, in French, ten sorts of words or parts of speech:—

Nouns or Substantives,	Participles,
Articles,	Adverbs,
Adjectives,	Prepositions,
Pronouns,	Conjunctions,
Verbs,	Interjections.

(2.) These are divided into variable words and invariable words.

(3.) The variable words are those of which the termination admits of various changes; by these changes various modifications of meaning are expressed. The variable words are of six kinds:—

The Noun,	The Pronoun,
The Article,	The Verb,
The Adjective,	The Participle.

(4.) The invariable words are those of which the termination never changes:—

The Adverb,	The Conjunction,
The Preposition,	The Interjection.

(5.) All variable parts of speech have two numbers: the *singular*, which denotes but one, and the *plural*, which denotes more than one.

(6.) All variable parts of speech, except the verb, have two genders; the *masculine* and the *feminine*.

§ 2.—Cases of Nouns.

The cases of nouns adopted by French grammarians are:—

(1.) The *nominatif* or *sujet*: answering to the nominative or subject of the English, and to the nominative of the Latin.

(2.) The *régime direct*, or direct object of the English, accusative of the Latin.

(3.) The *régime indirect*, indirect object of the English, answers to the oblique cases of the Latin, the genitive, dative, and ablative.

§ 3.—The Noun or Substantive.

(1.) The *noun* or *substantive* is a word which serves to name a person or a thing; as Jean, *John*; maison, *house*.

(2.) There are two sorts of nouns: *proper* and *common*.

(3.) A proper noun is applied to a particular person, or thing; as, Napoléon, *Napoleon*; Paris, *Paris*.

(4.) A common noun belongs to a whole class of objects; as, livre, *book*; homme, *man*.

(5.) Some common nouns, although singular in number, present to the mind the idea of several persons or things, forming a collection: they are for this reason denominated *collective* nouns; as, troupe, *troop*; peuple, *people*.

(6.) Collective nouns are general, or partitive: *general*, when they represent an entire collection; as, l'armée des Français, *the army of the French*: *partitive*, when they represent a partial collection; as, une troupe de soldats Français, *a troop of French soldiers*.

(7.) A common noun composed of several words, as, chef-d'-œuvre, *masterpiece*, avant-coureur, *forerunner*, is called a compound noun.

(8.) Of the two properties of nouns, *gender* and *number*, we shall commence with the first.

§ 4.—Gender of Nouns.

(1.) There are, in the French language, only two genders: the masculine and the feminine.

(2.) The masculine gender belongs to men, and animals of the male kind: as, Charles, *Charles*; lion, *lion*.

(3.) The feminine gender belongs to women, and animals of the female kind: as, Sophie, *Sophia*; lionne, *lioness*.

(4.) Through imitation—often on account of derivation, often without any real motive—the masculine and feminine genders have been given, in French, to the *names of inanimate objects*: thus, papier, *paper*, is masculine, and plume, *pen*, is feminine.

§ 5.—Rules for Determining Gender by the Meaning.

Masculine Nouns.	*Feminine Nouns.*
(1.) Male beings; as homme, *man*; lion, *lion*.	(1.) Female beings: as, femme, *woman*; lionne, *lioness*.
(2.) Objects to which male qualities are attributed: ange, *angel*; génie, *genius* (a spirit); soleil, *sun*.	(2.) Objects to which female qualities are attributed: fée, *fairy*; lune, *moon*.
(3.) The names of the seasons: le printemps, *the spring*, &c.; and of the months, janvier, *January*; février, *February*, &c.	(3.) Virtues: la charité, *charity*; except courage, *courage*; mérite, *merit*, which are masc.
(4.) The days of the week, lundi, *Monday*; mardi, *Tuesday*, &c.	(4.) Vices: la méchanceté, *wickedness*; except l'orgueil, *pride*, masc.
	(5.) Festivals: la Saint Jean, i.e. la fête de St. Jean, *St. John's-day*; la Chandeleur, *Candlemas*: except Noël, *Christmas*, masc.
(5.) The names of the cardinal points and the winds: as, l'est, *the East*; l'ouest, *the West*, &c. [See exceptions opposite.]	Bise, *a poetical term for North wind*. Tramontane, *a term applied on the Mediterranean to the North wind*. Brise, *breeze*; mousson, *trade-winds*.
(6.) The names used in the French decimal system: as, centime (*hundredth part of a franc*); kilogramme (1000 *grammes*, *about two pounds*); mètre, &c.	
(7.) Metals: le fer, *iron*; l'acier, *steel*, &c.	
(8.) Colours: le vert, *green*; le jaune, *yellow*.	
(9.) The names of empires and kingdoms when ending with a consonant: le Danemarc, *Denmark*; le Brésil, *Brazil*.	(5.) The names of countries when ending in e mute: la France; l'Espagne, l'Amérique, &c. Exceptions: Bengale, Hanovre, Mexique, Péloponèse.
(10.) Mountains: le Jura, *Mount Jura*; le Puy-de-Dome, (*) *the Puy de Dome*; le Cénis, le St. Bernard, *Mount Cenis*, *Mount St. Bernard*.	(6.) Chains of mountains in the plural: les Alpes, *the Alps*; les Pyrenées, *the Pyrenees*; les Voges, les Cévennes, &c.
(11.) The names of rivers when ending with a consonant: le Rhin, *the Rhine*; le Nil, *the Nile*.	(7.) The names of rivers when ending with e mute; la Seine, *the Seine*; la Loire, *the Loire*. Exceptions: Le Rhône, *the Rhone*; le Danube, le Tibre, le Cocyte, masc.
(12.) Trees, shrubs: le chêne, *the oak*; le frêne, *the ash*; le rosier, *the rose-bush*. [Exceptions opposite.]	(8.) Aubépine, *hawthorn*; bourdaine, *black alder*; épine, *thorn*; hièble, *dwarf-elder*; ronce, *brier*; yeuse, *ilex*.
(13.) The name of a language: as, le français, *French*; l'allemand, *German*, &c.	
(14.) The letters of the alphabet: un a, *an a*, e; un x, *an x*.	
(15.) Compound words formed of a verb and of a noun, either masculine or feminine, or of a pronoun and a verb: porte-feuille, *pocket-book*; rendez-vous, *rendezvous*.	(9.) Garde-robe, *ward-robe*; perce-neige, *spring-crocus*; perce-feuille, *hare's-ear*.
(16.) Nouns, pronouns, verbs, &c., used substantively: le boire et le manger, *eating and drinking*.	
(17.) Numbers—cardinal, ordinal, and proportional—used substantatively: le dix, *the tenth*; le neuvième, *the ninth*; le tiers, *the third*. [Exceptions opposite.]	(10.) Moitié, *half*; and all numbers ending with aine: douzaine, *dozen*; centaine, *hundred*, &c.

§ 6.—Gender, by the Termination.

(1.) The exceptions to the masculine will be found opposite the termination, in the feminine column; and the exceptions to the feminine, in the masculine column, also opposite:—

(2.) *Consonantal Terminations.*

Masculine.			*Feminine.*		
Terminations.	*Nouns.*	*English.*	*Termination.*	*Noun.*	*English.*
B					
EB	Horeb,	*Mount Horeb.*			
UB	radoub,	*refitting a ship.*			
MB	plomb,	*lead.*			
C					
AC	sac,	*sack.*			
EC	bec,	*beak.*			
IC	mastic,	*putty.*			
OC	soc,	*ploughshare.*			
UC	duc,	*duke.*			
NC	tronc,	*trunk.*			
RC	clerc,	*clerk.*			
SC	fisc,	*revenue.*			
D					
ED	pied,	*foot.*			
ID	nid,	*nest.*			
OD	tripod,	*tripod.*			
UD	Talmud,	*Talmud.*			
ND	marchand,	*merchant.*			
RD	bord,	*border.*			
F					
EF	chef	*chief.*			Exc.—chef, *key*; nef, *ship, nave*; soif, *thirst*.
IF	suif,	*tallow.*			
UF	œuf,	*egg.*			
RF	serf,	*stag.*			

(*) The word Puy, from the Celtic *puech*, mountain, is applied to a number of places in France: Puy-en-Velay, Puy-notre-Dame, &c.

	Masculine Nouns.		*Feminine Nouns.*
		G	
AG	rang,	*rank.*	|
		K	
CK	arack,	*arrack.*	|
		L	
AL	bal,	*ball.*	|
EL	sel,	*salt.*	|
IL	soleil,	*sun.*	|
OL	sol,	*soil.*	|
UL	calcul,	*calculation.*	|
		M	
AM	Adam,	*Adam.*	|
EM	harem,	*harem.*	|
IM	daim,	*deer.*	Exc.—faim, *hunger*; malefaim, *excessive hunger.*
OM	nom,	*name.*	|
UM	parfum,	*perfume.*	|
		N	
AN	cadran,	*dial.*	|
EN	examen,	*examination.*	|
IN	raisin,	*grape.*	Exc.—fin, *end*; main, *hand.*
ON	*not preceded by* i *or* gi, si, ti, xi.		Exc.—chanson, *song*; cuisson, *baking*; contrefaçon, *counterfeiting*; façon, *mode*; moisson, *harvest*; mousson, *trade-winds*; rançon, *ransom.*
	bâton,	*stick.*	
	gazon,	*turf.*	
	blason,	*blazon.*	
	bison, *bison*; horizon, *horizon*; oison, *gosling*: poison, *poison*; tison, *firebrand.*		ISON maison, *house.* Exceptions opposite.
	bastion, *bastion*; bestion, *figure-head of a ship.*		GEON région, *region.* SION pension, *pension.* TION question, *question.* XION réflexion, *reflection.*
		P	
AP	drap,	*cloth.*	|
OP	galop,	*gallop.*	|
UP	coup,	*blow.*	|
		Q	
OQ	coq-d'Inde, *turkey.*		|
		R	
AR	char,	*car,*	|
ER	fer,	*iron,*	Exc.—cuiller, *spoon*; mer, *sea.*
IR	plaisir,	*pleasure.*	chair, *flesh.*
OR	or,	*gold.*	|
UR	not preceded by e,		Exc.—tour, *tower.*
	azur,	*azure.*	|
	bonheur, *happiness*; cœur, *heart*; chœur, *chorus*; dénominateur, *denominator*; déshonneur, *dishonor*; équateur, *equator*; extérieur, *exterior*; honneur, *honour*; intérieur, *interior*; labeur, *labour*; malheur, *misfortune*; multiplicateur, *multiplier*; pleurs, *tears*; régulateur, *regulator*; ventilateur, *ventilator.*		EUR chaleur, *heat.* hauteur, *height.* Exceptions opposite.
		S	
AS	bras,	*arm,*	|
ES	grès,	*sandstone.*	|
IS	souris,	*mouse.*	amaryllis, *amaryllis*; brebis, *sheep*; fois, *time*; souris, *mouse*; vis, *screw*; oasis, *oasis.*
OS	os,	*bone.*	|
US	blocus,	*blockade.*	|
PS	temps,	*weather.*	|
RS	vers,	*verse.*	|
		T	
AT	climat,	*climate.*	|
ET	arrêt,	*arrest.*	forêt, *forest.*
IT	lit,	*bed.*	nuit, *night.*
OT	cachot,	*dungeon.*	dot, *dower.*
UT	bout,	*end.*	|
NT	pont,	*bridge.*	dent, *tooth*; gent, *people*; jument, *mare.*
RT	tort,	*wrong.*	part, *share*; la plupart, *the most.*

	Masculine Nouns.		*Feminine Nouns.*
		X	
AX	climax,	*climax.*	|
EX	silex,	*silex.*	|
IX	prix,	*price.*	Exc.—croix, *cross*; noix, *nut*; paix, *peace*: voix, *voice*; perdrix, *partridge*; poix, *pitch.*
UX	coutroux,	*anger.*	Exc.—chaux, *lime*; faux, *scythe*; toux, *cough*
XX	lynx,	*lynx.*	|
		Z	
AZ	gaz,	*gas.*	|
EZ	nez,	*nose.*	|
IZ	riz,	*rice.*	|

ANSWERS TO CORRESPONDENTS.

J. HAMILTON (Glasgow): We shall be glad to answer his question, but it is not sufficiently definite to us; we are not lawyers, and can't tell what things are understood in it; if he were beside us, we might settle the matter in one minute.—J. S. SILSDEN: We do not know the price of "The Pentateuch and its Assailants;" inquire in the Row.—W. HOSE (Carpenter): We advise him to stick to the Arithmetic, and to study Dr. Beard's Lessons in English; he may take to Drawing heartily as a relief from the weight of the other studies. There are some mispelt words in his note.—WALLACE ROBERTS (Exeter): The History of Greece by Keightley is very good, and will repay perusal. We can't tell how long it will take to learn short-hand so as to be able to write it with ease and rapidity.—M. E.: We do not know any remedy for stammering, except speaking very slowly till the defect be overcome.—G. CHEMICUS (Chester) should study the Lessons in French in the P. E. in preference to any other.—SCHOLASTICUS (Feltham) will find no manual for the study of etymology equal to Dr. Beard's Lessons in English in the P. E. Tropes will come in course. The best books to read for school management and teaching are the Reports of the Privy Council of Education, where the experience of hundreds is detailed.

JAMES BELL (Linlithgow): In reference to the query of multiplying 2s. 6d. by 2s. 6d., let us hear what Dr. James Thomson says in his very excellent treatise on Arithmetic: "It may be proper to caution learners against the absurdity of attempting *to multiply money by money*. This caution will not appear unnecessary, if it be considered that whole pages have been filled with instructions how to perform this problem; and it has been attempted to be shown, even with the semblance of *geometrical demonstration*, that if 2s. 6d. be multiplied by 2s. 6d., the product may be either 3 ¼d. or 6s. 3d! Let it be considered, however, that in multiplication, a quantity is simply repeated a given number of times; thus, if 2s. 6d. be repeated 4 times, the amount is 10s.; if 5 times, 12s. 6d., &c. To talk, therefore, of multiplying 2s. 6d. by 2s. 6d., or, which is precisely the same, of repeating 2s. 6d. 2s. 6d. times is absolute nonsense." After this *dictum* of Dr. Thomson, late Professor of Mathematics in the University of Glasgow, and one of the most clear-headed writers on mathematical subjects who has appeared within the last century, it would seem presumption on our humble part to say one word. But we shall give our own opinion, and speaking unto the operatives of this country, as unto wise men, they will at once judge what we say. Well, then, as we have said before, in innumerable cases of the application of Proportion we have to multiply *money by money*, and obtain a sensible result. For example, take this question, "If £1 gain 2s. 6d. in a certain time, how much will 2s. 6d. gain in the same time?" The answer to this question will be $\frac{25}{4}$d.; for, as £1 : $£\frac{1}{4}$ :: $£\frac{1}{4}$: $£\frac{1}{16}$ = $\frac{25}{4}$d., the answer. Again, take this question, "If 1s. gain 2s. 6d. in a certain time, how much will 2s. 6d. gain in the same time?" The answer to this question will be 6s. 3d.; for, as 1s. : 2s. 6d. :: 2s. 6d : 6s. 3d. the answer. In both these cases, 2s. 6d. has to be multiplied by 2s. 6d.; but the result is very different; and why? because in the first case, the gain 2s. 6d. is considered, and really is $\frac{1}{4}$ of *a pound*; whereas in the other case the gain 2s. 6d. is considered, and really is 2½ *times one shilling*; a pound being the standard of comparison in the one question, and a shilling the standard in the other question. It is not, therefore, absurd *to multiply money by money*, provided that the factors are considered as parts or multiples of a certain unit of money, and that in the multiplication the multiplier is considered an abstract number, or a number of times, or a fraction of a time, according to the nature of the question; while the multiplicand retains its concrete value, and the divisor is also deemed an abstract number.

LITERARY NOTICES.

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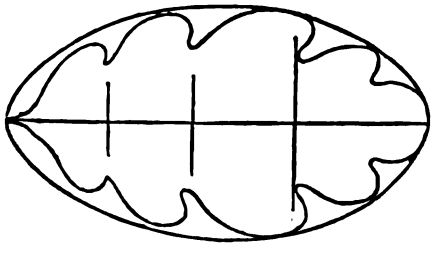
LESSONS IN DRAWING.—No. V.

OUTLINE DRAWING FROM SIMPLE FORMS.

Countless variety of symmetrical forms suitable for the application of the preceding lessons, is found in the leaves and flowers of plants and trees. With the exception of crystallized bodies, there is, perhaps no class of natural figures, in which geometrical characters are more strongly developed, or more readily detected. Leaves, flowers and shells, have formed the elements of decoration from the earliest period. They are used by civilised as well as barbarous nations; and during the progress of architecture and the imitative arts, they have held a large place in that of ornamentation. These natural productions may be represented with perfect geometrical symmetry, without impairing their natural characteristics; and this property has recommended them to the architect, as elements for beautifying structures raised according to the strictest rule. "Knops and flowers," as well as "Palm trees and open flowers" find their places in the ornamentation of the tabernacle and in the beautifying of Solomon's Temple; and however stiffly they may have imitated their graceful forms, the lotus and the palm were to the Egyptian architects what the acanthus was afterwards to the Greek, the standard of symmetry and elegance. The beautiful adaptations of the acanthus in the ornamentation of Greek architecture have descended to us, and seem incapable of improvement. The capital of the Corinthian column is still unmatched in architecture as a combination of beauty and richness. There needed, indeed, but a glance through the Great Exhibition of 1851 to show that the acanthus is still used for ornamental purposes precisely as the Greeks left it. When we take up the subject of ornament in these lessons, we shall have more to say on this head. It will be sufficient for the present to observe that successful rivalry in these exquisite

Fig. 62.



results of ancient art, must be based on the same principles, and that "trees, plants, and flowers," wide-spread and viewed as they exist in their natural forms, offer to the modern, as to the ancient architect, the great store for decorative art, unexhausted and inexhaustible.

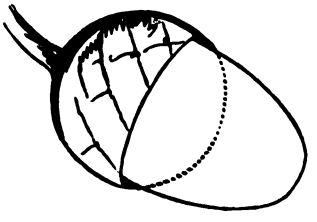
Fig. 62 is an outline showing the character of the oak leaf. It is to be drawn by first describing an ellipse.

The pupil will here observe the difference between an outline and a drawing. Any arrangement of lines will form an

Fig. 63.

outline: but a drawing is a representation of the actual appearance of any real object. Fig. 63 is a drawing, exhibiting oak leaves in several positions.

Fig. 64.



You will of course draw the representation of any object with more certainty, when you are able to refer its leading traits or characteristics to an outline. An acorn, for instance, presents a very simple outline; but when considered, as in fig. 64, to be compounded of a circle and an ellipse, it is more readily understood, and much easier to draw.

Fig. 65.

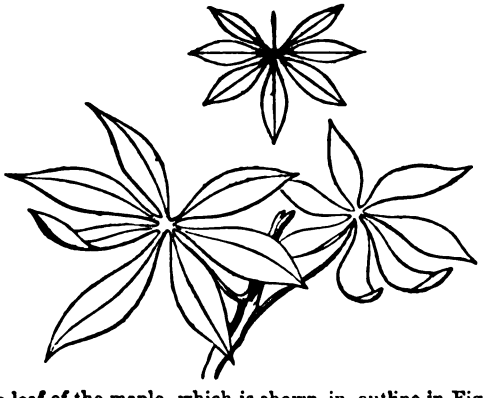
Fig 65 is a branch of an ash-tree. Here you will observe that the outline of the leaf is formed from an ellipse, with additions giving pointed extremities.

The same observation applies to fig. 66, which is an outline of part of an elm branch.

Fig. 66.

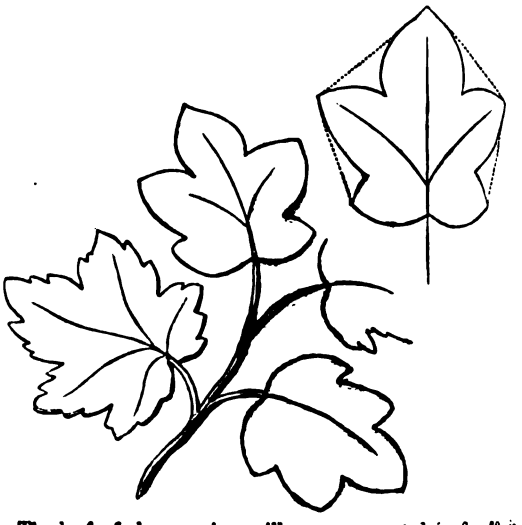
Fig. 67 is an outline of part of a branch of the horse-chestnut. The arrangement of the foliage here, is more clearly seen, by help of the small figure, which represents the knot of leaves proceeding from a single point.

Fig. 67.



The leaf of the maple, which is shown in outline in Fig. 68, is pentagonal in plan; and the branch shows more fully its natural indentations.

Fig. 68.



The leaf of the weeping willow, represented in fig. 69, is lance shaped, and is another variation of the long ellipse, with pointed extremities.

Fig. 69.

Fig. 70.

GROUP OF FLOWERS.

In thus giving the general outlines of these leaves, we have taken little notice of the *serrated* edges, as these are not essential to the outline, and they can in all cases be easily added, after the former are well secured.

It would be an easy matter to multiply such examples as these; but being desirous that all our pupils should *see things for themselves*, and cultivate the habit of observing nature, we recommend them to procure such real leaves and branches for themselves, and to endeavour, with the assistance of these lessons, to make drawings of their actual outlines from life. This practice will do much in forming the eye and hand of the artist; and where there has been considerable practice in Linear Drawing previously, it will tend much more to the advancement of the student than merely copying from prints or other drawings.

Those of our readers who have mastered Lessons III. and IV., will now be able to follow the hints given in this lesson to any extent. We shall soon have to direct their attention to Drawing in Perspective, and to explain much that embarrasses the untutored eye; but as a hint, which will be found useful in drawing such objects as have the ellipse for the basis of their forms, it may be observed that, with two exceptions, in whatsoever direction you look at an ellipse, it has always an ellipse for its outline, the proportions of its diameters varying as the direction is altered. The exceptions are, that there is one direction in which the diameters appearing equal to each other, the ellipse appears as a circle; and another direction, in which one diameter disappearing, the ellipse appears as a straight line.

In the group of flowers, fig. 70, with which we close this lesson, the large flower to the left is the Java lily; the dark flower next to it is the zinia; to the right, a little above, is a carnation; the light, delicate flowers next to it are clematis; and beyond is the achimenes. The last has a *monopetalous corolla*; the zinia and the carnation are specimens of *compound* flowers; and the lily exhibits the *pistil* in the centre, with the *stamens* surmounted by *anthers* around.

LESSONS IN ENGLISH.—No. XXXV.

By JOHN R. BEARD, D.D.

LATIN STEMS.

[I]n words degenerate they also improve. As a nation refines, its thoughts refine. What, therefore, was originally material becomes intellectual. The intellectual, too, may pass into the moral, and the moral may be elevated into the spiritual. Our most purely spiritual terms were all physical in their origin. What a wide difference is there between *birth* and the *new birth*; between *regeneration* and *regenerati n*. *Spirit* in its original Latin is merely *breath* or *breathing*. *Heaven*, the state of spiritual blessedness, if viewed derivatively, is merely the *heaved up* place, as hell is the covered place; *hellyer* is still used in some parts of England for a *coverer*,—that is, a tiler or slater, a house-coverer. And what is *virtue*? originally, but the quality of *vir*,—that is, a man! And what was that quality? *Valour*; he was emphatically *the man* who was most brave.

Happy, too, is a word which has undergone a favourable transformation. You see its primitive meaning in *happen* and mis*hap*. *Hap*, originally, was applied to a good or a bad event, signifying *occurrence* merely. But in this world of goodness, the general tenor of events is such as to promote men's good, hence to receive its *haps* is to be *happy*, and to be exceptional in regard to its *haps* is to be *unhappy*:—

> "Such *happes* which *happen* in such *hapless* warres,
> Make me to tearm them broyles and beastly larres."
> *Gascoigne.*

There are words represented as of recent origin which may claim some age. The term *Rationalist* owes not its birth to the influence of recent German philosophy, but was used under the Commonwealth to designate a sect then new which idolised reason. Or is the term *Christology* of German origin, but seems to have been invented by Dr. Thomas Jackson in the seventeenth century. The verb *to progress* is often disallowed as an Americanism, but it is found in Shakspeare:—

> "Let me wipe off this honourable dew
> That silverly doth *progress* on thy cheeks."
> "King John," act 3, s. 2.

LATIN STEMS.

Latin words.	*Stems.*	*English words.*
plebs, *the common people*	*pleb*	*plebeian*
plenus, *full*	*plen*	*plenitude, replenish*
pleo, *I fill*	*ply, plet*	*supply, complete, expletive*
plico, *I fold*	*plic*	*complicated*
ploro, *I wail*	*plor*	*deplore, implore*
plumbum, *lead*	*plumb, plum*	*plumber, plummet*
pono, *I place*	*pon*	*depone, exponent*
positus, *placed*	*pos, posit*	*impose, position*
populus, *the people*	*popul*	*popular*
porto, *I carry*	*port*	*portable, export*
poto, *I drink*	*pot*	*potion, potable*
praeda, *plunder*	*preda*	*predatory, depredation*
pravus, *wicked*	*prav*	*depravity*
precor, *I pray*	*prec*	*deprecate, imprecate*
prehendo, *I take hold of*	*prehend*	*apprehend*
prehensus, *taken*	*prehens*	*apprehension*
pretium, *a price*	*preci*	*appreciate*
probo, *I prove*	*prob*	*probable, probation*
probus, *good*	*prob*	*probity*
pudens (pudentis), *modest*	*pudent*	*impudent*
puer, *a boy*	*puer*	*puerile*
pugna, *a fight*	*pugn*	*pugnacious, impugn*
puto, *I prune, put in order, think*	*put*	*amputate, reputation, dispute*
putris, *rotten*	*putr*	*putrefaction, putrid*
quaero, *I seek, ask*	*quir, quer*	*query, inquire*
quaesitus, *asked*	*quisit, quest*	*question, inquest, inquisition, requisition*
quassus, *shaken, agitated*	*cuss*	*discuss, percussion*
quatuor, *four*	*quat, quadr*	*quaternion, quadrangle*
angulus, *a corner*	*angl, angul*	*angle, angular*
queror, *I complain*	*quer*	*querulous*
quinque, *five*	*quinqu*	*quinquennial*
radix (radĭcis), *a root*	*radic*	*radical, eradicate*
ramus, *a branch*	*ram*	*ramification*
rasus, *scraped*	*ras*	*razor, erase*
ratio (rationis), *reason*	*rat*	*rational, rate*
rectus, *straight*	*recti*	*rectilineal, rectify*
linea, *a line*	*line*	*linear, lineament*
rego, *I rule*	*reg*	*regal, regulate*
rectus, *ruled*	*rect*	*rector, director*
rete, *a net*	*reti*	*reticulate, retina*
rideo, *I laugh*	*rid*	*deride, ridicule*
risus, *laughed at*	*ris*	*risible, derisive*
rigo, *I water*	*rig*	*irrigate*
rodo, *I gnaw*	*rod*	*corrode, erode*
rosus, *gnawed*	*ros*	*corrosion, erosion*
rota, *a wheel*	*rota*	*rotation, rotary*
rumen (rumĭnis), *the gullet*	*rumin*	*ruminate*
ruptus, *broken*	*rupt*	*bankrupt, eruption*
rus (rŭris), *the country*	*rus, rur*	*rustic, rural*
sacer (sacri), *sacred*	*sacri, sacer*	*sacrifice, sacerdotal*
sal (salis), *salt*	*sali*	*saline*
salio, *I leap*	*sati*	*salient*
saltus, *leapt*	*sault, sult*	*assault, insult*
salvus, *safe*	*salv*	*salvation, salvage*
sanctus, *holy*	*sanct*	*sanctify, sanctuary*
satis, *enough*	*satis, sati*	*satisfy, satiate*
satur, *full*	*satur*	*saturate*
scando, *I climb*	*scend*	*ascend, descend*
scindo, *I cleave*	*scind*	*rescind*
scio, *I know*	*sci*	*science, prescience*
scribo, *I write*	*scrib*	*scribe, inscribe*
scriptus, *written*	*script*	*scripture, postscript*
scrutor, *I search diligently*	*scrut*	*scrutiny, inscrutable*
scurra, *a scoffer*	*scurr*	*scurrility*
sectus, *cut*	*sect*	*dissect, sectarian*
sedeo, *I sit*	*sed, sid*	*sedentary, preside*
sessus, *seated*	*sess*	*session*
semen (semĭnis), *seed*	*semin*	*disseminate, seminary*
semi, *half*	*semi*	*semicircle, semivowel*

Expletives are words not needed for the sense, but used merely to fill up and round off the sentence. Of course expletives are to be avoided:—

> "While *expletives* their feeble aid do join,
> And ten low words oft creep in one dull line." *Pope.*

The term *depone* in law phraseology is used by the Scotch where we use *depose*. The distinction is arbitrary, for we speak of the *deponent* while we say he *deposes*, not *depones*; though of old *depones* was used in England:—

> "And further Sprot deponeth, &c."—"State Trials."

The *retina*, or eye-net, the immediate seat or rather instrument of vision, is the net-like expansion of the optic nerve, on which objects are drawn, and from which they are made visible by the mind.

Reticulated denotes that which is made like net-work. Hence the meaning of *reticule* or *little bag made of net-work*, sometime since much in use among ladies.

To *ruminate* is to pass and repass the food through the rumen or *gullet* in order to its repeated chewing. Hence the phrase *to chew the cud*. Metaphorically, to *ruminate* is to muse, to reflect calmly;—

"As when a traveller, a long day past,
In painful search of what he cannot find,
At night's approach, content with the next cot,
There *ruminates* a while his labour lost."

In prose we say to *ruminate on*,—that is, to meditate upon:—

"He practises a slow meditation, and ruminates on the subject."—*Watts*, "On the Mind."

Bankrupt, a term of French extraction, properly denotes a trader or money-dealer whose bank or bench is broken, the last condition of commercial destitution:—

"A *bankrupt* is defined a trader who secretes himself, or does certain other acts tending to defraud his creditors."—*Blackstone*.

The terms *rustic* and *rural* differ in their application, the first being said of persons, the second of things. *Rustics* are often insensible to the loveliness of *rural* scenes.

COMPOSITION.

Form into a sentence each of these Words with their proper Prepositions.

	F. R.
Confide in,	fido, *I trust*
Conform to,	forma, *form*
Congenial with,	genus, *kind*
Congratulate on,	gratulor, *I congratulate*
Connect with,	necto, *I bind*
Conscious of,	scio, *I know*
Consecrate to,	sacer, *sacred*
Consent to,	sentio, *I feel, think*
Consign to,	signum, *a sign*
Consist of, in, with, / Consistent with,	sto, *I stand*
Consult, and consult with,	consul, *a counsellor*
Contend with, against,	tendo, *I stretch*
Contiguous to,	tango, *I touch*
Contrast with,	traho, *I draw*
Contrary to,	contra, *opposite*
Conversant in, with, about,	versor, *I am engaged in*
Convert to, into,	verto, *I turn*
Convict of, / Convince of,	vinco, *I overcome*
Copy from, after,	copie, *a transcript*
Correspond to, with,	respondeo, *I answer*
Covenant with, for,	venio, *I come*
Care of,	cura, *care*

To *consist of*, to *consist in*, and to *consist with*, have each a different meaning. To *consist of* has reference to the materials of which an object is made up; to *consist in* has reference to the substance or essence of a thought; to *consist with* has reference to the character or dignity of an agent or actor. It *consists with* the character of a wise man to expound doctrines *in* which the welfare of his fellow-men *consists*: that exposition he makes by words which *consist of* sounds, or by books which *consist of* letters. The wealth of a nation *consists* not so much *in* the number as the heart, the intelligence, and the sinews of its inhabitants.

HISTORICAL THEME.

Moses at Mount Horeb.

CONVERSATIONS ON ENGLISH GRAMMAR.—No. V.

ENGLISH DICTIONARIES.

"I suppose, from what you said in our last conversation, that there are several dictionaries of the English language?"—"Yes, there *are* several."—"Well, then, which am I to choose?"—"The selection in part depends on the amount of money you can spare for the purpose."—"My stock is small, but I would rather wait until it has increased, than purchase an inferior book."—"Very good, but what should you say to five guineas for a dictionary?"—"I can afford no such sum; the utmost that my means will allow me to expend in the work is a guinea, or a guinea and a half."—'Let us set the limit at a guinea and a half——"—"Nay, I am not sure I shall be able to raise that sum, and I am sure it will be a long time first."—"You did not hear me out; I was going to say that taking a guinea and a half as the highest price, I would mention several dictionaries which range from that down to six or seven shillings."—"Thank you, that plan will suit me very well."—"With a guinea and a half for our highest point, we exclude the dictionary of the celebrated Doctor Samuel Johnson. I may, however, remark that to that learned man we owe the commencement of sound lexicography in regard to the English tongue."—"Lexicography! what is that?"—"Dr. Johnson himself shall inform you; in his celebrated dictionary he defines lexicography as 'the art or practice of writing dictionaries.' Now can you tell me the derivation of the word?"—"Graphé means writing?"—"Yes, what does the former part of the word mean?"—"Is it connected with lego or logos?"—"With both; the original Greek is Lexicon, which, from lego, I speak (logos, a word), may be rendered *word-book*."—"I wish 'word-book' had been in use, I should then have had no difficulty: I like those Saxon compounds, they are so obvious in their import; how much better would word-book have been than dictionary or lexicon: but where is the difference between dictionary and lexicon?"—"In general there is no difference between them, though dictionary is by usage applied to word-books relating to the English or the Latin, and lexicon is applied to word-books relating to the Greek, the Hebrew, and other learned languages."—"Then, why have we two words?"—"As a matter of fact we have two words, because the English has been supplied with its terms from two languages—the Greek, whence we get lexicon, and the Latin, whence we get dictionary. But we have more than two words which in their general import correspond to word-book; there is vocabulary from the Latin, and glossary from the Greek: the former from vox, a voice or articulate sound, signifies a list or collection of words with or without their several significations, and is mostly applied either to all the words of a language considered collectively—thus we say, 'the English is a rich and varied vocabulary;' or to a number of words put together for a certain purpose, be that number smaller or larger—thus, a Latin vocabulary would be a selection of such words as a beginner in the language ought first of all to learn. Glossary is, so to say, a learned book, and denotes a list of terms hard to be understood, selected and given for explanation."—"What is the origin of glossary?"—"It comes from the Greek glossé, or, as the word appears in another form, glotté, which means a tongue, the organ being given for the product of the organ, that is, word."—"Then glotté is the term we find in polyglott?"—"Yes, polyglott is from the Greek glotté, tongue, and polys, many, and so signifies a many-tongued book; for instance, the Sacred Scriptures in Hebrew, Greek, Latin, German, and English."—"You think highly of Dr. Johnson's dictionary?"—"Yes."—"Do you not think I could procure a copy in an old book-shop for a small sum?" "Probably, but though I sometimes go to such places myself in search of book-rarities, I advise you to avoid them. Old books are not good for young students; you will obtain more real, because more true, knowledge in one volume of 'THE POPULAR EDUCATOR,' than, by careful searching and sifting, with years of labour, you could obtain from a shop full of old books; old books are very much like old clothes—they are worn-out; knowledge is ever in movement, and ever on the advance; consequently the sum of knowledge undergoes incessant change—what was once thought true is proved to be false; what was once thought exact, is proved to be inexact; therefore, dictionaries which contain the sum of knowledge in detailed explanations, come in time to be wrong; consequently, old English dictionaries lose, at least, a part of their value as guides to learners. Besides, Dr. Johnson was but imperfectly acquainted with the constituent elements of the English language, and therefore he was not a thoroughly competent etymologist."—"To whom, then, are we to look for sound instruction in etymology?"—"The science is yet in its infancy; I cannot recommend a wholly satisfactory guide. Dr. Johnson's dictionary was published in 1818, in five quarto volumes, under the editorial care of the Rev. H. J. Todd, who enlarged and improved the original. Yet this work comes not up to the mark. Nor could I recommend as a sufficient etymological guide a very valuable English dictionary, published in 1844, in two quarto volumes, by Pickering, the author being Charles Richardson, LL.D., who for his unquestionable deserts in this work has lately received a small pension from the crown. However, by their price, Johnson's and Richardson's dictionaries are beyond your reach."—"Again, then, I ask, what dictionary am I to purchase?"—"You may possibly find resources to procure a copy of Webster's; if not, Reid's Dictionary of the English Language, eighth edition, published by Oliver and Boyd, of Edinburgh, which can be had for six shillings and sixpence, would answer your purpose. There are, however, several reprints of both Webster's and Reid's excellent works.

LESSONS IN FRENCH.—No. XLV.

By Professor Louis Fasquelle, LL.D.

§ 6. Gender by the Terminations *(continued)*.

(3.) *Vowel Terminations.*

	Masculine.		*Feminine.*
		A	
A	acacia, *acacia.*		Exc.—vinula, *a sort of caterpillar*; sepia, *sepia.*
		E	

A complete classification of nouns ending in *e* mute (a majority of which are feminine) would be, from its length, of little practical use to the student, who would find it easier to apply to his dictionary than to such a list. We will give here the principal terminations, classing them according to their gender, and placing the exceptions under the examples given for the terminations, instead of putting them, as hitherto, in the opposite column.

ABE	astrolabe, *astrolabe.* Exc.—Souabe, *Suabia*; syllabe, *syllable.*
ACLE	miracle, *miracle.* Exc.—débacle, *breaking up of the ice*; macle, *a mineral.*
ACRE	sacre, *consecration.* Exc.—nacre, *mother of pearl.*
AGE	courage, *courage.* Exc.—image, *image*; rage, *rage*; page, *page of a book*; cage, *cage*; nage, *swimming*; plage, *beach.*
AIRE	salaire, *salary.* Exc.—affaire, *affair*; aire, *floor*; glaire, *white of egg*; grammaire, *grammar*; paire, *pair*; jugulaire, *jugular-vein*; haire, *hair-cloth*; chaire, *pulpit*; serpentaire, *snake-root*; pariétaire, *pellitory*, and a few other names of plants.
ARE	hectare, *hectare* (a measure).
ASTRE	cadastre, *register.*
AUME	chaume, *thatch.* Exc.—paume, *tennis.*
E	not immediately preceded by *t* or *ti*: abrégé, *abridgment.*
EGE	collège, *college.* Exc.—Norvège, *Norway.*
EME	carême, *lent.* Exc.—crême, *cream*; brême, *bream*; birème, tirème, *galley with two or three rows of oars.*
ETRE	prêtre, *priest.* Exc.—fenêtre, *window*; guêtre, *gaiter.*
EURRE	beurre, *butter.*
IDRE	cidre, *cider.*
ISME	prisme, *prism.*
ISQUE	risque, *risk.* Exc —bisque, *soup*
ISTE	ébéniste, *cabinet-maker.* Exc.—batiste, *cambric*; liste, *list*; piste, *track.*
UGE	refuge, *refuge.*
USTE	arbuste, *shrub.*
ACE	grâce, *grace.* Exc.—espace, *space.*
ADE	parade, *parade.* Exc.—stade, *stadium*; grade, *grade.*
AIE	haie, *hedge.*
ANCE	importance, *importance.*
ANSE	danse, *dance.*
ASSE	masse, *mass.* Exc.—Parnasse, *Parnassus.*
EE	nuée, *cloud.* Exc.—apogée, *apogee*; athée, *atheist*; camée, *cameo*; colisée, *coliseum*; coryphée, *coryphæus*; empyrée, *highest heaven*; lycée, *lyceum*; mausolée, *mausoleum*; musée, *museum*; hyménée, *marriage*; périgée, *perigee*; pygmée, *pygmy*; trochée, *trochee*; trophée, *trophy*; spondée, *spondee*; scarabée, *a beetle.*
EINE	baleine, *a whale.*
ENCE	cadence, *cadence.* Exc.—silence, *silence.*
ENNE	antienne, *anthem.*
ENSE	Exc.—renne, *reindeer.* offense, *offence.*
ESSE	tristesse, *sadness.*
IE	charpie, *lint.* Exc.—génie, *genius*; périhélie, *perihelion*; incendie, *conflagration*; parapluie, *umbrella*; pavie, *clingstone peach.*
IERE	chaudière, *boiler.*
INE	doctrine, *doctrine.*
IQUE	pratique, *practice.*
IVE	rive, *shore.*
ISSE	coulisse, *sliding-shutter*
LLE	paille, *straw.* Exc.—intervalle, *interval*; libelle, *libel*; vermicelle, *vermicelli*; violoncelle, *violoncello*; chèvrefeuille, *honey-suckle*; portefeuille, *pocket-book*; vaudeville, *ballad.*
OSSE	bosse, *bunch.* Exc.—colosse, *colossus*; carrosse, *coach.*
PPE	nappe, *table-cloth.*
RRE	not preceded by *u.* terre, *land.* Exc.—lierre, *ivy*; parterre, *flower-garden*; tonnerre, *thunder*; paratonnerre, *lightning-rod*; verre, *glass.*

	Masculine.		*Feminine.*
		TIE	amitié, *friendship.*
		TTE	patte, *paw.* Exc.—amulette, *amulet*; squelette, *skeleton.*
		URE	nature, *nature.*
		USE	excuse, *excuse.*
		UVE	cuve, *tub.*
		I	
I	midi, *noon.* Exc.—foi, *faith*; fourmi, *ant*; après-midi, *afternoon*; loi, *law*; merci, *mercy.*		
		U	
U	revenu, *revenue.* Exc.—bru, *daughter-in-law*; vertu, *virtue*; glu, *bird-lime*; eau, *water*; peau, *skin*; tribu, *tribe.*		

§ 7.—Nouns Masculine in one acceptation, and Feminine in another.

Masculine.		*Feminine.*	
Aigle,	*eagle.*	Aigle,	*standard*
Aune,	*alder.*	Aune,	*ell.*
Barbe,	*Barbary horse.*	Barbe,	*beard.*
Carpe,	*wrist (anatomy).*	Carpe,	*carp.*
Cartouche,	*ornaments (sculpture).*	Cartouche,	*cartridge.*
Couple,	*male and female.*	Couple,	*a pair, a brace, two.*
Crêpe,	*crape.*	Crêpe,	*pancake.*
Délice (sing.),	*delight.*	Délices (pl.),	*delights.*
Espace,	*space.*	Espace,	*leading (in printing).*
Exemple,	*example.*	Exemple,	*writing-copy.*
Faux,	*forgery.*	Faux,	*scythe.*
Foret,	*drill.*	Forêt,	*forest.*
Greffe,	*office of clerk of a court.*	Greffe,	*graft.*
Héliotrope,	*sun flower.*	Héliotrope,	*a mineral.*
Hymne,	*classical chant.*	Hymn,	*Christian hymn*
Livre,	*book.*	Livre,	*pound.*
Manche,	*handle.*	Manche,	*sleeve.*
Mémoire,	*memoir, bill.*	Mémoire,	*memory.*
Mode,	*mode, (grammar,) system.*	Mode,	*fashion.*
Moule,	*mould, model.*	Moule;	*shell-fish.*
Œuvre (*m. & f.*),	*work.*	Œuvres,	*literary works.*
Office,	*divine service.*	Office,	*pantry.*
Ombre,	*a game.*	Ombre,	*shadow, spectre.*
Orgue (sing.),	*organ.*	Orgues (pl.),	*organ.*
Palme,	*hand, a measure.*	Palme,	*the advantage.*
Panache,	*plume.*	Panache,	*pea-hen.*
Parallèle,	*comparison.*	Parallèle,	*parallel line.*
Pendule,	*pendulum.*	Pendule,	*clock.*
Période,	*acme, height*	Période,	*period, epoch.*
Pivoine,	*a bird.*	Pivoine,	*a flower.*
Plane,	*plane-tree.*	Plane,	*joiner's tool.*
Platine,	*platina.*	Platines,	*small metallic plates.*
Poêle,	*stove, pall.*	Poêle,	*frying-pan.*
Poste,	*place, office.*	Poste,	*post-office.*
Prétexte,	*pretence.*	Prétexte,	*a Roman robe.*
Régale,	*organ-pipe.*	Régale,	*right of receiving the revenues of a vacant bishopric.*
Remise,	*hackney-coach.*	Remise,	*carriage-house.*
Serpentaire,	*constellation.*	Serpentaire,	*dragon-wort.*
Solde,	*balance of account.*	Solde,	*pay.*
Somme,	*nap, sleep.*	Somme,	*sum.*
Souris,	*smile.*	Souris,	*mouse.*
Tour,	*tour, turn, trick.*	Tour,	*tower.*
Vague,	*space, emptiness.*	Vague,	*wave.*
Vase,	*vase, vessel.*	Vase,	*mire, slime.*
Voile,	*veil.*	Voile,	*sail.*

§ 8.—Formation of the Plural of Nouns.

(1.) The plural in French, as in English, is formed by the addition of *s* to the singular:—

Singular.	*Plural.*
maison, *house*	maisons, *houses*
ville, *town*	villes, *towns*

(2.) *First exception.*—Nouns ending in the singular with *s*, *x*, or *z*, have the same form in the plural :—

Singular.	*Plural.*
fils, *son*	fils, *sons*
voix, *voice*	voix, *voices*
nez, *nose*	nez, *noses.*

(3.) *Second exception.*—Nouns ending in the singular with *au* and *eu*, take *x* in the plural :—

Singular.	*Plural.*
chapeau, *hat*	chapeaux, *hats*
feu, *fire*	feux, *fires.*

(4.) *Third exception.*—The following nouns ending in *ou* take *x* in the plural :—

Singular.	*Plural.*
bijou, *jewel*	bijoux, *jewels*
caillou, *pebble*	cailloux, *pebbles*
chou, *cabbage*	choux, *cabbages*
genou, *knee*	genoux, *knees*
hibou, *owl*	hiboux, *owls*
joujou, *plaything*	joujoux, *playthings.*

(5.) *Fourth exception.*—The following nouns ending in *ail*, change that termination into *aux* in the plural :—

Singular.	*Plural.*
bail, *lease*	baux, *leases*
corail, *coral*	coraux, *corals*
émail, *enamel*	émaux, *enamels*
soupirail, *air hole*	soupiraux, *air-holes*
sous-bail, *under-lease*	sous-baux, *under-leases*
travail, *labour*	travaux, *labours.*

(6.) *Fifth exception.*—The following nouns form their plural irregularly :—

Singular.	*Plural.*
ail, *garlic*	aux
bétail, *cattle*	bestiaux

Bercail, *sheepfold*, has no plural.

(7.) *Sixth exception.*—Nouns ending in the singular with *al*, change that termination into *aux* in the plural :*—

Singular.	*Plural.*
général, *general*	généraux, *generals*
cheval, *horse*	chevaux, *horses*
mal, *evil*	maux, *evils.*

(8.) Ciel, œil, aïeul, travail, have two plurals :—

Singular.	*Plural.*
ciel, *heaven*	cieux, *heavens*
ciel, *tester of a bed* / *sky of a picture*	ciels, *testers of beds* / *skies of pictures*
œil, *eye*	yeux, *eyes*
œil-de-bœuf, *oval window*	œils-de-bœuf, *oval windows*
aïeul, *ancestor*	aïeux, *ancestors*
aïeul, *grandfather*	aïeuls, *grandfathers*
travail, *labour*	travaux, *labours*
travail, *trave*	travails, *traves.*

BIOGRAPHY.—No. IX.

THE REV. SAMUEL LEE, D.D.

Late Regius Professor of Hebrew and Arabic in the University of Cambridge, Rector of Barley, Canon in Bristol Cathedral, etc.

THERE is something in the literary career of this gentleman so remarkable in itself, and so full of encouragement to those who have to struggle with difficulties while endeavouring to obtain knowledge, that we feel much pleasure in bringing before the readers of the *Popular Educator*, several particulars which we have collected as to his early life. It will be seen that though he received but a scanty education, and was afterwards apprenticed to a humble, though useful mechanical profession; though he began life under circumstances which appeared unfavourable to everything like scientific pursuits, he yet succeeded to attain a height and eminence, to gain which, many, under far more advantageous circumstances, have toiled in vain. The fact is that there was in Samuel Lee a latent spark, kindled by a superior agency which no earthly circumstances could smother; and which, though it long burned dimly, and at times seemed wholly eclipsed, at length burst forth with a brightness which astonished, and continued to burn steadily and usefully for a series of years, till God, who raised him up for great and important purposes, thought fit to remove him to a higher and more glorious sphere.

SAMUEL LEE was born at Longnor, near Shrewsbury, May 14, 1783. He was sent to a charity school at Longnor, and remained in it till he was about twelve years of age, receiving the first rudiments of learning, and passing through the course usually pursued at such institutions. It does not appear that he distinguished himself in any respect: he certainly gave no signs of that remarkable talent for acquiring languages, by which he afterwards obtained a lasting reputation.

On leaving school he was apprenticed to a carpenter, and underwent hardships to which few of his age readily submit, but which he appears to have borne without repining. He was fond of reading, and caught up with eagerness such books as came in his way, either in the house in which he lodged, or in houses to which he was sent to work. Meeting frequently, however, with Latin phrases and quotations which he could not comprehend, and the comprehension of which he believed to be essential to the full understanding of the passages in which they occurred, he formed a determination to learn the Latin language. He had no one to give him any direction or assistance; but being on his way one day to purchase a new tool or two, he stopped at a book-stall, a temptation he could rarely resist, when he saw a copy of "Ruddiman's Latin Grammar," marked "one shilling." Though he could ill spare a shilling at that time, being much in want of tools, he immediately bought the book, determining upon some acts of self-denial to make up for the temporary loss. On the evening of that day he set to work, committed a portion of the grammar to memory, and rested not till, by snatching every moment of leisure, he mastered the whole. The next book he purchased was the Colloquies of Corderius, with an English translation in columns opposite to the Latin; this was of great use to him, as was also Entick's Latin and English Dictionary, which he obtained soon afterwards. To these books he added Clarke's Exercises, and Beza's Latin Testament.

With these valuable aids young Lee made some proficiency. By referring to his dictionary and his Corderius, he got at the meaning of a great number of words, but, as may be readily supposed, he met with many difficulties which he was convinced he could not overcome without the assistance of a master. About this time, falling into the company of a catholic priest, he ventured to ask him for an explanation of some difficulty; the priest, however, dismissed him with a somewhat sharp repulse, saying that "charity began at home." He was much mortified, though not discouraged by this uncourteous rebuff. He persevered in his endeavours, unaided as he was, and in about a year after this incident he was able to read the Latin Bible, Florus, some of Cicero's Orations, Cæsar's Commentaries, Justin, Sallust, Virgil Horace's Odes, and Ovid's Epistles.

Thus Samuel plodded on, notwithstanding many difficulties and much self-denial, through the remainder of his apprenticeship. His term having expired, he determined to learn the Greek language, and bought—by selling one book as soon as he had mastered its contents, and purchasing another with the money—the Westminster Greek Grammar, a Greek Testament, and Schrevelius' Lexicon, with the aid of which latter he made some progress. He next obtained Huntingford's Greek Exercises, the whole of which he wrote out; and then, in pursuance of the advice given in the exercises, he read Xenophon's Cyropædia, and soon after Plato's Dialogues, some portion of Homer's Iliad and Odyssey, Pythagoras' Golden Verses, with the commentary of Hierocles, Lucian's Dialogues of the Dead, and some of the Poetæ Minores, with the Antigone of Sophocles. A proof, this, of what can be done when a man is eagerly bent on the accomplishment of an object, and when he is determined to "redeem the time" for that purpose.

Lee next directed his attention to the acquisition of Hebrew, and to assist him in this he procured Bythner's Grammar, and his Lyra Prophetica; soon afterwards he obtained a Psalter, which he read by the help of the Lyra. He next purchased Buxtorf's Grammar and Lexicon, with a Hebrew Bible. While thus engaged he seemed to be fast approaching the summit of his wishes; but he met with new interruptions to his learned pursuits. A frequent inflammation in his eyes, and every possible discourage-

* Bal, *ball*; carnaval, *carnival*; chacal, *jackal*; régal, *treat*, follow the general rule.[1]

ment from those around him, proved powerful opponents. But habit, and *a fixed determination to proceed*, had now made study his dearest recreation from manual labour, and he every day returned to it as a source of pleasure. As we have before intimated, he felt many privations in consequence of his arduous application to books, but he was amply repaid by the happiness his pursuits afforded him.

A friend of Samuel Lee's, who had made himself intimately acquainted with Lee's mode of study, has informed us—in the hope that it may stimulate some solitary unbefriended student to adopt a similar course,—that the system pursued by this astonishing instance of successful self-education in the study of Latin, Greek, and Hebrew, was, the constant exercise of analysis, or parsing; declining the nouns, adjectives, and pronouns; conjugating the verbs; examining the rules for the genders of the nouns and the tenses of the verbs; and investigating the syntax.

About this time Lee met with the Targum of Onkelos; and as he had a Chaldaic Grammar in Bythner's Lyra, with the assistance of that and Schindler's Lexicon, he was soon able to read it, to his great delight. He next proceeded to the Syriac, and read some of Gutber's Testament, by the help of Otho's Synopsis and Schindler's Lexicon. He next looked at the Samaritan, but as the Samaritan Pentateuch differs little from the Hebrew, except in a change of letters, he found no difficulty in reading it in quotations wherever he found them.

By this time Lee had attained his twenty-fifth year. He then began to consider whether it would not be necessary for him to relinquish the study of languages and apply himself to something which might be more useful to one in his humble situation. He determined to abandon his favourite pursuits: he sold his books, made new resolutions as to his future course, and took unto himself a wife. That Providence, however, which had designed him to do a great work, interfered, and circumstances induced him to betake himself to study with additional industry and perseverance. His chief property was his chest of carpenter's tools, worth about £25; and his only dependence the use of those tools. A fire broke out and destroyed his tools, and with them his hopes of subsistence. He was cast on the world without a shilling, and without a friend to lend him one. It was necessary for him to pursue some new course, and he resolved upon one in which his former studies might prove advantageous. The occupation of a country schoolmaster seemed most likely to answer his purpose; and to qualify himself for this more fully he applied himself to the study of Murray's English Exercises, and improved himself also in Arithmetic. Still he had no money, and no friend to supply it.

At this critical juncture the struggles of this would-be scholar came to the ears of Archdeacon Corbett, who sent for him, ascertained the particulars of his case, and engaged to render him assistance. To the Archdeacon he was indebted for the situation of master of the Blue School, Shrewsbury; and by the same gentleman he was introduced to Dr. Jonathan Scott (translator of the Arabian Nights), who had been secretary to Hastings in India, and Oriental Professor of the Royal Military and East India colleges. In the company of Scott, Lee had, for the first time, an opportunity of conversing upon those arduous pursuits in which he had been so long engaged, and which he had prosecuted under every discouragement, in seclusion, and amidst the privations of poverty, with such extraordinary success. Dr. Scott lent him some books in Arabic, Persian, and Hindustanee, and directed his pronunciation of those tongues. In the course of a few months he was able not only to read and translate from any Arabic or Persian manuscript, but to compose in those languages. He translated into Arabic and Persian several of Dr. Johnson's Oriental Apologues in the Rambler, and Addison's Vision of Mirza in the Spectator, which Dr. Scott pronounced to be "wonderfully well done:" they met also with the approbation of Mr. James Anderson, an oriental scholar of high standing. By perseverance, Lee perfected himself in the knowledge of the languages to which he had before applied himself, adding thereto the knowledge of French and other modern languages.

During the period that Lee was master of the charity foundation at Shrewsbury, he attended two or more schools as a teacher of arithmetic, and at a few private houses as instructor in Persian and Hindustanee to the sons of gentlemen who were in expectation of appointments in the civil or military service of the Hon. East India Company; and the progress made by his pupils proved that, in those days as well as in after life, he had the talent of conveying knowledge to others—an art not always possessed by men of learning.

In December, 1813, Lee entered Queen's College, Cambridge; where his constantly accumulating acquisitions, his great talents and industry, led to his future advancement and reputation.

The principal events in the remainder of Samuel Lee's life may be thus briefly narrated:—

1816. Published his Syriac New Testament, for which he obtained the degree of D.D. from the University of Halle in Saxony. The Syriac Old Testament was published in 1823. Editor of the Malay Scriptures, the Arabic and Coptic Psalter and Gospels, translator of Genesis into Persian; editor of Martyn's Persian and Hindustanee Testament.

1817. Took the degree of B.A.

1817 and 1818. Superintended the Hindustanee Prayer-book, and the Morning and Evening Prayers in Persic. Wrote the history of the Abyssinian and Syrian churches in the Annual Report of the Missionary Society.

1819. Elected Professor of Arabic, and the degree of M.A. conferred upon him by Royal mandate.

1820. Grammar and Vocabulary of the New Zealand language.

1821. Syloge Librorum Orientalium, and Letter to Bellamy against his translation of the Bible.

1823. Elected chaplain of the gaol, Cambridge.

1824 to 1826. His Controversy with Dr. Henderson, and edited Sir W. Jones's Persian Grammar; the second edition of this grammar, in 1828, is in fact a new work.

1824. Controversial tracts on Christianity and Mohammedanism, by Martyn.

1827. Took the degree of B.D.

1831. Elected Regius Professor of Hebrew, and Prebendary of Bristol. This preferment was bestowed upon him by Lord Brougham, then Lord Chancellor. In this year he commenced a course of lectures on the Hebrew Scriptures, which he continued for the space of about three years.

1832. Published his Hebrew Grammar; a volume containing Sermons and Dissertations on Theological subjects, and an orignal Exposition of the Book of Revelation; and the Latin Prolegomena to Bagster's Polyglot Bible.

1833. The Travels of Ibn Batuta, translated from the Arabic, for which he obtained one of the King's golden medals. Created D.D.: at his creation a high encomium was passed upon him by Dr. Turton, Regius Professor of Divinity, in an elegant Latin Oration. A Controversy with Mr. Joseph Storrs Fry, of Bristol, on the Tithe Question.

1834. Sermon on the Primitive Sabbath, and Letter to Dr. Pye Smith, on Dissent.

1837. Book of the Patriarch Job.

1840. Visitation Sermon, containing a reply to Dr. Wiseman, on the Eucharist, as held by the Syrian Church. In February, his Hebrew and English Dictionary; of this last we may say that it is, *omnium facile princeps*.

It would occupy far too large a space to enumerate all the publications of Dr. Lee; by which he rendered service alike to the Christian Church and to the world. In addition to the Prebend of Bristol Cathedral, he held the Rectory of Barley; to the pastoral duties of which he attended with much punctuality, at the same time rendering all possible service to the Bible and Missionary Societies. Although his great genius was convertible to almost any purpose, he devoted himself chiefly to the study of the word of God; his highest ambition being, as far as we can judge, to obtain a thorough knowledge of that word himself, and to be able to make it known to his fellow-creatures. Though he had opportunities of attaining the highest eminence as a linguist or mathematician, he chose rather the sacred office of a minister of Christ, and as he had acquired the knowledge of so many of the languages of "the babbling earth," he determined that the nations with whose languages he had become familiar, should read, "in their own tongues, the wonderful works of God." Dr. Lee was amiable in his general conduct, and his whole career furnishes one of the most signal and brilliant instances of the acquirement of knowledge under difficulties that we have upon record. This eminent man died in December last, at Barley Rectory, Herts, at the usual age allotted to mankind in the prayer of Moses, the man of God, which he wrote on reviewing the history of those whose carcasses fell in the wilderness, and whose wanderings were a fit emblem of human life: "The days of our years are three-score years and ten." And well may it be added from the apostle James, "What is your life? It is even a vapour that appeareth for a little time, and then vanisheth away."

LESSONS IN NATURAL HISTORY.—No. XIV.

THE WEASEL.

(*Order* CARNIVORA.)

THE weasel is of a pale-reddish brown on the back, sides, and legs; the throat and belly are white; on each side under the corners of the mouth there is a brown spot; its ears are small and rounded; its eyes are small, black, and sparkling; its teeth are exceedingly sharp; and it has long whiskers like a cat. The length of the weasel does not exceed seven inches from the nose to the tail, and its height is little more than two inches and a half.

This animal, which is common in all parts of Britain, is lively and active, and being alike bold and fierce, it proves exceedingly destructive in farm-yards and warrens. Voracious in devouring eggs, it makes a small hole in the end of each, and sucks out the contents, leaving the shell entire. As the rat, on the contrary, usually drags the egg from the nest, and either makes a large hole in it, or breaks it into pieces, the farmer can readily tell which of these animals has invaded his premises.

THE WEASEL.

He is conscious, however, that the weasel, unlike the rat, may render him much service. It is more than a match for the largest rat, to which species it is a mortal enemy, and can thus rid the stack-yards and barns of these destructive vermin. It is even more useful than the cat in destroying rats, as from the slenderness of its body it can pursue them into their holes, and readily make them a prey. Mice, another plague of the farmer, are, of course, easy victims of the weasel.

With movements singularly graceful, the weasel climbs trees, and runs up the sides of a wall. It hunts by scent, like a dog, and tracks moles, with the utmost perseverance, through all their runs and winding galleries. It will even cross the water in the pursuit if its prey be in sight, nor does swiftness avail, for the weasel will travel onwards till its victim fails from exhaustion. Mr. Bell states that a kite, which had seized a weasel and mounted into the air, was observed to wheel irregularly, and at length to fall to the ground dead, the determined little animal having torn open the skin and large blood-vessels under the wing of the bird.

It is said that the weasel prefers meat which has become putrid, to that which has just been killed. Buffon says that one of these animals, with three of its young, were taken out of the carcass of a wolf which had been hung on a tree by the hind feet. The wolf was almost entirely putrified; yet the weasel had made a nest of leaves and herbage for her young in the thorax, or throat, of the corrupted carcass.

Instances are recorded in which several weasels have united in attacking men, and two of them are said to be a match for a dog. To take an example: a labourer in the parish of Glencairn, Dumfriesshire, was suddenly attacked by six weasels, which rushed upon him from an old dyke in the field where he was at work. Alarmed at such a furious onset, the man instantly betook himself to flight, but he soon found he was closely pursued; and although he had a large horse-whip, with which he endeavoured by several back-handed strokes to stop his assailants, yet they eagerly continued the pursuit. On the very point of being seized by the throat, he happily noticed at some distance the fallen branch of a tree, which he made for, and instantly snatching it up, he manfully rallied upon his enemies, and with such success that he speedily killed three of them, and put the remaining three to flight.

In another case, escape from the ferocity of some of these creatures was not so easy. An aged woman was on Shap Fells, when somewhat weary with a long walk, and observing an irregular pile of lichen-covered stones not far from the mountain-path, she sat down on one of them to rest. Scarcely had she done so, when she observed a weasel peep from beneath a mossy stone, and at the same time heard the sounds it uttered, indicating its high displeasure. But little disturbed—as she had seen and heard weasels before—by its so doing, she naturally became much alarmed when one after another appeared, equally angry, until there was a troop of these creatures. Some of them scrambled up her clothes, and one or two got as high as her neck and shoulders. She struck and kicked at them, and succeeded in laming some and killing others, when providentially a shepherd's dog, having been attracted to the place by the skirmish, came to the top of a neighbouring bank, and began to bark with all his might. The instant the vermin heard the noise of the dog, they disappeared under the large stones, and the assailed female made her escape with hurried steps.

The weasel often falls a prey to hawks, owls, and kites. It

breeds two or three times a year, and has a litter of five at a birth. She makes her nest of dried herbage; it is generally placed in a hole in the side of a bank, among brambles, or in an aged tree; and when molested, she defends herself and her young, as might be expected with the utmost courage.

In addition to the genus well-known in our country, there is another of the *mephitic* weasels, so called from their emitting an intolerable odour. Their distinguishing colour is black, rather abruptly cut up on the back by longitudinal stripes of white. The nails of the fore-feet are strong, and well adapted for digging, and the tail is long and bushy. These animals are slow in their movements, and they have neither propensities so carnivorous, nor a disposition so daring as some of the creatures to which they are allied. Their means of defence is very remarkable. It consists in the properties they possess of emitting at will a peculiar liquid secretion, the odour of which is so disgusting that every animal retreats dismayed from its presence. A single drop on a garment renders it useless thenceforward, as it can neither be purified by washing or exposing to the air, and the whole house becomes tainted if it be suffered to remain.

LESSONS IN GERMAN.—No. XXXV.

Section LXXI.

Auf eine Rechnung ſetzen, answers to our "place to an account;" as, dieſe Bücher können Sie auf meine Rechnung ſetzen; these books you may place or charge to my account. So also: Er machte ſich auf meine Rechnung luſtig; he made himself merry at my expense.

I. Preis geben, literally to give as a prize, and hence, to expose, to give at discretion, is compounded of Preis, *prize* and geben, *to give*. Ex.: Er hat mich verlaſſen und mich meinen Feinden Preis gegeben; he has deserted me, and exposed me to my enemies.

II. Hervor (forth, out), is compounded with many verbs and often expresses mere prominence; as, Er hat dieſen Punkt beſonders hervorgehoben; he has given this point especial importance.

Exercise 74

Abſicht'lich, purposely;
Ab'weſend, absent;
Anbruch, *m.* break, beginning;
Artig, kind, well-behaved;
Befreien, to set free;
Behaupt'ung, *f.* assertion, statement;
Beſſ'erung, *f.* improvement;
Büßen, to atone for, suffer for;
Entſchul'digen, to excuse, exculpate;
Erbittern, to embitter;
Erklären, to declare;
Erſticken, to suffocate;
Hervor'heben, (See II.);
Hitze, *f.* heat;
Januar, *m.* January:
Keineswegs, in no wise, by no means;
Luſtig, merry;
Namentlich, especially;
Oeff'entlich, openly;
Pflanze, *f.* plant;
Preis'geben, (See I.);
Rauch, *m.* smoke;
Rechnung, *f.* account, score;
Strafbar, punishable;
Verle'genheit, *f.* embarrassment, dilemma;
Verſchul'den, to commit a wrong;
Verzö'gerung, *f.* delay, putting off;
Wacker, valiant, gallant;
Zart, tender, frail.

Er ließ Alles, was er holte, auf meine Rechnung ſetzen; allein ich werde nur das bezahlen, was ich ſelbſt geholt' habe.	He had everything that he went for placed to my account, but I shall only pay (for) what I went for ("got") myself.
Er ſuchte Alles, was er verübt' hatte, von ſich ab und auf meine Rechnung zu bringen.	All that he had committed, he sought to remove from himself, and bring to my charge.
Ich mag weder auf Rechnung eines Andern ſpotten, noch mich ſelber dem Geſpötte Preis geben.	I wish neither to scoff at the expense of another, nor expose myself to (the) ridicule.
Ich habe die Arbeit gethan' und verlan'ge nun meinen Lohn.	I have done the work, and now demand my pay.
Von nun an hatte das Leben allen Reiz für ihn verlo'ren	From now (this time forward) life had lost all attraction for him.
Endlich langte die verſproch'ene Hülfe an.	Finally the promised aid arrived.

1. Entſchuldigen Sie mich, mein Herr, es iſt nicht vorſätzlich geſchehen. 2. Wenn er es abſichtlich gethan hat, ſo iſt er keineswegs zu entſchuldigen. 3. Obgleich Sie es nicht mit Abſicht gethan haben, ſo iſt es doch ſtrafbar. 4. Hätten Sie es vorſätzlich gethan, ſo müßten Sie ſich ſchämen. 5. Den Gefangenen hat man abſichtlich befreit. 6. Dieſer Mann hat nicht abſichtlich dieſe Verzögerung herbeigeführt. 7. So lange noch ſolche Männer an der Spitze des Staates ſtehen, können wir an keine Beſſerung denken. 8. So lange als ich keine Beſchäftigung habe, kann ich nicht zufrieden ſein. 9. So lange als ihr artig ſeid, ſollt ihr alles haben, was ihr braucht. 10. So lange als die Welt ſteht, hat man keine ſolche Behauptung gemacht. 11. Ich arbeite für dich ſo lange, als du krank biſt. 12. Wir ſorgten für ſeine ganze Familie, ſo lange als er abweſend war. 13. Sie können, ſo lange als Sie wünſchen in meinem Hauſe wohnen. 14. Wenn er ſich nicht ſo lange aufhält, ſo kann er auch meine Briefe nicht mehr bekommen. 15. Dieſer Mann arbeitet von Anbruch des Tages bis ſpät in die Nacht. 16. Von jetzt an gehe ich alle Tage vom Fluß bis an den Berg ſpazieren. 17. Ich habe nun einen Brief erhalten und werde, ſo bald als ich kann, zu meinen Freunden reiſen. 18. Bis den zwanzigſten Januar erhalte ich nun mein Geld. 19. Da ich jetzt angekommen bin, ſo werde ich mit ihm ſprechen, ſo bald als ich ihn ſehe. 20. Bis ihr endlich gekommen ſeid, iſt es Nacht geworden. 21. Von nun an wollen wir Freunde ſein. 22. Bis es Abend wird, wollen wir in der Stadt bleiben. 23. Der Kaufmann ſetzte Alles auf eine Rechnung. 24. Was ihr gethan habt, kommt jetzt auf meine Rechnung, und ich muß büßen, was ihr verſchuldet habt. 25. Es iſt heute eine erſtickende Hitze. 26. Der Unglückliche erſtickte in dem Rauche. 27. Das Unkraut erſtickt die zarten Pflanzen. 28. Die Stadt wurde den erbitterten Soldaten Preis gegeben. 29. Er wurde ſeinem Schickſale Preis gegeben. 30. Er hob ſein wackeres Betragen hervor und lobte ihn öffentlich. 31. Er konnte in ſeiner Verlegenheit kein Wort hervorbringen. 32. Nach langem Suchen brachte ſie ein altes Buch hervor.

1. The books, which I bought of you, you may charge to my account. 2. The conquerors made themselves merry at the expense of their enemies. 3. As long as the man has employment, he may be contented. 4. As long as the world stands, the word of God will never vanish. 5. I will work for my friend as long as he is ill. 6. As long as the scholars are diligent, their teacher will praise them. 7. You can remain with my family as long as you wish. 8. If you remain till I have finished these letters, you may take them to my friend. 9. From now, we shall give more time to study. 10. The ship was exposed to the wind and waves. 11. From the break of day till late in the evening the town was exposed to the fire of the enemy. 12. The sun breaks forth between the clouds. 13. The Athenians declared, none but Jupiter should henceforth reign in Athens. 14. As long as my heart approves of my conduct, the censure of the people shall give me no pain. 15. He has given to the last point in his speech especial importance. 16. They were amusing themselves at his expense, and he did not perceive it.

Section LXXII.

PASSIVE VERBS IN THE INDICATIVE.

The passive is formed by placing the auxiliary „werden" (*to become, to be,*) before the past participle of the main verb. (§ 84. § 85.) In the perfect, pluperfect, and second future tenses, the participle of werden rejects the augment „ge" and is to be rendered by "*been.*" Ex.: Er iſt geliebt worden (not ge worden); he has *been* loved. The verb „ſein" is also used in these tenses, but, with the signification of "*have.*" Ex.: Er iſt geliebt worden; he *has* been loved. Er war gelobt worden; he *had* been praised. Er wird gelobt worden ſein; he will *have* been praised.

Many intransitive verbs are used impersonally in the passive. Ex.: Es wurde bis ſpät in die Nacht gefochten; the fighting (it was fought, &c.) was continued till late in the night. Es wurde ihm von allen Seiten zu Hülfe geeilt; from all sides it was hastened to his assistance. Es wird in dem Garten von den Kindern geſpielt; it is played by the children in the garden. Es wurden in dem Concert einige ſchöne Lieder geſungen; there (it) were sung some beautiful songs in the concert.

Exercise 75.

Al'penlied, *n.* song of the Alps;
An'erkennen, to acknowledge, own;
Au'genblick, *m.* moment, twinkling (of an eye);
Aus'machen, to find out, ascertain;
Briefträger, *m.* letter-carrier;
Componiren, to compose;
Dereinst, once, one day, in the future;
Erbitterung, *f.* exasperation, animosity;
Erkennen, to perceive, recognise;
Erklettern, to climb, scramble up;
Ermorden, to murder;
Ernst, earnest;
Gemsenjäger, *m.* chamois-hunter;
Gericht, *m.* judgment;
Heidnisch, heathenish; heathen, pagan;
Hoffentlich, it is to be hoped, as I hope;
Je nachdem, as, according as;
Kostbar, costly, expensive;
Nachlässig, neglectful;
Mitwirkung, *f.* cooperation;
Priester, *m.* priest;
Rechtlich, honest, upright;
Schlagen, to beat, strike;
Schmieden, to bind with chains;
Schmücken, to adorn, attire;
Tadeln, to blame, cast a blame upon one;
Unbenützt, not used, not availed of;
Unschuld, *f.* innocence;
Verachten, to despise;
Verleumden, to backbite, calumniate;
Versammeln, to assemble, meet;
Verurtheilen, to doom, condemn;
Wüste, *f.* desert, wilderness;
Zeugniß, *n.* testimony.

Viele Menschen werden ihres Reichthums, nicht ihrer Verdien'ste wegen geachtet.
Many persons are honoured on account of their riches, not on account of their merits.

Am Ende der Schlacht wurden die Tap'ferſten mit Lorbeer bekränzt'
At the end of the battle the most valiant were crowned with laurels.

Das Buch des Schicksals ist von Gottes Hand verschloss'en worden, und kein Sterb'licher vermag' einen Blick in seine geheimnißvollen Blätter zu thun.
The book of fate has been closed by the hand of God, and no mortal is able to cast a look upon (into) its mysterious pages (leaves).

Dem reichen Cröſus war von dem Ora'kel das Ende seiner Herr'lichkeit verkün'digt worden.
To the rich Cræsus, the end of his splendour had been announced by the oracle.

So lange Zwietracht und Wi'derspruch unter den Menschen herrscht, (§ 136. 3.) so lange werden die wich'tigsten Wahr'heiten bekämpft' werden.
So long as discord and contradiction reign among mankind, so long will the most weighty truths be contested

Ruhe und Friede werden erst dann in diese Thäler zurück'kehren, wenn der Feind gänzlich geschla'gen worden sein wird.
Repose and peace will first return to these valleys when the enemy shall have been utterly defeated.

1. Der Lehrer liebt und lobt den fleißigen Schüler.=Der fleißige Schüler wird von dem Lehrer geliebt und gelobt. 2. Der Jäger schießt nicht nur Wölfe und Bären, sondern auch Vögel.=Nicht nur Wölfe und Bären, sondern auch Vögel werden von dem Jäger geschossen. 3. Die Mutter warnte den Sohn.=Der Sohn wurde von der Mutter gewarnt. 4. Der Briefträger brachte einen Brief.=Der Brief wurde von dem Briefträger gebracht. 5. Der Jude hat das Pferd des armen Mannes gekauft.=Das Pferd des armen Mannes ist von dem Juden gekauft worden. 6. Der Schweizer hat die Alpenlieder schön gesungen.=Die Alpenlieder sind von dem Schweizer schön gesungen worden. 7. Das Kind hat das Buch vergessen.=Das Buch war von dem Kinde vergessen worden. 8. Der Metzger hat das Kalb geschlachtet.=Das Kalb war von dem Metzger geschlachtet worden. 9. Der Feldherr wird seine Soldaten loben.=Die Soldaten werden von dem Feldherrn gelobt werden. 10. Gott wird das Gute belohnen.=Das Gute wird von Gott belohnt werden 11 Der Nachbar wird dem Freunde geholfen haben =Dem Freunde wird von dem Nachbarn geholfen worden sein. 12. Der heidnische Priester wird das arme Mädchen geopfert haben.=Das arme Mädchen wird von dem heidnischen Priester geopfert worden sein. 13 Cäsar ist unter Mitwirkung seines Freundes Brutus ermordet worden. 14. Die steilsten Felsen werden von den Gemsenjägern erklettert. 15. Der günstige Augenblick wird von dem Klugen ergriffen. 16. Es wurde in einer halben Stunde mehr gethan, denn sonst in einer ganzen. 17. Der Streit wurde auf beiden Seiten mit großer Erbitterung geführt. 18. Schon manche kostbare Stunde ist un, benützt geblieben. 19. Das Werk ist endlich vollendet worden und wird in den ersten Tagen erscheinen. 20. Endlich ist es ausgemacht worden, wer der Dieb ist. 21. Die Brücke wurde durch das Eis mit fortgerissen. 22. Die Kameele werden in der Wüste oft von den Reisenden geschlachtet, um Wasser zu erhalten. 23. Die Söhne des Brutus waren von ihrem Vater zum Tode verurtheilt worden. 24. Prometheus war von Jupiter an einen Felsen geschmiedet worden. 25. Die Sache wird sehr interessant werden. 26. Hoffentlich wird der Feind geschlagen worden sein. 27 Es wird dereinst ein ernstes Gericht gehalten werden, nachdem alle Völker versammelt worden sein. 28. Viele werden gelobt werden, welche Tadel erwarteten, und Viele getadelt worden sein, welche ein Lob erwartet hatten. 29. Der Jüngling war verleumdet worden. 30. Die Unschuld desselben wird erkannt werden, nachdem seine rechtlichen Handlungen werden erkannt worden sein. 31. Die Tapferſten des Heeres werden belohnt werden, je nachdem ihre Thaten werden anerkannt worden sein.

1. The mother warned the son.=The son was warned by the mother. 2. Romulus founded Rome.=Rome was founded by Romulus. 3. The Gauls burnt it.=It was burnt by the Gauls. 4. Mr. G. composed this song, and Mr. N. sang it.=This song was composed by Mr. G. and was sung by Mr. N. 5. We love and seek skilful people.=Skilful people are loved and sought; but unskilful people are generally despised. 9. A man often neglects his duties, while thinking of his pleasures. 10. Most sacred duties have often been neglected while we have been devoted too much to pleasure. 11. The hat of the victor had been adorned with flowers. 12. The most valiant of the army will be rewarded, according as their actions are acknowledged. 13. Thy sister is loved and praised by her teacher, because she is diligent and attentive; but thou wilt be censured by thine, because thou dost not like to work. 14. Charles has been punished because he had not finished his exercise. 15. We were praised by our teacher while we were diligent. 16. Our friend has been punished, because he had been neglectful. 16. Thou hast had the pleasure of passing some days with thy parents in the country; thou hast been praised and rewarded by them, because thy teacher has given thee a favourable testimony. 17. His brother would have been better received.

Section LXXIII.

Passive verbs in the subjunctive. (§ 85.)

Exercise 76.

Abbrechen, to break off, crop, pluck;
Auffallend, startling, striking, remarkable;
Ausrufen, to call out;
Aeußere, *n.* countenance, exterior;
Befürchten, to fear, apprehend;
Begnadigen, to pardon, favour;
Beißen, to bite;
Besatzung, *f.* garrison;
Bestechung, *f.* corruption, bribery;
Carthago, *n.* Carthage;
Darbieten, to present, offer;
Dafür halten, to be of opinion, to deem;
Ehren, to honour, respect, esteem;
Einnehmen, to occupy, take possession of;
Fortschleppen, to drag, pull along;
Graben, to dig, grub, ditch;
Griechisch, Greek, Hellenic;
Hintergehen, to deceive, delude;
Hirsch, *m.* stag, hart, deer;
Klagen, to complain lament;
Lösen, to solve, unriddle;
Orakel, *n.* oracle;
Räthsel, *n.* riddle, enigma;
Spiel, *n.* game, play;
Troja, *n.* Troy;
Ue'bermaß, *n.* excess, superfluity;
Ue'brigens, as for the rest, besides;
Verkün'digen, to announce, perdict;
Vermu'then, to suppose, presume, think.

Er wollte nicht erlau'ben, daß jener Mann gerufen werde.
He would not allow, that that man should be called.

Sie hatten vergeb'ens gehofft', daß die vielen kleinen Herzogthümer in Provin'zen eingetheilt würden.
They had vainly hoped, that the many little Dukedoms would be divided into provinces.

Man glaubt, daß bei diesem letzten Sturme viele Schiffe verschlagen worden seien
It is supposed, that by this late (last) storm, many vessels have been cast away.

Er erzähl'te mir, daß meine Ab'handlungen über diesen Ge'genstand sehr gelobt' worden wäre,
He told (Sect. 83. I.) me, that my negotiation concerning this affair, han been very much lauded.

Da die fürſtliche Familie gegenwärtig iſt, ſo vermuthet man, daß dieſen Abend ein großes Concert werde gegeben werden.	Since the princely family is present, it is conjectured, that a great concert will be given this evening.
Ich hoffe, daß in kurzer Zeit alle Hinderniſſe von ihm werden überwunden worden ſein.	I hope, that in (a) short time, all hindrances will have been surmounted by him.

1. Es wird geſagt, daß der Schauſpieler eine Vorſtellung gebe.=Es wird geſagt, daß eine Vorſtellung von dem Schauſpieler gegeben werde. 2. Der Nachbar glaubt, daß der Knabe ſeine Eltern täuſche.=Der Nachbar glaubt, daß die Eltern von dem Knaben getäuſcht werden. 3. Die Kinder ſagten, der Jäger ſchöſſe den Hirſch.=Die Kinder ſagten, der Hirſch würde von dem Jäger geſchoſſen. 4. Man befürchtet, der Hund beiße die Leute.=Man befürchtet, die Leute würden von dem Hunde gebiſſen. 5. Man vermuthet, der Freund habe den Freund hintergangen.=Man vermuthet, der Freund ſei vom Freunde hintergangen worden. 6. Der Vater meinte, daß die Kinder geſpielt hätten.=Der Vater meinte, daß von den Kindern geſpielt worden wäre. 7. Er erzählte mir, daß die Mädchen die Blumen in ſeinem Garten abgebrochen hätten.=Er erzählte mir, daß die Blumen in ſeinem Garten von den Mädchen wären abgebrochen worden. 8. Der alte Soldat rief aus, daß er ſeinen Feldherrn nie vergeſſen werde.=Der alte Soldat rief aus, daß ſein Feldherr nie von ihm werde vergeſſen werden. 9. Die Mutter ſagte, ſie werde dieſen Nachmittag im Garten graben.=Die Mutter ſagte, es werde dieſen Nachmittag im Garten von ihr gegraben werden. 10. Ich möchte wiſſen, ob ſie ihn werden geehrt haben.=Ich möchte wiſſen, ob er von ihnen werde geehrt worden ſein. 11. Ich dachte nicht anders, als daß er das Spiel werde gewonnen haben.=Ich dachte nicht anders, als daß das Spiel von ihm werde gewonnen worden ſein. 12. Das Orakel verkündigte ihm, er werde ſiegen. 13. Er ſagte mir, er werde von Jedermann geliebt und geachtet. 14. Er behauptet, das Räthſel ſei durch ihn gelöſt worden. 15. Die Geſchichte meldet, daß Troja von den griechiſchen Fürſten zerſtört worden ſei. 16 Er ſagte ihm, er würde ſeinetwegen (Sect. 74.) Alles zu thun bereit ſein. 17. Der Freund beklagte ſich, daß er ſo wenig von mir beſucht würde. 18. Man ſagt, Ungarn ſei durch Beſtechung, nicht durch Gewalt der Waffen, beſiegt worden. 19. Mein Nachbar ſagte mir, das Aeußere dieſes Mannes böte nichts Auffallendes dar, aber ſeine Seele würde geziert durch eine Menge trefflicher Eigenſchaften. 20. Der alte Cato ſchloß eine jede Rede mit den Worten: Uebrigens halte ich dafür, daß Carthago zerſtört werde. 21. Man vermuthet, die Feſtung ſei von den Feinden eingenommen worden, allein die Beſatzung werde begnadigt worden ſein. 22 Der Jüngling ſagte, es werde noch Vieles von ihm gethan werden. 23. Der betrübte Vater glaubt, ſein Sohn werde von dem erbitterten Feinde erſchoſſen worden ſein. 24. Die Freundin behauptete, daß das Unglück durch die Schuld des Nachbars herbeigeführt worden wäre. 25. Der Arme klagte, daß er gewaltſam fortgeſchleppt worden wäre.

1. It was said, that everybody would love those children.=It was said, those children would be loved by everybody. 2. The teacher believes, that the scholars could have learned their exercise. The teacher believes, that the exercise could have been learned by the scholars. 3. The gardener said, he would dig to-morrow in the garden.=The gardener said, it would be dug by him to morrow. 4. We wish that you may love and esteem your friends.=We wish that your friends may be loved and esteemed by you. 5. We believed not that we should ever have been praised by our teachers, and that we should have satisfied them in everything. 6. It is impossible that you could have received the intelligence before us, except it might have been communicated to you by telegraph. 7. How is it possible, that this undertaking could have been finished by you? 11. We doubt very much, that we can ever be rewarded for our troubles, and that the promises can ever be fulfilled. 12. How could it be possible, that that people was governed badly, when it had so wise and good a prince. 13. The poor slave complained that he had been forcibly dragged along, and in the excess of his grief he cried out: "Oh, that I had never been born!"

Tout est grand dans le temple de la faveur, excepté les portes, qui sont si basses qu'il faut y entrer en rampant.—*Levis.*

LESSONS IN GEOGRAPHY.—No. XVII

THE MAP OF EUROPE.

The continent of Europe forms the north-western part of world, or great triple continent in the eastern hemisphere, wholly within the northern hemisphere, to the north-east, e south-east of the British isles. This continent is situated wholly within the north temperate zone, with the exception of the more northern parts of No'rway, Swe'den and Russia lie within the north frigid zone. Europe is bounded on th by the Arctic Ocean; on the south, by the Mediterra'nean parts—the gulfs of Ly'ons, Ge'noa, and Ve'nice, the Archipe'la Sea of Ma'rmora, the Black Sea, the Sea of Az'of, and the c Mount Cau'casus; on the east, by Asia, which is separated f by the chain of the Oural Mountains, the river Ou'ral, Ca'spian Sea; and on the west by the north Atla'ntic Ocean. continent extends from Lat. 71° 6′ N. to Lat. 36° 6′ N. an Long. 9° 31′ W. to Long. 64° 30′ E. Its length, from C Vi'ncent in Portugal, to the north-eastern extremity of Rus Europe, is about 3,500 miles; and its breadth varies from half its length, or 1,750 miles, to 757 miles, the distance Da'ntzig on the Ba'ltic to Ode'ssa on the Black Sea, right the middle of the continent. The most northerly point of E is usually considered to be the *North Cape*, in Lat. 71° 10′ N Long. 26° 1′ E; the most southerly point is called Euro'pa in Lat. 36° 6′ N. and Long. 5° 21′ W.; the most easterly po scarcely defined, being in the range of the Oural Mountains, the mouth of the river Kara; and the most westerly point is Roca near Lisbon, in Lat. 38° 47′ N. and Long. 9° 31′ W.

The surface of the land in Europe contains, according t latest estimate, about 3½ millions of square miles, or more e 3,586,187 square miles; and its population is upwards o millions, or more exactly 262,874,500. Hence, there are i continent on an average about 73 inhabitants to every square but as Russia in Europe is reckoned to contain about two mi of square miles, or more than half of the continent, and to h population of about 60 millions, or less than one-fourth of th the whole continent,—it follows, that in Russia there are o average about 30 inhabitants to every square mile, and in the of the continent on an average about 122 inhabitants to every sq mile. The surface of the inland seas belonging to Europ estimated at nearly 1½ millions of square miles, or more accur at 1,483,000 square miles, distributed in the following proporti the White Sea, in the North of Russia, 38,000; the Ba'ltic between Sweden and Russia, having Ge'rmany on the south, De'nmark at its entrance, 135,000; the Mediterra'nean or Great lying south of Europe, about 1,000,000; the Black Sea, sout Russia, 180,000; and the Caspian Sea or Great Inland L 130,000. The part of the Atlantic Ocean which flows betw Great Britain and the continent is called the German Ocear North Sea; its passage on the south is called the English Chan and at the narrowest part the Strait of Dover, which is about miles across, and is reckoned 200 feet at its greatest depth. entrance to the Baltic or East Sea, is by a channel of which part between No'rway and De'nmark is called the Skagar-R and the part between Swe'den and Denmark the Kattegat; in latter part, there are three straits called the Sound, about 2½ m wide, the Great Belt about 8 miles wide, and the Little Belt ab three-quarters of a mile wide. In the northern part of the Ba are the Gulfs of Bo'thnia, Fi'nland and Ri'ga. On the west France and North of Spain, lies a part of the Atla'ntic called Bay of Bi'scay. South of Spain between Eu'rope and A'fr lies the entrance to the Mediterra'nean, called the Strait of G ra'ltar, which is about 13 miles broad in the narrowest part, about 1,000 feet deep.

The length of the Mediterra'nean is reckoned about 2,400 mi and its greatest depth upwards of 6,000 feet, or more than a n and a furlong; and its waters are more salt than those of Atla'ntic, from which a strong current runs continually into former. The tides in the Mediterranean are, owing to its n row entrance, very small, and in many places scarcely perceptil The Gulf of Venice or the Adria'tic Sea is an arm of the Me di ranean which lies east of Italy and south of the Austrian do nions; and the Archipe'lago (anciently the Ægean Sea), another s between Greece and Asia Minor, studded with islands famous ancient history. The waters of the Archipelago communicate w

those of the Sea of Ma'rmora (anciently the Propontis) through a narrow channel or strait called the Dardanelles (anciently the Hellespont), about half a mile in width at its narrowest part; those of the Sea of Marmora with those of the Black Sea (anciently the Euxine Sea) by the Strait of Constantinople (anciently the Thra'cian Bo'sphorus), which is still narrower than the former; and those of the Black Sea with those of the Sea of Az'of or Azov (anciently the Pa'lus Mæ'otis, *the Mæotian Fen*) by the Strait of Jenikale (anciently the Cimm'erian Bo'sphorus, *i.e.*, the Cimmerian *Ox-Ford*), about a mile and a half wide. The eastern part of the Mediterranean adjoining Turkey in Asia is called the Levant (from the French, levant, *rising*), because to the inhabitants along the northern and southern shores of the Great Sea the sun appears to rise in that quarter of the horizon. The waters of the Caspian Sea or Lake are not superficially (that is, on the surface of the land) connected with those of the Mediterranean, being separated from them by the Caucasian chain of mountains. Owing to the indentation of the continent of Europe by seas, bays, and gulfs, it has a greater line of sea-coast, in proportion to its size, than any other continent on the face of the globe; and lying almost wholly within the north temperate zone, it is better adapted for the health, convenience, and commercial intercourse of its inhabitants. Hence its superiority in point of power, intelligence, and wealth to all the other continents. The total length of its sea-coast is estimated at nearly twenty thousand miles, or only about one-fifth part less than the circumference of the globe.

COUNTRIES, KINGDOMS, EMPIRES, AND STATES OF EUROPE.

Countries.	Capitals.	Latitudes.	Longitudes.	Present Ruler.	Form of Government.
Russia in Europe	St. Petersburg	59° 57′ N.	30° 19′ E.	Nicholas I.	Absolute Monarchy
Poland	Warsaw	52 14	21 3		
Norway	Christiania	59 54	10 45	Oscar I.	Limited Monarchy
Sweden	Stockholm	59 21	18 4		
Denmark	Copenhagen	55 41	12 35	Frederick VII.	Limited Monarchy
Holstein (3)	Altona	53 33	9 57		
England and Wales	London	51 31	0 6 W.	Victoria I.	Limited Monarchy
Scotland	Edinburgh	55 57	3 11		
Ireland	Dublin	53 23	6 21		
France	Paris	48 50	2 20 E.	Napoleon III.	Absolute Monarchy
Germany (70)	Frankfort	50 7	8 36	The Diet	Confederate States
Austria (4)	Vienna	48 13	16 23	Francis Joseph I.	Absolute Monarchy
Hungary	Pesth-Buda	47 29	19 3		
Gallitzia, or Austrian Poland	Lemberg	49 48	24 5		
Lombardy, Venice — Austrian Italy	Milan	45 28	9 12		
	Venice	45 26	12 21		
Prussia (4)	Berlin	52 31	13 24	Frederick William IV.	Absolute Monarchy
Holland	Amsterdam	52 22	4 53	William III.	Limited Monarchy
Belgium	Brussels	50 51	4 22	Leopold I.	Limited Monarchy
Bavaria (4)	Munich	48 9	11 37	Maximilian II.	Limited Monarchy
Wurtemberg (4)	Stuttgard	48 46	9 11	William	Monarchy.
Saxony (4)	Dresden	51 3	13 43	Frederick Augustus	Limited Monarchy
Hanover (4)	Hanover	52 22	9 43	George Frederick	Monarchy.
Baden (3)	Carlsruhe	49 0	8 25	Chs. Leopold Frederick	Grand Dutchy
Mecklenburg states (2)	Schwerin	53 38	11 30	Frederick Francis	G. Dutchy
Mecklenburg states (1)	Strelitz	53 25	13 10	George V.	G. Dutchy
Hessen states (3)	Cassel	51 19	9 35	Frederick William	Electorate
Hessen states (3)	Darmstadt	49 56	8 35	Louis III.	Grand Dutchy
Hessen states (1)	Homburg	50 15	8 30	Ferdinand	Landgraviate
Brunswick (2)	Brunswick	52 16	10 32	William	G. Dutchy
Holstein-Oldenburg (1)	Oldenburg	53 9	8 15	Augustus	Grand Dutchy
Nassau (2)	Wiesbaden	50 6	8 9	Adolphus	G. Dutchy
Luxemburg (3)	Luxemburg	49 38	6 10	(see Holland)	G. Dutchy
Saxon states (1)	Weimar	50 59	11 21	Charles Frederick	Grand Dutchy
Saxon states (1)	Coburg-Gotha	50 56	10 44	Ernest II.	Dutchy
Saxon states (1)	Meiningen	50 35	10 24	Bernard	Dutchy
Saxon states (1)	Altenburg	50 58	12 20	Joseph	Dutchy
Saxon states (1)	Hildeburghausen	50 27	10 43		
Anhalt states (3)	Dessau	51 48	12 18	Leopold	Dutchy
Schwarzburg states (2)	Sonderhausen	51 23	10 50	Guather II.	Principality
Hohenzollern states (2)	Hechingen	48 22	8 55	Frederick William	Principality
Lippe states (2)	Detmold	51 54	8 50	Leopold	Principality
Reuss states (2)	Greitz	50 40	12 15	Henry XX.	Principality
Waldeck (1)	Corbach	51 22	8 50	George Victor	Principality
Lichtenstein (1)	Vadutz	47 8	9 32	Aloys Joseph	Principality
Hanse towns (1)	Hamburg	53 33	9 59	The Senate	Republican
Hanse towns (1)	Lubeck	53 51	10 50		Republican
Hanse towns (1)	Bremen	53 5	8 48		Republican
Hanse towns (1)	Frankfort	50 7	8 36		Republican
Switzerland	Berne	46 57	7 26	The Diet	Republican
Spain	Madrid	40 25	3 42 W.	Isabella II.	Limited Monarchy
Portugal	Lisbon	38 43	9 8	Maria II.	Limited Monarchy
Italy	Rome	41 54	12 29 E.	The Pope	Ecclesiastical Monarchy
The Two Sardinias — Insular	Cagliari	9 18	9 6	Victor Emanuel	Monarchy
The Two Sardinias — Continental	Turin	45 4	7 43		
Tuscany	Florence	43 47	11 16	Leopold II.	Grand Dutchy
Popedom	Rome	41 54	12 29	Pope Pius IX.	Absolute Monarchy
The Two Sicilies — Naples	Naples	40 52	14 15	Ferdinand	Monarchy
The Two Sicilies — Sicily	Palermo	38 7	13 21		
Modena	Modena	44 39	10 56	Francis V.	Dutchy
Parma	Parma	44 48	10 27	Charles Louis	Dutchy
Lucca	Lucca	43 55	10 30		Dutchy
San Marino	S. Marino	43 57	12 20		Republican.
Turkey	Constantinople	41 1	28 55	Abdul Mejid	Absolute Monarchy
Greece	Athens	37 58	23 46	Otho	Limited Monarchy

In the north of Europe there are only two peninsulas worthy of particular notice, namely, the Great Scandinavian Peninsula, which includes Sweden and Norway, and lies between the Baltic Sea and the North Atlantic Ocean; and the Peninsula of Jutland, which includes continental Denmark, and lies between the Kattegut and the North Sea. It is joined to the continent by the isthmus of Sleswig, which is about 25 miles wide. In the south of Europe there are three peninsulas of great importance in history, namely, the Iberian or Hispanian Peninsula, including Spain and Portugal, which lies between the Mediterranean and the Atlantic, and is separated from the rest of Europe by the chain of the Pyrenean Mountains stretching from the Bay of Biscay to the Gulf of Lyons; and Greece (anciently, the Peloponnesus, *the Island of Pelops*), sometimes called the Morea, which is joined to the mainland, called Hellas (anciently Achaia), by the isthmus of Corinth; this isthmus being only about *four* miles wide at the narrowest part. To these peninsulas may be added the Crimea, which is the most southern part of Russia, and is joined to the mainland by the isthmus of Perecop, which is only about five miles wide at the narrowest part.

In the preceding Table of the Countries of Europe we have endeavoured to comprise a great deal of information in the smallest possible space. In the first column, the countries marked in capitals are independent and self-governed; those marked in small letters are dependent on the others with which they are connected. The states of Germany are connected by a Confederation, in which each has a certain number of votes, amounting in all to 70; the number of votes belonging to each state is attached to its name in a parenthesis. The latitudes and longitudes of the capitals of some of the smaller states are taken from a map, and therefore are not so strictly accurate as those of the larger countries, which have been astronomically determined. The names of the rulers of each country or state is taken from a table inserted in the "Working Man's Friend," vol. II., No. 38, p. 179, col. 2. The form of government has been ascertained with the greatest care from various documents. Where the monarchy or sovereignty is not marked as absolute or limited, it is generally of a doubtful or an undetermined character; but in small states this is of little importance to the general tranquillity of Europe.

LESSONS IN GEOMETRY.—No. XV.

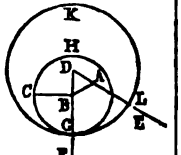
LECTURES ON EUCLID.

PROPOSITION II.

PROBLEM.—*From a given point to draw a straight line equal to a given straight line.*

In fig. 2, let A be the given point from which the straight line is to be drawn, and B C the given straight line to which the required straight line is to be equal.

Fig. 2.



Join the points A and B (Postulate 1, Book I.), and upon the straight line A B describe an equilateral triangle A D B (Proposition 1, Book I.) With the point B as a centre, and the straight line B C as radius, describe the circle C G H (Postulate 3, Book I.) Produce the straight line D B till it meets the circumference of the circle C G H in the point G (Postulate 2, Book I.) With the point D as a centre, and the straight line D G as radius, describe the circle G K L. Produce the straight line D A till it meets the circumference of the circle G K L in the point L. Then the straight line A L is equal to the given straight line B C.

For, by Definition 15, Book I., the straight line B C is equal to the straight line B G, and the straight line D L to the straight line D G. But, by the construction and Definition 24, the straight line D A is equal to the straight line D B. Therefore, by Axiom 3, Book I., the straight line A L is equal to the straight line B G. Whence, the straight lines A L and B C are each equal to the straight line B G; and, by Axiom 1, Book I., the straight line A L is therefore equal to the straight line B C; and it is drawn from the point A as required.

The construction of this problem is here different from that of Euclid; and it is better than his. The student will at once see that the portions G F and L E of the straight lines D F and D E, as drawn in Euclid's construction, are superfluous, and that by this construction the straight line A L is drawn at once of the exact and proper length required. In some remarks which we made upon Dr. Thomson's edition of Euclid when it first appeared,—remarks which we made at his own request,—we pointed out to him this construction as preferable to Euclid's. He admitted the fact, but in his subsequent editions made no alteration. Perhaps—as we ourselves have done in Cassell's edition—he retained the old construction, lest he should be charged with too much *innovation*. "I have taken care," said Dr. Thomson, in the first edition of his Euclid, "not to touch with too rude a hand a work which has stood for so many centuries." There is a species of *conservatism* followed even in mathematics! We shall rejoice, however, in giving *our* students the benefit of every new improvement that has been made in this science.

The practical student,—the mechanic and the engineer, will, on perusing the above demonstration and remarks, very probably say to themselves: "What is the use of all this unnecessary parade of learning about such a simple matter as drawing one straight line of exactly the same length as another? Why not take a pair of compasses or dividers such as those described in the Lessons on Drawing, (fig. 57, page 250, col. 1,) and at once transfer the distance from B to C by their means, to any other place of the paper or plane that you wish, say from A to L; then draw a straight line joining the points A and L, and the thing is done?" Why not, indeed! For all practical purposes, this method is quite sufficient; to go through all the steps of Euclid's construction is wholly unnecessary for mechanical operations. What, then, it may be asked, is the use of Euclid's method? We answer, that it is useful as a *training of the mind* to accurate thought, conception, and reasoning; useful to the acquisition of a link in the great chain of geometrical demonstration; and useful to the certainty of the geometrical process of argumentation, in which nothing is to be *taken for granted* which is not laid down in *postulates*, and agreed upon between the student and the professor before they enter upon the earnest study of this exact science. Without Euclid's method, it would be necessary to demand as a *postulate* that "a distance or length of a straight line can be transferred from one place to another, or from one part of a plane to another part of it;" and, in this case, reference to the *first* proposition of this book would be rendered unnecessary in the *second* proposition, which would then virtually become the *first*, and Euclid's order would be destroyed. Even in the construction of the first proposition, the complete circles A C E and B C D, fig. 1, are not necessary; all that is wanted being a single point of intersection, which may be obtained from two small arcs or portions of these circles drawn nearly over the middle of the straight line A B.

The exercise appended to this proposition is, "Draw the figures and show the application of the construction and demonstration to different positions of the points and the straight line; such as when the given point is situated above the straight line or below the straight line; also, when in the straight line of itself, at the extremities, or at any point between them." In order to perform this exercise, the student has only to assume the point A a little above the middle of B C, fig. 2, or a little below the middle of B C, and make precisely the same construction, using the same letters in every way; by so doing, he will find that as the equilateral triangle A B D may be constructed on opposite sides of A B, he will thus have the power to draw the straight line A L in four different directions. Again, he may assume the point A in the straight line itself; if in or near the middle of B C, then A B will be part of B C, and the joining of A B will be unnecessary; but, by following precisely the same construction, and using the same letters, he will obtain two different directions for the straight line A L, according as he constructs the equilateral triangle A B D on one side or other of A B. Next, if he assumes the point B for the point A, the equilateral triangle A B D, and the second circle G K L, become both unnecessary, for the circle G C H will be sufficient for the purpose of drawing A L, any radius of this circle being the line required. If the point C, the other extremity of B C, be employed as the point to which the given point A is to be joined, then there will be just double the number of the preceding varieties in the construction. The expense of cutting the figures prevents us from exhibiting all these varieties of construction to the eye of the student; but with the preceding hints he will now be fully able to draw them for himself.*

* Several of our students—among whom may be mentioned J. C. Jones, Llanefydd; A. Coats, Glasgow—have sent us accurate drawings and explanations of these different diagrams.

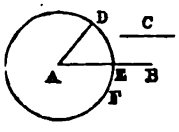
The first proposition of this book may be varied in its enunciation so as to exercise the ingenuity of the learner; thus, it may be put under either of the following forms:—"To find a point at the same distance from *two* given points, that these points are from each other;" or, "to find *three* points equally distant from each other." From the consideration of the latter form, there might arise in the mind the problem to find *four* points equally distant from each other; a solution of this problem is given in vol. I., at p. 79, col. 2, art. 6. If the inquiring and ingenious student wishes to find *more than four* points equally distant from each other, he will find that the problem *is impossible*, and he will be clever if he can assign a satisfactory reason. The second proposition above discussed might be put in the following form:—"To find the *locus* of all the points which are at the same distance from a given point, that two other given points are from each other." By *locus* here is meant the *place* or line, *straight* or *curved*, in which if any point be taken, it will be found to be at the required distance from the given point. In the preceding figure, if a circle were described from the point A as a centre with the straight line A L as radius, this circle would be the *locus* required.

PROPOSITION III.

PROBLEM.—*From the greater of two given straight lines to cut off a part equal to the less.*

In fig. 3, let A B and C be the two given straight lines of which A B is the greater, and from which a part is to be cut off equal to C the less. From the point A draw a straight line A D equal to C by the preceding proposition, and from the same point as a centre, with A D as radius, describe the circle D E F (Post. 3), cutting A B in the point E. Then the part A E, of the straight line A B, is equal to C.

Fig. 3.



For, by Definition 15, the straight line A E is equal to the straight line A D, and by construction, the straight line C is equal to the same straight line. Therefore, by Axiom 1, the straight line A E is equal to the straight line C, and it is cut off the straight line A B as required.

In the construction of this problem, the student should go through the process required by the preceding proposition in order to obtain the straight line A D. He would then see that the whole construction actually required is considerably more complex than it appears to be in fig. 3; and unless he does this, he will not have a clear geometrical idea of this proposition. The practical geometer, in solving this problem, would do here as in the preceding proposition, take the distance or length of C in his dividers, fix it with the screw, and then lay it off upon A B at once, when the point E would be obtained, and the part A E as required; but, as we observed above, this would be a mechanical solution, not a geometrical one. The solution of the exercise appended to this proposition will be given in our next lesson.

A KEY TO THE EXERCISES IN THE LATIN LESSONS.

(*Continued from page* 239, *Vol. II.*)

By JOHN R. BEARD, D.D.

Page 388, col. 1, vol. I.—LATIN-ENGLISH.

The soldiers hungered and thirsted duting the whole day; Nature has clothed the eyes with very thin membranes; why have you adorned and clothed the walls of your house with chaplets? you had pleased your teachers, because you had always obeyed their commands; scarcely had our soldiers fortified the camp, when Caesar formed a line of battle; we shall not sleep until (before that) we have finished our business; when the soldiers have fortified the camp, they will prepare for the fight; take care, boys, that you do not chatter; the laws of the Spartans have this object, to instruct (that they may instruct) the youth in labours; no one doubted that you had always taken care of the boys; tell me, by what consolation you have soothed the troubled mind of your friend? I know not why you have punished the boy; I did not doubt that you had kept my precepts in memory; do not chatter, daughters; I come to ask you, to walk (that you may walk) with me; the soldiers ought to guard the city; wisdom is the art of seeing; we must obey the precepts of virtue; the art of sailing is most useful.

Page 338, col. 1, vol. I.—ENGLISH-LATIN.

Sitierunt; esuriam; praeceptis meis non obedies; pueri gaudent; patri non obedierunt; nescio cur patri non obedierint; nemo dubitat quin boni pueri patri obediant; verba mea memoriâ custodivit; curae mihi erit ut verba mea memoriâ custodias; veniunt urbem munitum; ars scribendi utilis est; domûs suae parietes coronis ornant; non prius dormiam quam negotia finivero; negotia finivistine? puerum puniebat, quum scholam intrabam.

Page 388, col. 2, vol. I.—LATIN-ENGLISH.

The father takes care that (ut) his son is well instructed; the father took care that (ut) his son was well instructed; the citizens fear that the camp is fortified by the enemies before the city; the eyes have been clothed with very thin membranes; when the king was entering the city, the houses of all the citizens were clothed and adorned with chaplets and flowers; we shall not sleep until (before that) your business is (shall have been) finished; as soon as the camp is (shall have been) fortified, the soldiers will prepare for the fight; we feared that the city had been blockaded by the enemies; let the wicked be punished; a good scholar strives to be instructed in the knowledge of letters; the city, having been blockaded, is punished by many evils; a cultivated man not only benefits himself but others also; boys must be diligently instructed.

Page 388, col. 2, vol. I.—ENGLISH-LATIN.

Custodiuntur; urbs custoditur; urbs custodietur; urbs custodita est; curo ut urbs custodiatur; nemo dubitat quin urbs bene custodiatur; cives urbem custodire debent; cur cives non urbem custodiunt? nescio cur cives non urbem custodiant; metuo ut cives urbam custodiant; ad pugnam se expedierunt; domûs parietes floribus vestiti sunt.

Page 410, col. 1, vol. I.—LATIN-ENGLISH.

My friends cannot be received in one house; tell us, by what consolation the troubled mind of the friend has been soothed? the narrow limits of your breast cannot contain so great a character, nor will the world contain thee; I must take food (food must be taken by me); you must teach; teaching boys, you will be much loved; say, why the boy has been punished? the war came to an end; see that the state receives no injury (not anything of injury); tell me, what has been written to you by your sister? no vice is more vile than avarice, especially in rulers who manage (managing) the state; thinking of heavenly things, we despise these our own as insignificant; the class of men who reproach (reproaching) kind actions is hateful; a draught of cold water is hurtful to one sweating from the effect of labour; a good man assists a good man without his entreating it; storks, about to migrate into foreign lands, are assembled in one spot; a great multitude of men are collected in the city, for the purpose of seeing the public games; all griefs (which are) borne patiently are less bitter; the general dismisses the soldiers, after praising them (having been praised) on account of their distinguished valour; many youths, having been badly educated in their early boyhood by their parents, rush to destruction; in the reign of Xerxes (Xerxes reigning), the Greeks obtained a most splendid victory over the Persians; there is friendship between good men and God, nature uniting them; when winter approaches (winter approaching), many birds seek milder regions; peace being recovered, the arts flourish; when kings were banished (kings being banished), the Romans laid the foundation of a free state; though the country is changed (the country being changed), the characters of men are not changed; since the laws of God have been religiously observed (the laws of God having been religiously observed), our life will be happy.

Page 410, col. 1, vol. I.—ENGLISH-LATIN.

Veri amici angustâ domo capi possunt; non capiunt angustiae hujus domûs tantam personam; dic mihi quid pater tibi dixerit; fer matri aquam; avaritia in parentibus domos gerentibus magnum vitium est; avaritiâ deletâ, vitium deletum est; cogitas patriam, miles periit; timenti amicus magnae consolationi est; republicâ turbatâ, quis beatus esse potest? ingens hominum multitudo venerunt, potitura vinum; milites laudati, dimissi sunt; Regnante Victoriâ, Educator Popularis institutus est; libro mutato, non sententias mutas.

(*End of the Key to Vol.* I.)

Page 9, col. 2, vol II.—LATIN-ENGLISH.

Who does not admire the splendour and beauty (for pulchritudinemque read pulchritudinemque) of virtue? the general encouraged the soldiers to attempt to throw into confusion the enemies' line; already the enemies attempted to attack the city, when suddenly they were driven back by the citizens; when you

have despised pleasure, then, at length, you will be happy; survey the noble examples of virtue which have been recorded in history; I come to accompany you into the garden; dreams are difficult to be explained; Socrates accounted himself an inhabitant and a citizen of the whole world; learn willingly (being willing); what is sweeter than to learn many things? riches accompany a learner, honours accompany (a learner); the wicked man will at length remember his vices with grief.

Page 9, col. 2, vol. II.—ENGLISH-LATIN.

Mulierum pulchritudinem admiratus sum; hominem hortati sunt; rex milites hortabitur ut hostes propulsent; improbum pater filium arbitrabatur; quis signa interpretetur? tum demum Dei signa interpretaberis, quum sapiens et bonus eris; virtutis exempla facilia sunt interpretatu; ille me in horto comitabatur, quum tu venisti; eo patrem comitatum; pater me in provinciam comitatum venit; honores bonos et sapientes comitabuntur; pueri, discite libentes, et admiratione afficiemini.

Page 11, col. 1, vol. II.—LATIN-ENGLISH.

Sabinus having encouraged his (troops), gives the signal; your benefits exhort me to obey your command; Caesar exhorted his soldiers to (strive after) glory; they encouraged them to become friends (towards joining friendship); I exhort you again and again concerning the same things on which I have exhorted you in a former letter; we will not cease to advise Pompey (for Pomperium read Pompeium) to shun great dishonour; he exhorts them not to fail in courage; I, then (for tune read tunc) fearful, advised shameful flight; I, indeed, cease not to recommend peace.

Page 11, col. 1, vol. II.—ENGLISH-LATIN.

Magister ad diligentiam discipulos hortari non desinit; magister discipulos ad diligentiam hortabatur; magister discipulos ad diligentiam hortatus, omnibus oscula dedit; sapientia tua me hortatur ut imperio tuo paream; hortabitur eos in amicitiam jungendam; pater tuus te iisdem de rebus hortatur, quibus ego fratrem meum hortabor; hortor te ne animo deficias; sororem tuam hortati sunt, ne animo deficiat; pudendam fugam hortabor nunquam; bellum hortari non desinit.

Page 23, col. 1, vol. II.—LATIN-ENGLISH.

You had scarcely confessed your fault, when your father pitied you; you had already admitted that you had erred, when you denied it again; we had not yet entreated your assistance, when you promised it to us; we had scarcely confessed our want, when you most freely promised us your assistance (praesidium); there is great power in philosophy when it heals our minds, and removes vain anxieties; the arts afford us great assistance when they severally support themselves independently; teachers serve (merentur) their country well (deserve well of their country), when they instruct the youth (juventutem) by the study of useful letters; when philosophy heals our minds, we ought to give up ourselves wholly and thoroughly to it (for medeturei read medetur ei, and strike out the comma before tradere); all pitied you, since you were in wretched (circumstances), not in consequence of wickedness, but on account of fortune; since the soldiers feared dangers, they dared not to fight with the enemies; the covetous (man), though he is extremely rich, will not admit that he has enough; take pity on us; O citizens, relieve our want; let each defend his son; no one, beholding the whole earth, will doubt concerning the providence of God; the citizens, thinking that the enemies were about to attack the city, strove most energetically to drive them back; I come to promise (about to promise) you my assistance; it is the duty of a young man to reverence his elders; you ought in every way to relieve the want of the citizens; who knows not that you have served the republic well? (that you have deserved well of the republic); I hope that you will pity me.

Page 23, col. 1, vol. II.—ENGLISH-LATIN.

Peccata sua fassi sunt; peccata sua fatebuntur; fassine erunt peccata? peccata sua non fatebitur; soror mea peccata fassa est; adolescentes negant se peccata fassuros esse; religio hominum animis medetur; solum religio vera hominum animis mederi potest; religio semper bonorum animos sanavit· O mi pater, miserere mei; O Deus, miserere nostri; O Deus, hominum cunctorum miserere; conjux quisque tuetor uxorem suam; adolescentes, milites domos suas oppugnaturos rati, prae metu se interfecerunt; artes ipsae singulae artifices tuentur; tuenturne artes ipsae se? artes artifices tuitae sunt, et tuentur, et tuebuntur; intuere coelum, et Deum vereberis; virtutem intuentes, homines fiunt sapientes; praeclare de republicâ meritus est; regina praeclare de republicâ merebitur; milites praeclare de patriâ meriti sunt; praeclare de domo mereri non possum; intuetur virtutis exemplar; fatetur peccata, et veniam impetrat; confessi peccata veniam impetravere; quum peccata confessi sitis, veniam impetrabitis.

Page 23, col. 2, vol. II.—LATIN-ENGLISH.

Why do we not fear the veterans? because not even they themselves wish to be feared; we venerate you, Romans, and if you so desire, we even fear you; let her not be afraid to enter into the house of another; I fear that I am walking out with this ornament for the sake of (exciting) love rather (than for anything else); I shall not cease to be apprehensive about Carthage, until I have ascertained that it is demolished; I fear that Dolabella will not be able to benefit us sufficiently; I received your letter, by which I understood that you were afraid, lest the former (letter) had not been delivered to me; he was afraid, lest he should hurt the mind of Divitiacus by the punishment of that man; I fear if I begin to explain this thing, I shall seem not to be narrating a life, but to be writing a history; I do not fear that I shall satisfy you by writing; I do not fear you will do anything timidly, anything foolishly; I do not fear that the moderation of my life will prevail too little against false rumours.

Page 23, col. 2, vol. II.—ENGLISH-LATIN.

Verentur parentes, regem timent; tyranni timentur; tyrannos timebunt; parentes meos verebor; non vereor ne verbis te expleam; timetis in hostium castra introire; vereor ne frustra legam; de patriâ metuunt ne excidatur; timeo ne mater veniat; quid times ne mater veniat? quia contra praecepta sua ago; metuunt ne patruus mortuus sit; metuo ne Dei ira in hanc urbem incidat; vita tua contra calumniam valebit; ne verearis ne vita tua contra malorum calumniam non valeat; vereris ut tibi prodesse possim; ne verearis nequid stulte faciam; frater meus non veretur nequid stulte faciam.

SOLID TREASURES.

Arise, immortal soul, arise,
Expand thy wings and soar
Above the ground, beyond the skies,
And dwell on earth no more.

Seek wisdom's treasures in her fields,
Exhaustless, rich, and free,
Those hidden treasures which she yields
When keenly sought they be.

Those treasures raise the meanest soul,
Enrich the humblest mind;
They make the sick and maimed whole,
Give eyesight to the blind.

Around the checquer'd scenes of life,
They cast a halo bright;
They chase the dreary gloom of strife,
Yield rays of heav'nly light.

Whoever craves these blessings now,
Must with his soul begin,
Must know himself; to wisdom bow,
And conquer ev'ry sin.

With nobleness of mind, despise
The prejudice of birth;
Exert his faculties, and rise
To their intrinsic worth.

The little he already knows
Must lead him on to more;
Successful labour clearly shows
How to increase his store.

See how the great and good have gain'd
The suffrage of mankind;
A height, like theirs, may be obtained
By labour of the mind.

Now, let the toils of others prove
A stimulus to thee;
For cowards fail, they will not move,
Nor like brave warriors be.

Behold the war with ignorance,
In which the wise engage,
Their surest weapon is the glance
Of wisdom's sacred page.

Come then, this pow'rful aegis take,
This panoply divine;
And gain those trophies which will make
Thine arms for ever shine.

W. F. (amended.)

ANSWERS TO CORRESPONDENTS.

SHORT-HAND.—J. G—K: All right but "potato," "character," and "improbability." J. G. seems to have overlooked the *repeater* in the first and last of these. In the second, the *t* is *short*, and the word cannot therefore be "caricature." You must write letters with no preceding vowel much smaller. Your *k* in "kalso" is longer than the *l*, see the rule given in a note in the fourth lesson.—A YOUNG LEARNER: "G soft" requires no separate alphabetic character. It is a combination of *d* and *zh*. "Ch," in chair, is the *breath* correspondent of "G soft."—a combination of *t* and *zh*. See the words "page, knowledge, chapter, and handkerchief," illustrated in the second lesson. The characters may be written either upwards or downwards according to the taste and convenience of the writer. The learner is fettered with no rule in this particular. The recapitulative table in the fourth lesson will serve to explain and simplify the list of prefixes.

AMICUS POPULI (Richmond): For information on Electricity and Galvanism, we recommend "Peschell's Physics," vol. III.—JEUNE ANGLAIS (Swansea): Thanks.—I. T. G. (Leeds) should revise his former studies first; he may go on with Music as a recreation.—YOUNG SAILOR (Manchester): "Norie's Navigation" (price 16s.) is the best.—G. D. (Tilly) is quite right on the proportion given in Hutton's Mathematics, viz., As any one side is to the sine of its opposite angle, so is any other side to the sine of its opposite angle;" this proportion is heterogeneous, and therefore erroneous, see Cassell's Euclid, Book V., Definition V., p. 98. It should be stated as he has said, viz., "Any one side is to any other side, as the sine of the angle opposite the former side is to the sine of the angle opposite the latter side."—ULTRA PEDGERS (Belfast): We dissuade him from the learned professions as he calls them; but we advise him to acquire learning by all means. The course pointed out in the Regulations of the University of London, is among the best for him.—M. B. SMITH (Shelf): Dr. Beard's Lessons in English are superior to all the grammars he has mentioned.—G. WILKINSON (Earby): His letter has been overlooked.—SUBSCRIBER (Whitby) should study the sixpenny series of Lessons in French before he takes up the lessons in the P. E. The second course of the French Lessons is begun.—A. W. CLITHERO: We can't tell.—S. J. R. (Strand): A perpendicular means a straight line *at right angles* to another *in any position; a perpendicular to the horizon* means a straight line at right angles to a horizontal straight line.—J. HOARE (Bridport) informs us that Mr. Budgett's salary during the three years mentioned in the Biography, was £40, £50, and £60, and that he saved out of the whole £100, not £300.

Communications have been received from E. J. BREMNER (Carlisle); D. C. (Glasgow); J. LOVETT (Ashforddby); C. T. JONES (Bushy Heath); J. HAYWOOD (Edgware-road).—HUM BRAZILEIRO: As soon as we can.—W. S. (Sydney-street (wishes to know a good, plain, and inexpensive book on costume, armour, &c., English in particular.—T. and E. DENNISS (Edwinstowe): The *last edition* of Keith on the Globes (Longmans and Co.) is the best, and is greatly improved.—W. N. B. should pursue his own plan; it is very good.—PATHWAY should first study English, Penmanship, and Arithmetic in regular order.

A FRENCH SCHOLAR (Perthshire): We cannot, on principle, give opinions to *scholars*, which might prove unfavourable or injurious to their *teachers*; we believe that in the latter position, every man does his best; and for the members of the scholastic profession we have the deepest sympathy.—E. O. (Fleet-street): In time.—R. M. W.: Thanks for his correction.—G. GORDON (Edinburgh): We are glad that a *Co-Instruction Society* has been formed at Buchanan's Coffee-house, High-street, to meet on Tuesdays, at half-past 8 P.M.; and that it is to begin with the "Lessons in French;" we hope the members will increase so as to render the study valuable and interesting to many.—F. SCRIVEN (Leominster): Yes, the "French Manual" contains Reading Lessons.—PUNCTILIO (Buckland): 1. No; 2. Yes; 3. No.—J. C. L. (Montrose): According to the *Greek Scriptures*, called the *Septuagint*, the flood of Noah took place 2,262 years after the creation of Adam, and the advent of the Saviour 3,316 after the flood; hence, the latter event took place 5,478 years after the creation, see vol. I., p. 96, col. 1, line 6 from the bottom. *Flos* is a Greek word signifying *a flame; flos* is the Latin word signifying *a flower*.—G. S. S.: We thank him for the sketch of the Corinthian order; we have examined, and find we are right.—M. THIMBISON (Otley): See the second answer above this.

W. E. WILLIAMS (Merthyr Tydvil), and J. DONALD (Aberdeen); F. BUXTON (Salford): Their solutions are partly right and partly wrong; we strongly recommend them to study Cassell's Euclid, as well as his Arithmetic.—THOMAS (Malton): Withering's Botany, by Macgillivray, is a work which contains—in a Dictionary form—the names of plants, their descriptions, and the places where they may be found.—F. ROBINSON (London): The use of *therefor* instead of *therefore* is simply *pedantic* and *unusual*, and therefore *erroneous*; for common usage is the rule that establishes the right spelling of a language. If the proper meaning of the word were to be the guide to its spelling, it should be written *thisfor*, as the word *therefore* simply means *for this*.

W. M'INTYRE and POOR SCHOLAR (Glasgow): For the pronunciation of the French words, see Cassell's "Lessons in French" republished from the "Working Man's Friend;" price 6d., or 7d. by post.—J. NICOL (Glasgow). Instructions in Mapping will be given. The Latin arrangement will be explained.—E. CROSSLEY (Littleborough): Study the Lessons in Drawing in the P. E. as they appear.—W. HYMERS (Barnard Castle): To "accede to London;" to "acquit themselves of a bad habit;" and to "be adequate to the rich;" are expressions which cannot be tolerated in English composition.—E. J. (Reading) will, by studying the Second Part of the Lessons in French, attain her wishes.—JOHN MARTIN (Stroud): See vol. I. of the P. E., page 407, col. 2.—J. A. O. (South Molton); A SHOP BOY (Isley): Their penmanship is not near enough to our *Court-hand*.—A. W. HAMILTON (Hull): We do not know.—J. B (Hulme): The term *compter* is from the French verb compter, *to reckon*; it means a place where a person is put in order to be *reckoned* with, or taken to *account* (accompt).—C. W. F. (London): His attempt at *poetry* is pretty fair; but it wants more amendments than we have time to make upon it.—J. LEE (Westminster): We can't say yet.—E. C. COOKE (Holloway): His suggestion is good.

J. P. (Hackney): By the ratio of Metius given in our Lessons on Geometry, No. XI., the diameter of a circle is to the circumference as 113 to 355; and by the rule of Archimedes given in Lesson No. XII., the area of a circle is equal to half the diameter multiplied by half the circumference; therefore $\frac{113\times355}{2\times2}=\frac{113}{4}\times355$ represents the area of a circle whose diameter is 113; and $113\times113=\frac{113}{4}\times452$ represents the square of the diameter. Whence, as $\frac{113}{4}\times355:\frac{113}{4}\times452$:: the area of a circle : the square of the diameter, that is, as 355 : 452, by removing the common factor $\frac{113}{4}$. Again, $355\times355=\frac{355}{4}\times1420$ represents the square of the circumference; and $\frac{355}{4}\times113$ represents the area of the circle; therefore $\frac{355}{4}\times113:\frac{355}{4}\times1420$, or 355 : 1420 :: the area of a circle : the square of its circumference. See Walkingame on the square root.

JOHN WILKIE (Fulham): "To find two numbers whose sum is half their product;" let $x+y=a$, and $xy=2a$, then solving this by quadratics, or otherwise, you have $x=\frac{1}{2}\left\{a+\sqrt{(a^2-8a)}\right\}$ and $y=\frac{1}{2}\left\{a-\sqrt{(a^2-8a)}\right\}$; in which, by substituting any possible number for a, you may obtain the numbers required.

ERRATA.

Vol. II., p. 255, col. 1, line 12, for *by water* read *by land*.
Vol. I., p. 328, col. 2, line 15, for *loops* read *loop*.

LITERARY NOTICES.

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LESSONS IN PHONETIC SHORT-HAND.—No. V.

By ALEX. MELVILLE BELL, F.R.S.S.A.,

Professor of Elocution and Vocal Physiology, Member of the British Phonetic Council, Author of the "Principles of Speech and Elocution"—"The Elocutionary Manual"—"Steno-phonography,"—&c.

49. WITH this lesson we introduce a new principle of abbreviation, applying to all the subordinate classes of words—articles, pronouns, prepositions, secondary adverbs, conjunctions, and auxiliary verbs. These words are written *without full-sized characters*. This has the effect of giving them a distinctive appearance to the eye, while, by the force of contrast, it throws into emphatic prominence the leading words of a sentence, which retain a full notation, in accordance with the principles detailed in the preceding lessons.

50. The principal words in sentences are *nouns* and *verbs*; and the next in importance are the words that qualify nouns and verbs—namely *adjectives* and *adverbs*. The last of these classes includes two different species of words—adverbs that qualify *verbs*, and those that qualify *adjectives* or *adverbs*. Of these, the former is, of course, the primary species: the latter we call *secondary adverbs*.

51. The subordinate words are—besides being contracted—WRITTEN CONSTRUCTIVELY; that is, *above* or *below* the leading words to which they refer, and with which they are accentually connected in ordinary utterance; so that, both by size and position, their comparative inferiority is plainly indicated.

52. This plan of *grouping* the subordinate with the principal words gives a highly rhetorical effect to the writing, similar to that which is produced in printing by the use of *italic* and CAPITAL letters. It is at once a source of great brevity in writing, and of perspicuity and effectiveness in reading. It also reduces the possibilities of ambiguity between words of the same "articulate skeleton"—by confining the reader's choice to principal words only; and thus enables him with the most perfect confidence to leave out vowels in ordinary notation—indeed rendering their insertion, in the vast majority of cases, altogether superfluous.

53. The following passage exemplifies, in type, the effect of the grammatical grouping, in distinguishing between principal and subordinate words. The syllables enclosed in brackets are contracted Prefixes and Affixes.

It is that a so and may to the
hoped system simple philosoph[ical] lead general
as this

of the of in The
[intro]duc[tion] art stenography schools. study

is of the most to
attractive nature young persons. Occas[ional] exercises,

that would never become for the we
irksome, "labour delight physics
in

may at a of to every
pain," trifling expenditure time, secure schoolboy

a in before he is to
practical facility short-hand writing called enter

the the or the The
college, counting-house, workshop. intellectual advan-

of such an at such a would be
tages art possessed time, [incal]cul[ably]
great.

54. Another advantage gained by the principle of GROUPING is, that all the minor marks of punctuation may be omitted, without danger of ambiguity in deciphering. The grouping is itself a valuable species of punctuation; indeed, for the purposes of effective reading, far more valuable than that by commas, semicolons, &c. With this principle of notation, it is simply necessary in writing to indicate the greater divisions of composition, such as are generally marked by periods and paragraphs. For this purpose, a line of *three* or more *dots*, ranged "horizontally," or a short zig-zag line, will be the best sign for catching the eye, and for simplicity of execution. No other mark of punctuation can be at all *necessary*; but, it may be well to add, that there is nothing in the system to prevent the writer, who chooses to do so, from inserting all the ordinary signs. In this case, to secure against ambiguity, the comma and full stop would require to be either well "spaced off" from the writing on either side, or encircled by a small ring. The other marks would need no alteration.

55. In the ready and accurate application of the grouping principle, those learners will have an advantage who are best acquainted with the grammatical classifications of words, and the rules for the construction of sentences; but entire ignorance of these subjects will not prevent any person from writing constructively, though he may not perhaps group with perfect accuracy. To the ungrammatical reader it may be enough to say that all the *little words* of common occurrence, and those which in pronunciation he passes lightly over, are to be *reduced* in *writing* to as small a size as possible, and placed *above or below*—as they happen to be pronounced before or after—the more important words with which they are connected in utterance. That is, the little and generally unemphatic words which, in a greater or less degree, enter into the composition of every sentence, are *not to occupy space separately in the line of writing*, but to be *clustered about the leading and emphatic words*, which constitute the new and essential parts of the sentence.

56. No group should contain two leading words; each will contain one, except when a very large collection of subordinate words coming together may render it inconvenient to add the principal word, which will then stand by itself.

57. It is of great importance to attach a definite outline to all the subordinate words, by invariably writing each in its own appropriate mode, that the possibility of confusion between words containing the same letters may be entirely obviated. Such words as *am, me, my, may; either, other, there, through; this, thus; these, those; ever, over, very, every*, &c., will thus be distinguished by a different arrangement of the letters that make up their "articulate skeleton." All compound and derivative words, too, preserve the outline of the simple words from which they are formed, with alphabetic additions for the new syllables.

58. In arranging Abbreviations for the subordinate words, the ALPHABET has been almost uniformly adhered to; so that the learner who is well acquainted with the First Lesson will experience very little difficulty in making himself master of all the contractions. There are, for instance, not more than FIVE marks that can be considered as arbitrary, employed in representing the whole category of subordinate words. The words denoted by them are *an, the, and; more* and derivatives, *no—not*.

59. No distinction in writing is necessary between the nominative and objective forms of pronouns, as *he, him*, &c.; the different persons or numbers of auxiliary verbs, as *am, art, is, are; may, may'st*, &c.; or the infinitive and the past participle of such verbs, as *do, done; be, been*, &c. The governing words in the context leave no room for ambiguity in such cases.

60. The following is a list of such subordinate words as require no alphabetic alteration in their contracted writing. They are *merely reduced in size*—written with all their elements, but without full-sized characters. The list contains a few common adjectives, as well as the inferior classes of words.

61. It is almost unnecessary to illustrate these words, as the attentive student should be able, from his knowledge of the alphabet alone, to supply the symbols for himself with accuracy. But, as fluency in reading the short-hand must depend greatly on certainty with regard to the definite forms of the subordinate words, illustrations are added; while, at the same time, the *printed list* contains *directive marks*, to enable the student to exercise himself in constructing the symbols alphabetically. He will thus also the better understand the simplicity of the forms, which might not otherwise be obvious at first sight.

62. Let the learner cover down the marks, and then endeavour to produce them from the directive printing; comparing, afterwards, his own arrangements with the illustrations. This exercise will have the effect of fixing all the characteristic variations upon his memory.

63. LIST OF SUBORDINATE WORDS,

WRITTEN ALPHABETICALLY.

[An asterisk after s, (s*), signifies the *hook* s; after r (r*), the "horizontal" r; after *m*, *n*, or *ng*, (the ring letters,) a *ring* without a tail. This mark (′) after a letter signifies that it is to be written *upwards*; and (b), that the letter preceding it is to be written *backwards*. Letters with no directive mark are to be written downwards, or if horizontal characters, forwards—in the ordinary way.]

Be (been)-by
ab′out
but (adverb)
above′
b*f′or*e
*b*elow
*ben*eath
becaus*e
bec*b*om′e
both
bes*ide
bad
b′etter*
best′
Do (dost, done)
doing*b
F′ar
f′or*
f′r*om*
f′ir*s*t
f′or*m*er*
off
often [=of n*]
(G.) ago
again*
good
gr*eat
He (him)
his*
h*ere
hither′
henc*e
whole [=hol e]
(L.) all
al′s*o
els*e
al′tho′
alon*e
along*
always*
less
least′
les*t
l′ike
latt′er*
Me [*ring to left*]
my [*ring to right*]
m′ay (may′st) [*ring to left*]
m′ay b′e [*united*]
m′ay do [*separate*]
am* (art, is, are)
m*ust
am′ong
am′id
man*y [*rings to left*]
min*e [*rings to right*]
M*r*
M*iss
M*essr*s*
(N.) in [*ring to left*]
on [*ring to right*]
unto [*ring to right*]
an′y [*ring to left*]
own′ [*ring to right*]
non*e [*rings to left*]
in*deed [= ring, d, repeafer]
unless
un*til
n*or
on*ly
n*othing*
n*either′
an*other
enough [enuf′]
n*ear*
n*am*ely (viz.)
(P.) up
upon*
(R.) or
So
som′e
s*b*am′e
soon*
sin′c*e
s*till
She
shall (shalt)
To—it
to b′e [*connected*]
to do [*side by side*]
to day [*connected*]
tom*orr*ow
till
each (= eatsh)
They (them)
this*
th us*
*thes*b*e
hose
*that
han*
then
thenc*e
either′
other
their* (there)
(V.) of
ever*y
very
ov′er [*an over-curve*]
ever′ [*an oval*]
We
with
w′ell
w′as* (wast, were)
w′ere (wert) [*conditional mood*]
will (wilt)
one [= wun*]
one′s*
once [=wunc*e]
Wh′at
wh′er*e
wh′en*
wh′en*c*e
wh′ether′
whither′
You
your*
yon*
yon*der*
yes*
yet
(Z.) as

64. The great advantage of providing, by a distinctive notation, for all the most common subordinate words, is, that, in reading from the short-hand, the eye recognises them at a glance; and principal words containing the same letters are thus preserved from the possibility of being mistaken for subordinates. The latter may, besides, be *joined together* as they happen to occur in phrases, at least in such combinations as are of regular grammatical construction. The longest cluster of them can never be mistaken for a principal word. The eye is at once led, by the absence of full-sized characters, to recognise the COMBINATION, and to resolve it into its component words. In this way a considerable amount of additional brevity is gained, and a *complete* list of regular phrases provided with a highly contracted notation, *without requiring the student to learn a single special character as a "phrasogram."*

65. The following are Exercises, consisting of words and phrases which combine subordinate words included in the preceding list.

I. Write the following words, referring to the Table of Affixes, Lesson IV., for the syllables in *italics*. Him*self*, my*self*, them*selves*, there*fore*, where*fore*; fro*ward*, forward; hither*ward*, in*ward*, on*ward*, to*wards*, up*wards*.

II. Write the following derivative words, by adding the letters in *italics*, (in the mode indicated by the directive printing) to the simple subordinate words from which they are formed.

Beside*s*, firs*tly*, former*ly*, again*s*t*, greater*, greates*t*, like*ly*, latter*ly*, among*s*t, amid*s*t, Mrs*, Misse*s*, into, nearer (repeater) near*est*, nearly, sooner*, soones*t*, its*, others*—(other's), their*s*—(there's), within*, without, your*s*.

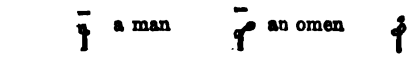
III. Write the following compound words and phrases, by

joining the symbols of the simple subordinate words of which they are composed.

Hereabout, thereabout, whereabout; hitherto, heretofore; thereupon, whereupon; therewith, wherewith, therein, thereon, their own, my own, your own, wherein, whereon: s^boever, whatever, whats^boever, whenever, whens^oever, wherever, wheres^oever, whithers^boever, as ever, for ever; all along, all alone, all but, all that, all this, all these, all those, all other, all over, all well, all one, above all, than all; less so, less than, far less, nothing less, still less; must be, shall be, will be; before that, because that, besides that, from that, also that, else that, lest that, only that, namely that, since that, so that, till that, well that, once that, that one; till then, until then, till when, till this, till to-morrow, like enough, like some, like to, like this, like that, like as; so far, so often, so like, so many as, so many that, so so, so well, so well that; or else, somewhat, one other, one another, once again, sooner than; as before, as bad as, as far as, as formerly, as often, as^b good as, as^b great, as heretofore, as also, as else, as always, as like as, as many as, as any, as none, as indeed, as nothing, as another, as near as, as soon as, as still as, as this, as thus, as that, as well as, as when, as yon, as yet.

66. The Articles *a* and *the*.

The Article *a* or *an* is represented by a *hyphen*, and *the*, by a *dot*, written above the word to which they refer. Thus:—



67. The Conjunctions *and* and *but*.

The Conjunctions *and* and *but* are represented by hyphen-marks written from *left to right* (` and,) or from *right to left* (´ but); and NOT GROUPED with any other words, but standing apart in the line of writing. Thus:—

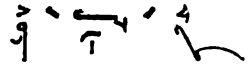
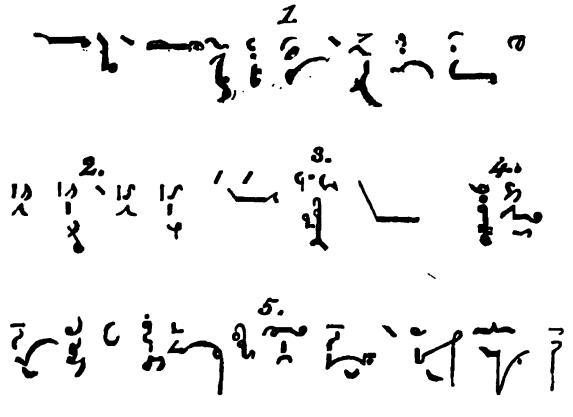


ILLUSTRATION OF THE MODE OF GROUPING THE SUBORDINATE WORDS, WITH KEY ANNEXED.



1. Surely goodness *and* mercy *shall* follow *me all the* days *of my* life, *and I shall* dwell *in the* house *of the* Lord *for ever*.

2. *It were well it were done* quickly, *and it was well it was done then*.

3. *But be* careful *lest the least* [misunder]standing occur.

4. *These are* undoubtedly *very-far better-than those*.

5. *He will* give *you neither one-nor-another of them, nor-yet any-other under* present circumstances; *sooner-than do so, he will* destroy *them, and thus* disappoint *you as-well-as* gratify *his* spite.

LESSONS IN ENGLISH.—No. XXXVI.

By John R. Beard, D.D.

LATIN STEMS.

It is curious to observe what a controlling influence the subject matter has in the metaphors employed and the derivations that are brought into play. We *lay down* railways; we *set up* an inn; so we *set up* a carriage after we have made our fortune in that shop which we *set up* when we were poor. As we may *set up* a shop, so may we *open* a shop; but we must *begin* business, or we may *set up in* business. Having built or rented, we may *open* a warehouse, as we may *open* a shop. So in professions—parsons *occupy* a pulpit, and solicitors *take* to the desk, while barristers *hold* briefs, and judges *fill* the bench. We *draw* with a pencil and *paint* with a brush. Pictures as well as books are *composed*, and both must be *sketched* before they are begun; but the one ends in a *painting*, the other in a *treatise*; the one is *the canvas*, the other is *the volume*. If we are charitably inclined and abound in wealth, we *build* a church, or *found* an hospital; but if we expend our money for our own pleasure or convenience, we *erect* a mansion and *lay out* pleasure-grounds. Probably we may begin to travel, and then we *make a voyage* by sea and *take a journey* by land. A young man entering one of the universities *reads* for honour, and *studies* for the church. If your son is a clergyman, he *does duty* on a Sunday, but if he is a dissenting minister, he *preaches*. A methodist minister *travels*, a minister of the establishment is an *incumbent*; the latter *has a living*, the former *is on a circuit*. Lawyers *advise*, physicians *prescribe*, clergymen *admonish*, and confessors *direct*. A ship impelled by a steam-engine *sails*, a train drawn by a steam-engine *runs*. Handicraftsmen receive their remuneration in *wages*, clerks in *salaries*, lawyers in *fees*, and ministers of religion in *stipends*.

Emolument, a term always applied to the receipts of the higher classes, reminds one of the time when there was in each manor or vicinity one mill, the lord or owner of which received as his pay either a portion of the flour there ground or its equivalent in money. Hence emolument, properly that which comes out of the mill-stone, came to denote gain from office or high employment.

This fact leads to the observation that words to a full mind are singularly suggestive; they are also singularly conservative, keeping and tacitly transmitting from age to age facts and history which relate to their origin, and have something to teach respecting ancient manners and customs. Gray has said—

"The curfew tolls the knell of parting day."

It is equally true that the word curfew (oouvrefeu, *put out the fire*, or fire-extinguisher), preserves a recollection of a day long since passed and gone, when the Norman, being sovereign lord of England, published his behest that at a fixed moment the fires of the Saxon peasantry should be extinguished.

Stipulation (stipula, L. *a straw*), preserves an indirect record of the legal custom once prevalent of presenting a straw as a token of the delivery of possession to one who had purchased an estate; and who keeping that straw as a token of his proprietorship, regarded it as the condition on which he held the land.

In the phrase "signing a deed," you have a trace of the times when men unable to write their name, made instead the sign of the cross in attestation of the part which they took in the matter.

Calculation (calculus, L. *a little stone*), recalls the old custom of employing pebbles (like the little balls in the Abacus) by which to perform questions of arithmetic (arithmos, G. *a number*), or the science of number.

His library may remind the student of the primitive period when the rind or bark (liber, L.) of trees served instead of the then unknown parchment and paper.

Latin Stems.

Latin words.	*Stems.*	*English words.*
senex (senis),	*seni*	*senility*
sentio, *I feel*	*sent*	*sentient*
sensus, *felt*	*sens, sent*	*sensation*, dis*sent*
sequor, *I follow*	*sequ*	ob*sequies*, sub*sequent*
secutus, *followed*	*secut*	per*secute*, pro*secute*
sidus (sidĕris), *a star*	*sider*	*sider*eal
silva, *a wood*	*silv*	*silv*an
similis, *like*	*simil*	*simil*ar, *simil*itude
simul, *at the same time*	*simul*	*simul*taneous
simulo, *I feign*	*simul*	*simul*ation, dis*simul*ation

Latin words.	*Stems.*	*English words.*
socius, *a companion*	*soci*	*social*, *society*
sol (solis), *the sun*	*sol*	*solar*, *solstice*
solor, *I comfort*	*sol*	*solace*, *console*
solus, *alone*	*sol*, *soli*	*sole*, *solitude*, *soliloquy*
solvo, *I loose*	*solv*	*dissolve*
solutus, *loosed*	*solu*, *solut*	*soluble*, *dissolute*
somnus, *sleep*	*somn*	*somniferous*
sopor (sopóris), *heaviness*	*sopor*	*soporific*
sorbeo, *I suck in*	*sorb*	*absorbent*
sorptus, *sucked in*	*sorpt*	*absorption*
sors (sortis), *a lot*	*sort*	*sort*, *assort*, *consort*
sparsus, *scattered*, *sprinkled*	*sparse*, *spers*	*sparse*, *disperse*, *aspersion*
species, *a form*	*speci*	*species*, *specific*
specio, *I see*	*speci*	*specious*
spectus, *seen*	*spect*	*aspect*
specula, *a watch-tower*	*specul*	*speculate*
spero, *I hope*	*sper*, *spair*	*desperate*, *despair*
spiro, *I breathe*	*spir*	*respiration*, *expire*
spondeo, *I vow, promise*	*spond*	*respond*
sponsus, *vowed, betrothed*	*spons*	*response*, *sponsor*, *spouse*
stillo, *I drop*	*stil*	*distil*
stinguo*, *I put out*	*stingu*	*extinguish*
stinctus, *extinguished*	*stinct*	*extinct*
stipula, *a straw*	*stipul*	*stipulate*
stirps, *the root of a tree*	*stirp*	*exstirpate*
sto, *I stand*	*stat*, *stant*, *stic*	*stature*, *distant*, *solstice*
stringo, *I bind*	*string*	*astringent*
strictus, *bound*	*strict*	*strict*, *restrict*
struo, *I pile up*	*strue*, *stroy*	*construe*, *destroy*
structus, *piled up*	*struct*	*structure*
stultus, *foolish*	*stult*	*stultify*
suadeo, *I advise*	*suad*	*persuade*, *dissuade*
suasus, *advised*	*suas*	*persuasion*
suavis, *sweet*	*suav*	*suavity*
sumo, *I take*	*sum*, *sumpt*	*assume*, *assumption*
surgo, *I rise*	*surg*	*insurgent*
surrectus, *risen*	*surrect*	*resurrection*
tango, *I touch*	*tang*, *tig*	*tangent*, *contiguous*
tactus, *touched*	*tact*	*tact*, *contact*
tardus, *slow*	*tard*	*tardy*, *retard*
tego, *I cover*	*teg*	*integument*
tectus, *covered*	*tect*	*protect*
tempus (tempŏris), *time*	*tempor*	*temporal*, *contemporary*
tendo, *I stretch*	*tend*, *tent*, *tens*	*tend*, *attend*, *distend*, *extend*, *tent*, *extent*, *intense*.

Subsequent, properly denotes that which follows immediately. The force of *immediately* is given by the sub. This word reminds me of a defect in the English language; we have no adjective equivalent to the adverb after, no adjective which denotes the relation of afterwards simply, apart, that is from the question, whether the sequence is near or remote. Commonly, subsequent is so used.

Simulation and dissimulation, both from simulo, I feign, or put on a character, differ thus: simulation signifies pretending to be what you are not; and dissimulation concealing what you are. They have both the same purpose, namely, to produce a false impression, to mislead; and so are both wrong.

> "Hide thee, thou bloody hand,
> Thou perjured, and thou *simular* of virtue;
> Thou art incestuous."—*Shakespeare*, "Lear."

The way in which a metaphor may cloak a moral misdemeanour is exemplified in the following quotation, where dissimulation is made to seem almost a virtue by reference to the propriety of keeping your own hand unseen while playing at cards:—

"Simulation and dissimulation are the chief arts of cunning; the first will be esteemed always by a wise man unworthy of him, and will be therefore avoided by him in every possible case; for to resume my Lord Bacon's comparison, simulation is put on that we may look into the cards of another; whereas dissimulation intends nothing more than to hide our own."—*Bolingbroke.*

Our word sort comes to us from the Latin, sors, through the French, sorte, which means kind or species with special reference to quality, as is exemplified in the phrase "of what sort?" From this idea of quality is derived the application of the word as found in "to sort," "to assort."

> "And when my careful eye I cast upon my sheep,
> I *sort* them in my pens, and *sorted* so I keep."—*Drayton.*

"An adjective is by nature a general and in some measure an abstract word, and presupposes the idea of a certain species or *assortment* of things, to all of which it is equally applicable."
Smith, "Formation of Language."

Sparse is a word not often used but convenient. It is specially applicable when in the thing spoken of the idea of sprinkled or scattered, the notion "here and there," the notion "up and down," the notion "in different parts," "confusedly," "without order" is implied or intended: these are cases in which our term *rare* does not meet the want:—

"There are doubtless many such soils *sparsedly* through the nation."
—*Evelyn.*

Contiguous differs from both adjacent and near. Near, conveys the common idea of proximity. But that which is near does not touch, whereas the idea of touching is essential in contiguity. But contiguity implies not merely that A touches B but also that B touches A; but a thing is adjacent when it lies up to another thing, whether it touches that other thing or not. As in many cases the differences here are very much differences of conception, you may conceive and so speak of that which is adjacent as being also contiguous, though things so lying can scarcely be thought of as being near; yet may proximity be predicated of them, inasmuch as proximus means next, that is nearest, the one thing of a series which comes next or nearest to another. It may happen that the next is also contiguous, or actually touching. Two parishes are near each other; two districts of those two parishes are adjacent; two limits of those two districts are actually contiguous.

EXERCISES IN COMPOSITION.

Words with their proper Prepositions.

	F. R.
Dash against, upon	dask, *a blow*
Deal in, by, with	daelan, *to separate*
Debar of, from	barre, *a bar*
Decide on,	caedo, *I cut*
Defend against, from,	fendo, *I cleave*
Deficient in,	facio, *I make*
Defraud of,	fraudo, *I cheat*
Demand of,	mando, *I consign*
Denounce against (a person) or (a thing),	nuntius, *a messenger*
Depend on,	pendo, *I hang*
Deprive of,	privo, *I deprive*
Derogate from, Derogatory to,	rogo, *I ask*
Descended from,	scando, *I climb*
Deserving of,	servus, *a slave*
Desirous of,	desiderium, *desire*
Desist from,	sto, *I stand*
Despair of,	spero, *I hope*
Despoil of,	spolio, *I strip, rob*
Destined to,	teneo, *I hold*
Destitute of,	destitutus, *deprived*
Detach from,	detacher, *to undo*
Detract from,	traho, *I draw.*

Make an abstract of the narrative which ensues, and then report it by word of mouth to children or friends. If you prefer, give the substance of it in a letter to a correspondent. Take care in any case not to copy or transcribe:—

Charles Edward Entering Holyrood.

On the 13th September the little army of Charles crossed the Forth, and, animated by every fear, the terrified men of Edinburgh made a show of standing to their colours. But this parade was not fated to last long. On the 16th, the Prince's advanced guard were at Kirkliston, within a few miles of the city, where the consternation increased every moment, until the volunteers began to bribe with sixpences every soldier they met, to take their arms to the castle. The arrival of the Prince was awaited by the Whigs with doubt and dismay, and by the Jacobites (at the head of whom was the Provost) with an exultation which they took very little pains to conceal. Certain commissioners were sent to Gray's Mill, to treat with the Highland chiefs for delivering the keys of the city on the best terms. Of what passed at the conference nothing is known, but, by a preconcerted arrangement (it is supposed) between them and the Prince, the city was surprised next morning at four o'clock. A soldier of the city guard, sentinel at the Netherbow, stopped a hackney coach that approached his post. "Open the Port!" cried the driver, "for I behove to get out." "Yea

* The common forms in composition, are extinguo and extinctus.

cannot," replied the sentinel, "without an order from Provost Stuart." "Provost Coutts hath ordered me to be let out," replied the driver, whipping up his horses. The soldier still remonstrated, when James Gillespie, under-keeper of the Port, said—"Let out the coach instantly, for I have an order to that effect." "Oh, sir, 'tis well; you have the keys of the Port and must answer for it," replied the soldier, and pulled back the ponderous gate in the arch between the towers. The moment the coach passed out, a Highlander sprang in, and in the twilight, grasped the sentinel, and wrested his musket from him. It was the chieftain of Lochiel; and immediately the whole Clan Cameron, nine hundred strong, with swords drawn and banners displayed, all clad in their native tartan, marched up the High-street with twelve pipers before them, making the lofty houses ring, and awakening the terrified citizens with the stirring air of

"We'll awa to Shirramuir,
And haud the Whigs in order."

About mid-day, the main body of the Highland army, making a circuit by the ancient Tower of Merchiston, marched west by the Grange Loan, a narrow road, between old walls and aged trees, and thus avoiding the castle guns, arrived in the King's Park, where the young Prince—arrayed in the national garb, which displayed to advantage his tall and handsome figure, and wearing on his left breast the Order of the Thistle—was received with acclamation by the people. Surrounded by his Highland guard—all veterans of Sheriffmuir and Glenshiel, men verging on eighty years of age, and distinguished by snow-white beards and Lochaber axes—the Prince approached the great gate of the palace, and there he paused; for, at that moment, a twenty-four pound shot, fired from the castle, struck the front wall of James V.'s Tower, near the window that lights the state apartments of Queen Mary. It dislodged several stones, and they fell together into the court. In this incident there was something so peculiarly insulting to the descendant of the Stuarts when standing on the very threshold of their desolate palace, that a simultaneous groan burst from the spectators; a shout of acclamation followed, and the Prince again approached the gate, but again paused, and looked round him irresolutely, for there was no Lord Keeper, no Earl Marischal, no Great Chamberlain, no Master of the Household, to usher him into ancient Holyrood, till a gentleman sprang from the crowd, raised his hat, and drawing his dress-sword, led the way to the state apartments, while another shout of applause burst from the people. In absence of his father, the Prince was proclaimed Regent of Britain by the heralds, at the cross, around which Lochiel, with his Camerons, and several ladies on horseback with drawn swords, acted as guard; the first for safety, the last for honour and enthusiasm. The Highlanders stayed within their camp, or, when in the city behaved themselves with the utmost order and decorum; no outrages were committed, and no brawls of any kind ensued.—*Memorials of the Castle of Edinburgh, pp.* 225-228.

LESSONS IN FRENCH.—No. XLVI.

By Professor Louis Fasquelle, LL.D.

§ 9.—Plural of Compound Nouns.

(1.) When two nouns form a compound substantive, both take the plural ending:—

Singular.	*Plural.*
chef-lieu, *chief place*	chefs-lieux, *chief places*
lieutenant-colonel, *lieutenant-colonel*	lieutenants-colonels, *lieutenant-colonels.*

(2.) When a compound noun is formed of two substantives joined by a preposition, the first only takes the plural ending:—

Singular.	*Plural.*
arc-en-ciel, *rainbow*	arcs-en-ciel, *rainbows*
chef-d'œuvre, *masterpiece*	chefs-d'œuvre, *masterpieces.*

The words tête-à-tête and coq-à-l'âne (*an incongruous discourse*), remain unchanged in the plural.

(3.) When a noun and an adjective form a compound noun, both are varied in the plural:—

Singular.	*Plural.*
gentilhomme, *nobleman*	gentilshommes, *noblemen*
porte-cochère, *carriage-door*	portes-cochères, *carriage-doors*
basse cour, *poultry-yard*	basses-cours, *poultry-yards.*

(4.) For the sake of euphony, the mark of the plural * is omitted in the adjective of the following compound words:—

Singular.	*Plural.*
grand'mère, *grandmother*	grand'mères, *grandmothers*
grand'messe, *high mass*	grand'messes, *high-masses.*

(5.) The words, Monsieur, *Sir, Mr., gentleman*; Madame *Madam*, or *Mrs.*; Mademoiselle, *Miss*, form their plural as follows:—

Singular.	*Plural.*
Monsieur, *Sir*, etc.	Messieurs, *Sirs, gentlemen*
Madame, *Madam*, etc.	Mesdames, *ladies*, etc.
Mademoiselle, *Miss*, etc.	Mademoiselles, *young ladies*, etc.

(6.) In words composed of a noun and a verb, a preposition or an adverb, the noun takes the form of the plural; provided, however, there is plurality in the idea:—

Singular.	*Plural.*
passe-port, *passport*	passe-ports, *passports*
avant-garde, *vanguard*	avant-gardes, *vanguards*

(7.) Compound nouns of which the second word indicates plurality, take *s* in the singular and plural:—

Singular	*Plural.*
cure-dents, *a tooth-pick*	cure-dents, *tooth-picks*
casse-noisettes, *nut-crackers*	casse-noisettes, *nut-crackers.*

(8.) Words composed of two verbs, or of a verb joined to an adverb, or a preposition, are invariable:—

Singular.	*Plural.*
passe-partout, *master-key*	passe-partout, *master-keys*
pour-boire, *coachman's fee*	pour-boire, *coachman's fees.*

§ 10.—Nouns which have no Plural.

(1.) The nouns of metals considered in themselves: as, or, *gold*; argent, *silver*; plomb, *lead*; étain, *pewter*; fer, *iron*; cuivre, *copper*; vif argent, *quicksilver*, &c.

(2.) Aromas: such as baume, *balsam*; encens, *incense*, &c.

(3.) The names of virtues and vices, and some names relating to physical and moral man: as, la jeunesse, *youth*; la beauté, *beauty*; la bonté, *goodness*; le courage, *courage.*

(4.) Adjectives used substantively: as, le beau, *the beautiful*; l'utile, *the useful*, &c.

§ 11.—Nouns which have no Singular in the sense here given.

Arrhes,	*earnest money.*	Entraves,	*difficulties.*
Annales,	*annals.*	Fiançailles,	*betrothing.*
Appas,	*charms.*	Funérailles,	*funeral.*
Arrérages,	*arrears.*	Frais,	*expenses, costs.*
Arrêts (être aux),	*to be under arrest.*	Gages,	*wages.*
Assises,	*assizes.*	Gens,	*people.*
Broussailles,	*brushwood.*	Lunettes,	*spectacles.*
Catacombes,	*catacombs.*	Mœurs,	*manners.*
Ciseaux,	*scissors.*	Mouchettes,	*snuffers.*
Confins,	*confines.*	Pierreries,	*jewels, diamonds.*
Denrées, Vivres,	*provisions.*	Pincettes,	*tongs.*
Décombres,	*ruins.*	Pleurs,	*tears.*
Etrennes,	*new year's presents.*	Semailles,	*seeding time.*
Environs, Alentours,	*environs.*	Ténèbres,	*darkness.*
		Tenailles,	*pincers.*
		Vitraux,	*window-glass.*

§ 12.—Proper Names.

(1.) Proper names, when not used figuratively, are invariable, even when preceded by the plural article, les (*).

L'Espagne s'honore d'avoir produit les deux *Sénèque.* RAYNOUARD.	*Spain prides herself on having given birth to the two Senecas.*
Les *Locke*, les *Montesquieu*, les *J. J. Rousseau*, en se levant en Europe, appelèrent les peuples modernes à la liberté. CHATEAUBRIAND.	*Locke, Montesquieu, J. J. Rousseau, as they arose in Europe, called upon modern nations to claim their liberty.*

(2.) When proper names are used figuratively, they take the form of the plural.

La France a eu ses *Césars* et ses *Pompées.* NOEL ET CHAPSAL.	*France has had its Cæsars and its Pompeys.*

That is,—generals like Pompey and Cæsar.

Un coup d'œil de Louis enfantaits des *Corneilles.* DELILLE.	*A glance from Louis produced Corneilles.*

That is,—poets like Corneille.

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* The mark of the feminine also.

* Often used by the French before the names of celebrated individuals.

§ 13.—The Article.

(1.) The article is a word prefixed to a noun, or to a word used substantively, to determine the extent of its signification.

(2.) Modern French grammarians recognise only one article, *le*.

(3.) This article, contracted with the preposition *de*, is often used before a word in a partitive sense. [§ 78.]

(4.) The words *un*, *masc.*, *une*, *fem.*, answering to the indefinite article *a* or *an* in English, are now very properly* classed with the numeral adjectives. We shall, however, for the sake of convenience, devote a few lines to them under this head.

(5.) The article *le*, *the*, is *la* for the feminine, and *les* for the plural.

(6.) The article is subject to two kinds of changes: *elision* [§ 146] and *contraction*.

(7.) Elision is the suppression of the letters *e*, *a*, which are replaced by an apostrophe ['] before a vowel, or an *h* mute [see L. 3 (11)]: thus,

l'esprit, *the mind*,	instead of	le esprit
l'amitié, *the friendship*,	,,	la amitié
l'homme, *the man*,	,,	le homme
l'humanité, *humanity*,	,,	la humanité.

(8.) Contraction is the union of the article *le*, *les*, with one of the prepositions, *à*, *de*. Thus, we say by contraction :—

au livre, *to the book*,	instead of	à le livre
aux fruits, *to the fruits*,	,,	à les fruits
du livre, *of the book*,	,,	de le livre
des fruits, *of the fruits*,	,,	de les fruits.

(9.) The contractions *au*, *du*, are not used before masculine words commencing with a vowel, or an *h* mute, nor before feminine words :—

à l'homme,	*to the man*
à l'ami,	*to the friend*
de l'homme,	*of the man*
de l'ami,	*of the friend.*

(10.) The article used before words taken in a partitive sense [§ 78 (1)], comes in connexion or contraction with the preposition *de* ; it is rendered in English by *some* or *any*, expressed or understood :—

du pain, m.	*some bread*, or	*of the* bread	(*a part of*)
de l'argent, m.	*money, some money*,	*of the* money	(*a part of*)
de la viande, f.	*meat, some meat*,	*of the* meat	(*a part of*)
de l'argenterie, f.	*silver-plate, some silver plate*,	*of the* silver-plate	(*a part of*)
des livres, m.	*books, some books*,	*of the* books	(*a part of*)

(11.) The English indefinite article, *a* or *an*, is rendered in French by *un* for the masculine, and *une* for the feminine; when those words are connected with the preposition *de*, the *e* of the preposition is elided :—

Masculine.		*Feminine.*	
un homme,	*a man*	une femme,	*a woman*
d'un homme,	*of or from a man*	d'une femme,	*of or from a woman*
à un homme,	*at or to a man.*	à une femme,	*at or to a woman.*

Résumé of the above Observations.

le, before a masculine word,	*commencing with a consonant,*
la, before a feminine word,	*commencing with a consonant,*
l', before a word of either gender,	*commencing with a vowel or h mute,*
	} *the*
les, for the plural, *in all cases.*	
du, before a masculine word,	*commencing with a consonant,*
de la, before a feminine word,	*commencing with a consonant,*
de l' before a word of either gender,	*commencing with a vowel or h mute,*
	} *of the, from the, some, any.*
des, for the plural, *in all cases.*	
au, before a masculine word,	*commencing with a consonant,*
à la, before a feminine word,	*commencing with a consonant,*
à l', before a word of either gender,	*commencing with a vowel or h mute,*
	} *at or to the.*
aux, for the plural, *in all cases,*	
un, before a masculine noun,	} *a, an, one.*
une, before a feminine noun,	
d'un, before a masculine noun,	} *of or from a, an, one.*
d'une before a feminine noun,	
à un, before a masculine noun,	} *at or to a, an, one.*
à une, before a feminine noun,	

* No difference can be made in rendering English into French, between a and one, so that in French *un* homme means *a man*, or *one man*, The other numeral adjectives might with as much propriety have been called articles as this word *un*.

Le père et la mère sont au désespoir. B. DE ST. PIERRE.
The father and mother are in despair.

L'amitié dans nos cœurs verse un bonheur paisible. DEMOUSTIER.
Friendship pours a peaceful happiness into our hearts.

L'honneur aux grands cœurs est plus cher que la vie. CORNEILLE.
Honour is dearer than life to noble hearts.

Les filles et les garçons chantèrent en chœur. B. DE ST. PIERRE.
The boys and girls sang in chorus.

Sur les rives du Gange on voit fleurir l'ébène. DELILLE.
On the banks of the Ganges we see the ebony in bloom.

La violette se cache timidement au milieu des filles de l'ombre. DELEUZE.
The violet conceals herself timidly in the midst of the daughters of the shade.

Le remords se réveille au cri de la nature. DE BELLOY.
Remorse is aroused by the cry of nature.

La moitié des humains vit aux dépens de l'autre. DESTOUCHES.
The half of mankind lives at the expense of the other.

§ 14-1.—The Adjective.

(1.) The adjective serves to denote the quality or manner of being of the noun.

(2.) Adjectives are of two sorts : *qualifying adjectives* and *determining adjectives*.

(3.) We call *qualifying adjectives* those which add to the idea of the object, that of a quality proper to it; as bon, *good*; noble, *noble* ; courageux, *courageous*.

(4.) *Determining adjectives* are those which add to the idea of the object, that of a particular limitation or determination; as quelque, *some* ; tout, *all* ; autre, *other* ; mon, *my* ; nul, *no* ; un, *one* ; deux, *two*.

LESSONS IN LATIN.—No. XLII.

By John R. Beard, D. D.

IMPERSONAL VERBS.

Those verbs are called *impersonal*, that is, without persons, which have not the ordinary persons. When I say pater amat, *father loves*, I use a personal verb, of which pater, in the third person singular, is the subject. When I say ego rideo, sed tu fles, *I laugh, but thou weepest*, I use personal verbs, having respectively the persons ego and tu, *I* and *thou*, for their subjects. If, however, I say gelat, *it freezes*, I employ a verb which has none of the ordinary persons for its subject. Yet is the form of the verb gelat that of the third person singular. Hence it appears, that impersonal verbs are found in the third person singular. In some sense, then, they have one person, namely, the *third*. They may therefore be called *uni-personal* verbs. Uni-personal is a less inaccurate designation for these verbs than *impersonal*.

From these remarks, we may define *impersonal verbs* as those which express an action without reference to any defined subject. Such are

Impersonal Verbs relating to Atmospheric Phenomena.

Fulgurat, *it lightens.*	Gelat, *it freezes.*
Fulminat, *it strikes with lightning.*	Diluculat, *it dawns.*
Tonat, *it thunders.*	Lucescit, *the day breaks.*
Grandinat, *it hails.*	Vesperascit, *it grows dark*, or, *evening comes on.*
Pluit, *it rains.*	Noctescit, *the night approaches.*
Ningit, *it snows.*	

Connexions are rare in which these verbs have a definite subject, e. g., Jupiter tonat, Jupiter fulgurat; dies vesperascit, coelum vesperascit ; lapides pluunt ; we find, however, lapidibus pluit, and sanguinem fluit. Besides vesperascit, there is the form advesperascit, and the perfect vesperavit.

In a wider sense, grammarians class among impersonal verbs some that denote

States of Mind, Duty, or Necessity.

Miseret, *it occasions pity;* misertum, and miseritum est rarely miseruit, miserēre.

Piget, *it occasions grief;* piguit, or pigitum est, pigēre.

Poenitet, *it occasions sorrow;* poenituit, poenitēre.

Pudet, *it occasions shame;* puduit and puditum est, pudēre.

Taedet, *it occasions weariness;* instead of taeduit, which is very rare, pertaesum est; taedēre.

Oportet, *it behoves, it is proper;* oportuit, oportēre.

Libet (lŭbet), *it pleases;* libuit, or libitum est.

Licet, *it is lawful, permitted;* licuit, or licĭtum est, licēre.
Decet, *it becomes, it is seemly;* decuit, decēre.
Dedecet, *it is unseemly, improper;* dedecuit, dedecēre.

The person who is the subject of the feeling, or liable to the duty, is put in the accusative case; as, *te* oportet in litteras incumbere, *you ought to apply to literature*, or *to study*. Besides an accusative of the person, these verbs, in general, may have a genitive of the thing, e. g., miseret me tuae calamitatis, *I am sorry for thy calamity*. We may exhibit their construction, thus:

Pudet me ignaviae, *I am ashamed of idleness.*	Pudet nos ignaviae, *we are ashamed of idleness.*
Pudet te ignaviae, *thou art ashamed of idleness.*	Pudet vos ignaviae, *ye are ashamed of idleness.*
Pudet illum ignaviae, *he is ashamed of idleness.*	Pudet illos ignaviae, *they are ashamed of idleness.*

Oportet, however, has for its subject two accusatives, thus: oportet te hoc facere, *you ought to do this*. Libet and licet require a dative of the person, e. g., libet mihi, *I am allowed;* licet vobis, *you are allowed*. Of licet, there is the imperative form licetō; otherwise, the subjunctive present is used for the imperative, e. g., pudeat te, *shame upon thee*. For the most part, these verbs are without participles. Yet we find the following:—Decens, libens, licens, poenitens, liciturus, puditurus, and pigendus, pudendus, poenitendus; also, the gerunds, poenitendi, pudendo, and pigendum.

There is another class of

Personal Verbs used as Impersonal.

Interest, and rĕfert, *it concerns.*
Accĭdit, evĕnit, contingit, *it happens.*
Accēdit, *it is added, moreover.*
Appāret, *it appears, it is clear.*
Paret, liquet, *it is obvious, apparent,*
Conducit, *it is conducive to, advantageous,*
Expĕdit, prodest, *it is useful.*
Convĕnit, *it is suitable.*
Nocet, *it is injurious.*
Fallit, fugit, praeterit (me), *it escapes me, escapes my notice, I know not.*
Placet, placuit, and placĭtum est, *it pleases.*
Sufficit, *it is sufficient.*
Suppĕtit, *there is a supply.*
Succurrit, *aid is given.*
Vacat, *there is a want.*
Stat, *it stands, it is agreed.*
Constat, *it is made out, proved.*
Praestat, *it is better.*
Restat, *it remains.*
Solet, assolet, *it is customary.*
Attĭnet, pertinet, *it regards, relates to.*
Est=licet, e. g., est videre, *it is to be seen, you may see.*

There may be added

Passive Impersonals.

Curritur, *it is run*, that is, *men run, they run.*
Venitur, *it is come, they come;* ventum est, *they have come.*
Bibitur, bibitum est, *they drink, drinking is going on.*
Traditur, *it is handed down, reported.*
Scribitur, *it is written.*
Ridetur, *men laugh.*

Interest and rĕfert take a genitive of the person, but instead of the genitive of the personal pronoun, the ablative is used, meā, tuā, suā, nostrā, vestrā.

VOCABULARY.

Demĕto, demessui, demessum 3, *I cut down, mow*; commentarium, i, n. *a note, record, a note-book*, with pl. commentaria, *archives*, or *national records*; nefas, n indeclinable, *that which is too wicked to be uttered* (ne, *not*, and fari, *to speak*), *wrong, impious*; libīdo, libidĭnis, f. *desire, lust*; interĭmo, interemi, interemptum 3, *I slay, take off*; ignavia, ae, f. *idleness sloth, cowardice*; comitia, orum, n. *the Comitia*, or *public assembly of the Roman people*; interemptio, ōnis, f. *murder*; honestē, *honourably*; turpiter, *basely*.

EXERCISES.—LATIN-ENGLISH.

Interest omnium recta facere; noctu magis quam interdiu sine tonitribus fulgurat; et jam lucescebat omniaque sub oculis erant; omnia notescunt; et vesperascit et non noverunt viam; me taedet sermonis tui; quid nostrā refert victum esse Antonium? ubi jam vesperaverat; mea mater, tui me miseret, mei piget; praeceptoris multum interest discipulos summo studio in litteras incumbere; magnopere meā interest ut te videam; ut subito, ut propere, ut valide tonuit! non ante demetuntur fructus quam gelaverit; lacte pluit; omnium magni interest feliciter vivere; in nostris commentariis scriptum habemus, Jove tonante, et fulgurante, comitia populi habere nefas; sagittis, plumbo et saxis grandinat; pluet credo hŏdie; totum illud spatium quā pluitur et ningitur; pluvius est dies; interdum ningit; eamus, lucescit jam; sunt homines quos libidinis suae neque pudeat nĕque taedeat; taedet ipsum Pompeium vehementerque poenitet; pudet piget que mei me; fratris me quidem piget pudetque; sapientis est, nihil quod poenitere possit facere; Alexander, quum interemisset Clitum, vix a se manus abstinuit, tanta vis fuit poenitendi; tanquam ita fieri non solum oporteret sed etiam necesse esset; est etiam aliquid quod non oporteat etiam si licet; adde etiam, si libet, velocitatem; quod tibi lubet, idem mihi lubet.

ENGLISH-LATIN.

I am sorry for my sins; he is weary of life; is he weary of life? they are not weary of life; this interests all men; this interests thee and me; does it interest us? they are weary of our conversation; it grows dark; it rains; does it rain? it hails; it lightens; it thunders; it will rain all day (totum per diem); it snows; it rains blood; go home, for it grows dark; those men repent of their lusts; I am ashamed of my brother; Alexander repented the murder of his friend Clitus; it behoves thee to repent of thy sins; to do good is the interest of all; my mother repents and grieves; they run; men laugh; are you ashamed of your idleness? they are ashamed of their idleness; I like (it pleases me) to do good; dost thou like to read? to love father and mother is seemly; it is unbecoming (disgraceful) to lie; that escapes thy notice; it is better to die honourably than to live basely; will that escape your notice?

Aesopii Fabulae.

CANIS MORDAX.

Cani mordāci paterfamilias jussit tintinnabulum ex aere appendi, ut omnes eum cavere possent. Ille vero aeris tinnĭtu gaudebat, et quasi virtutis suae praemium esset, alios canes prae se contemnere coepit. Cui unus senior, "O te stolidum," inquit, "qui ignorare videris, isto tinnĭtu pravitatem morum tuorum indicari?"—Haec fabula scripta est in eos, qui sibi insignibus flagitiorum suorum placent.

CANIS ET LUPUS.

Lupus canem videns bene saginatum, "quanta est," inquit, "felicitas tua! tu, ut videtur, laute vivis, ut ego fame enĕcor." Tum canis, "licet," inquit, "mecum in urbem venias et eādem felicitate fruaris." Lupus conditionem accepit. Dum una eunt, animadvertit lupus in collo canis attritos pilos. "Quid hoc est?" inquit. "Num jugum sustines? cervix enim tua tota est glabra." "Nihil est" canis respondit. "Sed interdiu me alligant, ut noctu sim vigilantior; atque haec sunt vestigia collaris, quod cervici circumdāri solet." Tum lupus, "Vale," inquit, "amice! nihil moror felicitatem servitute emtam!"—Haec fabula docet, liberis nullum commodum tanti esse, quod servitutis calamitatem compensare possit.

LUPUS ET GRUS.

In faucibus lupi os inhaesĕrat. Mercede igitur conducit gruem, qui illud extrāhat. Hoc grus longitudine colli facile effecit. Quum autem mercedem postularet, subrīdens lupus et dentibus infrendens, "Num tibi," inquit, parva merces videtur, quod caput incolume ex lupi faucibus extraxisti?

AGRICOLA ET ANGUIS.

Agricŏla anguem repĕrit, frigore paene exstinctum. Misericordiā motus, eum fovit et subter alas recondidit. Mox anguis recreatus vires recepit, et agricolae pro beneficio letāle vulnus inflixit.—Haec fabula docet qualem mercedem mali pro beneficiis reddere soleant.

VOCABULARY.

Mordax, ācis, *biting, given to biting*; aes, aeris, n. *brass*; tinnĭtus, us, m. *a ringing*; pravitas, ātis, f. *badness, vice, viciousness*; insigne, is, n. *a token*; flagitium, i, n. *a crime*; laute, *well, richly*; sagino 1, *I fatten*; enĕco 1, *I kill*; fruor 3 dep., *I enjoy* (gov. abl.); una, *together, together with*; num, *asks a question, expecting an answer in the negative*—num sustines? *surely thou dost not bear a yoke?* attritus (tero), a, um, part. *rubbed, rubbed off*; pilus, i, m. *hair*; cervix, icis, f. *the neck*; glaber, glabra, glabrum, *stript of hair, bald*; vestigium, i, n. *a footstep, a trace, mark*; collāre, is, n. *a collar* (collum); moror 1. dep., *I delay, wait for, desire*; nihil moror felic. &c., "*I have no desire for a happiness which has been purchased by slavery*;" fauces, ium, f. *the throat*; letālis, e, *deadly*.

LESSONS IN GEOLOGY.—No. XXVI.

By Thomas W. Jenkyn, D.D., F.R.G.S., F.G.S., &c.

CHAPTER II.

ON THE ACTION OF WATER ON THE EARTH'S CRUST.

SECTION X.

ON THE FORMATION OF DELTAS.

You have seen that all the rivers and rills which issue from the mountains, are more or less charged with earthy particles, which they have worn from the rocks over which they have flowed, and which they hold in suspension as long as their current is rapid, or their waters are agitated.

In proportion to the length of their course, these streams become more and more loaded with sand and mud, according as their power of abrasion is increased or continued. These adventitious materials, taken up by the rivers, are suspended in the fluid, until they are carried onward and deposited in a lake, or in the sea.

If the stream has a feeble current, much of the pebbles and gravel which they bear are thrown down in the bed of the river, and form those alluvial plains which were described in the last lesson. But by far the greatest quantity of this detritus is carried down to the mouths of rivers; that is, to their junction with other streams, or with the waters of a lake or a sea. There they form accumulations of sand and mud which, since the days of Herodotus, are called Deltas.

Delta is the name of the fourth letter in the Greek alphabet, and is thus formed Δ. This designation was originally given by the Greeks to that part of Lower Egypt which extends from the Mediterranean up to the point now occupied by Cairo, and which has a triangular shape something like the Greek letter Delta. See fig. 56.

Fig. 56.

The Delta of the Nile.

You see that the whole of this district is in the form of the Greek Delta. It is evident that this form or shape has been given to the country by the river Nile, which empties itself into the sea by different mouths, as the wood-cut represents. Hence, wherever there are found alluvial tracts at the mouths of great rivers which enter the sea by two or more diverging branches, they are called, by geologists, Deltas, though such accumulations may have nothing of the triangular shape.

A former lesson has taught you that when a river is charged with detritus, the middle of the stream is the portion most loaded, because it is there that the velocity is greatest. Whenever that velocity becomes diminished, either by a plain, or by the waters of a lake or of a sea, the mouth of the river becomes wider, and forms what is called an estuary. At its junction with the calm water of the lake, or when its velocity is checked by the power of the sea, the detritus sinks, and a central deposit is formed. To this deposit fresh accessions are made every moment, day and night, by incessant contributions from the turbid waters of the river, till, at last, the detritus deposited rises to the surface as dry ground, and forms an island. No sooner is it an island, than, necessarily, it divides the river into two streams.

The island, thus formed by river sediments, keeps constantly increasing in length, and enlarging in breadth. What is most remarkable in the formation of this deposit is, that the enlargement, or the widening, of the island is in the portion nearest the sea. The part which is towards the stream is being perpetually abraded by the force of the current rushing against its sides: but, in the part where it fronts the sea, there is quiet or dead water, in which the detritus is constantly subsiding and settling.

The formation and the permanence of this island, make the two branches of the river on each side of it to diverge more and more. The result of this divergence is that the island itself, between the two branches and the sea, will become more and more of the shape of Delta, or of a triangular form.

The river has now two branches. If the river be large, each of these branches will be charged with detritus. As each branch joins the sea, each will again deposit its detritus at that junction; and, consequently, each will form a fresh delta of its own, upon the same principle as the main river did. By this process other islands will appear, and new branches of the stream will be constantly formed. Some of these branch currents will be diverging, and some converging, in all directions, until the surface will appear as a net-work of rivers, inclosing numerous portions of land, all of which are, as seen in the wood-cut, more or less of a deltoid or triangular character. See fig. 56.

It is not only a possible case, but it is a fact in physical geography that, by the constant increase of river deposits, and by the checks which these diverging and converging streams receive, all the deltas described may be formed into one large alluvial plain, that is, into one continuous delta, like that of the Thames, from near Reading down to Sheerness, or like that depicted in the last lesson (fig. 55).

Inundations, freshets, or floods, have a great share in the formation and growth of deltas. When rivers become greatly and rapidly swollen, their channels can no longer contain the water supplied by heavy rains, or by melted snows: they, therefore overflow all the plains and lowlands about their mouths. The waters, which spread beyond the two banks of the river, will always run slower than those in the bed of the stream. This outspread water will soon precipitate the fine sand or mud which it holds in suspension, and the sediment, which settles down, forms a layer of a new rock.

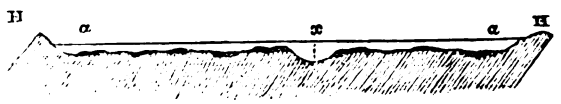
The land, which is thus covered by a flood, is likely to have a surface that is a little indented or undulated, as is represented in fig. 57. These curves in the surface of the indented plain will produce four results. 1. The fresh layers of sand or silt deposited will not be horizontal, nor of equal thickness. 2. Wherever there is a little curving or delving in the surface of the soil, there will be a current of moving water. 3. When the flood begins to subside, some of the upper portions of the undulating surface will appear above the sheet of water as islands. 4. The water running between these will deepen these curves or hollows, so that eventually the surface will, after the water is gone, be more uneven than before. With every fresh flood, these effects will be increased. Fresh sediments will be deposited on the upper parts of the undulations, so as to raise them higher than before. The intervening hollows also will be excavated deeper and deeper, till they become permanent branches of the main river. In the process of time the alluvial plain will have the same deltoid character or triangular shape, and the landscape will have the same net-like appearance of rivers and islands, as was the case in the instance first mentioned.

You now see that deltas are formed in two ways. They are formed by rivers precipitating their detritus at their junction with a lake or a sea, and by rivers scooping out channels in an alluvial plain. You also see that there are two ways in which deltas grow in magnitude. They grow by extending into a lake or sea, and along a coast; and they grow in height or depth, as the surface rises higher with every new layer deposited by a flood.

The increase of deltas, by extending into the sea and along the coast, will be at once understood by a glance at the delta

of the Nile, in fig. 56. Their increase in elevation also will be understood by referring to fig. 55, in our last lesson, and by a study of the following diagrams.

Fig. 57.



Mud deposited by a River Flood, through the breadth and length of a Low Valley.

Here you have a section across a river bed between high lands. H H are the high lands on each side of a valley *a a*, and *x* is the bed of the river when there is no flood. When the river is flooded, the turbid waters will extend over the whole section, and deposit their sediments on the surface of the entire area. The amount of this deposit will be greatest on the immediate banks of the river—partly because the first waters of the overflow will be on those lines, and partly because as the flood drains back to the bed of the river, the last precipitations will be there also. By a repetition of this process the banks will become so elevated as never to be covered by a flood. This is explained in fig. 58.

Fig. 58.

Sediments deposited by Floods where a River has raised its Banks.

Here it is shown that when a river has, in the course of time, raised its bed and its banks by successive deposits, and the flood spread over the extent of the valley, the water will be kept back in the hollows at *a a*, until it is evaporated, and the whole sediment rests as a new layer on the surface. It is evident that this valley will be gradually elevated, so long as the floods continue thus to operate in adding new layers.

I will now relate to you a few of the most remarkable facts connected with the formation and extension of deltas.

Your attention has been called to the delta of the Nile, as being one of the most illustrative specimens. It was a very ancient saying among the Egyptians that "Egypt was the gift of the Nile." So may the Dutch of the present day say that "Holland is the gift of the Rhine." If you look at fig. 56, representing a small map of Egypt, you will see that the whole appearance of the lowlands shows that, at one time, the Mediterranean formed a bay up to the rocks near Memphis, some miles above where Cairo now stands. The present base of these rocks is now washed by the inundations of the Nile, at an elevation of 70 or 80 feet above the level of the Mediterranean.

You are to consider that when the Nile, at a very remote age, began to flow, the river met the sea at these rocks. It immediately began to deposit its detritus on that coast, and it has continued the process ever since. The bed of the river itself, and the entire valley covered by its inundations, are daily undergoing a gradual increase of elevation, varying in different places, and lessening in proportion as the river approaches the sea. Since thus the Nile precipitates so much of its sediment in the inundated parts of Higher Egypt, the alluvial deposit does not cause the delta to extend rapidly towards the sea. Nevertheless, some ancient cities which were once close to the shore, are now a mile or more inland. The earlier geographers mention several mouths of the Nile which, in the present day, are all silted up.

The *bed* of the Nile keeps rising, in pace with the general elevation of the soil caused by annual deposition; but the *banks* of the river are much higher than the flat land at a distance. These elevated banks and flat lands are represented in fig. 58. They are consequently very seldom covered by water, even during the highest inundations. That the bed of the river, and the soil of the valley of the Nile, are gradually rising, is evident from the following facts. The increase of sediment in the bed of the river makes the annual flood to spread over a wider and wider area, and hence the alluvial soil encroaches on districts that were once adorned with statues and temples, which the waters never reached three thousand years ago, but which are now covered to the depth of six or seven feet with the deposits of the Nile.

Wherever deep cuttings have been made in the alluvial deposit of the Nile, it is found that the mud is thinly stratified. In each annual lamina, the upper part of the layer is of lighter coloured earth than the lower. The layers of each year separate easily from one another. The annual layers vary, of course, in thickness, according to the quantity of mud brought down by each inundation. The mean annual thickness of a layer is, near Cairo, that of a sheet of thin pasteboard: a stratum, therefore, of two or three feet in thickness, represents the deposition of a thousand years.

The extension of the Delta, as it protrudes into the Mediterranean, is easily ascertained, both by historical records and by soundings. At a small distance from the shore of the Delta, the depth of the sea is about 12 fathoms. This depth is found to increase gradually to 50 fathoms, and then, at once, the depth is 380 fathoms. This was probably the original depth of the sea, before the Nile made it shallower by fluviatile matter.

The Delta of the Nile commences, as you see in fig. 56, about 100 miles in a direct line from the Mediterranean to above Cairo. Its breadth on the coast is at least 230 miles. The whole area of this Delta, with the exception of a few sand-hills and artificial mounds or tumuli, is a perfectly level plain, intersected in every direction by channels from the main river. The fall of the Nile, from Cairo to the sea, is only one foot in 16,000.

The geological principles developed by the Delta of the Nile are found, with certain modifications, in every other delta on the face of the globe. It would be impossible, in a lesson like this, to detail the formation and progress of the Delta of the Rhine in the German Ocean, the Delta of the Rhone in the Mediterranean, of the Po in the Adriatic, of the Danube in the Black Sea, of the Ganges in the Indian Ocean, of the Orinoco in the Atlantic, and of the Mississippi in the Gulf of Mexico. The physical geography of all these you must read for yourself.

The examination of the structure and contents of a delta is a study of great importance to a geologist. This is evident, when you consider that in these deltas will be found imbedded, leaves and branches of trees, remains of animals that fall into the streams, together with shells and other exuviæ. Imagine that any large delta, say of the Nile, Ganges, or the Mississippi, were ever raised to a considerable elevation, by volcanic agency. In that case the geologist would be able, by examining the fossil remains, to determine easily the character of the animals and plants of the countries through which those mighty rivers had flowed. As in the present deltas of England, he would find the bones of the horse, the deer, and other domesticated animals, associated with the trunks of trees and the leaves of plants, and also river-shells and sea-shells mingled with human bones and works of art,—so in that of the Ganges he would detect the animals and vegetables of India, and in that of the Mississippi those of North America.

An ancient delta of this description, elevated by volcanic power, is found in England, in what is called the Wealden of Kent and Sussex. The arguments that are employed to account for the contents of this delta, are as clear and as satisfactory as any that could be employed to account for the cables and anchors, and ships' timber, which some future naturalist may find imbedded in the Goodwin Sands, should they ever become an elevated island.

LESSONS IN GERMAN.—No. XXXVI.

Section LXXIV.

The preposition „wegen" is often compounded with the genitive of personal pronouns (§ 57. 2.), which in this connection substitute „t" or „ff" for the final „r". Ex.: Meinetwegen (instead of meinerwegen), on my account, for my sake (literally on account of me). Seinetwegen nur bin ich gekommen; on his account only have I come.

I. The preposition zu is often used after certain verbs (as,

machen, werden, brauchen, &c.,) to mark the result of an action, or the end or destination of a thing. Ex.: Sie haben ihn zum Feind gemacht; you have made him (to) an enemy, or, you made an enemy of him. Das Eis wird zu Waſſer; the ice becomes (to) water. Er braucht fünf Ellen Tuch zu einem Mantel; he needs five ells of cloth for a cloak.

II. Verdacht auf Jemand haben, or, Jemand in Verdacht haben (literally, to have suspicion upon one, or, to hold one in suspicion,) answers to our "to suspect." Ex.: Ich habe Verdacht auf ihn, or, ich habe ihn in Verdacht; I suspect him, or, I have suspicion of (upon) him.

Exercise 77.

An'kleiden, to dress, attire;	Krankheit, *f.* sickness, illness;	Verdacht, *m.* suspicion;	
Aufwärterin, *f.* female-servant; waiting-woman;	Mittag, *m.* noon, mid-day;	Weiter, farther;	
Auszehrung, *f.* consumption;	Mitternacht, *f.* mid-night;	Werfen, to throw, cast;	
Baden, to bathe;	Speiſen, to eat; zu Mittag ſpeiſen, to dine;	Worauf, whereupon, on which;	
Frühſtücken, to breakfast;		Zuerſt, at first, for the first.	

Haben Sie gehört', an was für einer Krankheit der Rei'ſende geſtorben iſt?	Have you heard what disease the traveller (has) died of?
So viel (Sect. 35. IV.) ich weiß, iſt er an der Cho'lera geſtor'ben.	As far as I know, he (has) died of the cholera.
Alexander der Große ſtarb an einer Krankheit zu Ba'bylon im drei und drei'ßigſten Jahre ſeines Lebens.	Alexander the great died of (a) sickness at Babylon in the thirty-third year of his life.
Auf wen haben Sie Verdacht'?	Whom do you suspect? (Upon whom have you suspicion?)
Ich habe ihn in Verdacht', mich beraubt' zu haben.	I suspect him of having robbed me. (I have him in suspicion to have robbed me.)
Nachdem' ich zu Nacht geſpeiſt haben werde, gehe ich aus.	After I shall have supped I shall go out. (After I shall have eaten at night, I go out.)
Er iſt nach zehn Uhr zu mir gekommen.	He came to me after ten o'clock. (He is come to me after ten o'clock.)
Er iſt wegen ſeiner Krankheit nicht gegangen.	On account of his illness he did not go (He is on account of his illness not gone.)

1. Wiſſen Sie nicht, an was für einer Krankheit ihre Nichte geſtorben iſt? 2. So viel ich gehört habe, iſt ſie an der Auszehrung geſtorben. 3. Viele ſind in dieſem Jahre an der Cholera geſtorben. 4. Weiß man nicht, wer die ſilbernen Löffel geſtohlen hat? 5. Nein, aber man hat Verdacht auf einen Bedienten des Hauſes. 6. Man hatte zuerſt eine alte Aufwärterin in Verdacht. 7. Er hat mich in Verdacht, ihn vorſätzlich beleidigt zu haben. 8. Ich weiß wirklich nicht, auf wen ich meinen Verdacht werfen, und worauf ich ihn ſtützen ſoll. 9. Nachdem ich mich angekleidet, und nachdem ich gefrühſtückt haben werde, will ich ihn beſuchen. 10. Nachdem er zu Mittag geſpeiſt hatte, las er die Zeitung. 11. Nachdem er ſich gebadet hatte, machte er einen Spaziergang. 12. Nach zehn Uhr des Abends beſuchte er mich noch. 13. Nach Mitternacht werden wir unſere Reiſe weiter fortſetzen. 14. Es giebt Menſchen, welche nach dieſem Leben kein anderes erwarten. 15. Ich freue mich ſeinetwegen mehr als meinetwegen. 16. Ihretwegen habe ich die Reiſe unternommen. 17. Euretwegen iſt der Vater ſo betrübt. 18. Unſertwegen brauchen ſie ſich nicht zu ſchämen. 19. Mein Bruder war ſeiner ſelbſt nicht mehr mächtig. 20. Haſt Du Herrn N. ſelbſt, oder ſeine Frau geſehen? 21. Ich habe ihn ſelbſt nicht nur geſehen, ſondern auch geſprochen. 22. Ein treuer Soldat ſtirbt lieber, als daß er zum Verräther wird.

1. Are we obliged to wait for our friend? 2. No, not on his account. 3. This man is detested on account of his perfidy. 4. Do not grieve on account of us! 5. On my account you may do what you like. 6. My brother died of consumption in the nineteenth year of his age. 7. Do you know who has stolen your gold watch? 8. No, but I am suspicious of that man who came to our house yesterday. 9. At first I suspected a servant of the house. 10. After I had performed my last voyage, I applied myself to the study of the living languages. 11. After we had dined we took an airing on horseback. 12. After he had breakfasted, he visited his brother-in-law. 13. This lady wants eighteen ells of muslin for a dress. 14. That youth became a doctor. 15. That speculation made our neighbour a rich man. 16. He told me he should on his own account speak to his father.

Section LXXV.

Nicht wahr? literally, not true? (it is not true), answers to our phrases "isn't it? wasn't it? don't they?" &c. after an assertion; as, Es iſt kaltes Wetter, nicht wahr? It is cold weather, isn't it? Sie kennen ihn, nicht wahr? You know him, don't you? Sometimes „nicht wahr?" precedes the assertion; as, Nicht wahr, Sie ſind müde? You are tired, are you not?

I. Aufwarten (compounded of the *particle* auf and warten § 90.), signifies to wait upon, to serve, and governs the dative. Ich warte Ihnen auf; I wait upon you. Darf ich Ihnen mit einer Taſſe Thee aufwarten? May I serve you with a cup of tea? Ich danke Ihnen, sometimes abbreviated to Ich danke, is the usual reply answering to our "No; I thank you." Ich bin ſo frei (literally, I am so free), is the usual equivalent to our "*If* you please." Ich mache ihm meine Aufwartung; I wait upon him, literally, make my waiting upon him. Warten, when followed by the *preposition* „auf" signifies "to wait for." Ex.: Ich warte auf ihn; I am waiting for him.

II. Sollen (See § 83. 6. *Rem.*) with an infinitive is often answered, in English, by the infinitive only, preceded by the preposition "*to*;" as, Ich weiß nicht, was ich thun ſoll; I do not know what to do.

III. Nicht zum Worte, or, zu Worte kommen, signifies literally, not to come to the word, or to words, that is, not *effectually*, not in a manner to be heard and understood.

Exercise 78.

Achen, *n.* Aix-la-Chapelle;	Ebenfalls, also, too, likewise;	Umſonſt, in vain, vainly;	
Ankläger, *m.* accuser, impleader;	Entſchuldigung, *f.* excuse, apology;	Vergebens, in vain, vainly;	
Aufwarten, (See I.);	Kellner, *m.* waiter, bar-keeper;	Vergnügt, cheerful, merry, delightful;	
Beſchuldigung, *f.* accusation, imputation;	Krönung, *f.* coronation;	Vertre'ter, *m.* representative;	
Bier, *n.* beer, ale;	Ordnen, to regulate, order;	Widerfahren, to happen, befall;	
Chocolate, *f.* chocolate;	Taſſe, *f.* cup, dish;	Zunge, *f.* tongue.	

Ihr Herr Vater iſt krank, nicht wahr?	Your father is sick; isn't he?
Ich wartete eine Stunde auf Sie, dann ging ich und machte dem Fremden meine Aufwartung.	I waited an hour for you; then I went and waited upon (called upon) the stranger.
Er machte mich darauf aufmerkſam, daß die Zeit vorbei' war.	He reminded me (made me observant) that the time was past.
Er wußte nicht, was er thun ſollte.	He did not know what to do.
Die Meiſten Monarchen laſſen ihrem Willen freien Lauf.	(The) most monarchs allow their wills free scope (course).
Der Lärm ließ mich nicht zum Worte kommen.	The noise did not permit me to be understood. (See III.)

1. Es war eine ſchöne Stunde, nicht wahr, mein Freund? 2. Ja, das war ſie, und nicht ſo bald werde ich ſie vergeſſen. 3. Nicht wahr, der Nachbar war ebenfalls auf dem Feſte? 4. Ja, er war dort und ſehr vergnügt. 5. Nicht wahr, es iſt ſchon ſehr ſpät? 6. Nein, es iſt noch verdrießlich früh. 7. Nicht wahr, es iſt nicht alles wahr was die Leute ſagen? 8. Nein, nicht Alles darf man ihnen glauben. 9. Ich habe ſchon eine Stunde auf ihn gewartet, und immer läßt er ſich noch nicht ſehen. 10. Wir warten auf den aufwartenden Kellner. 11. Wenn Sie es erlauben werde ich Ihnen heute Nachmittag meine Aufwartung machen. 12. Darf ich Ihnen mit einer Taſſe Thee oder Kaffee aufwarten. 13. Ich danke

für Thee, aber ich bin so frei, eine Tasse Kaffee anzunehmen. 14. Bei der Krönung der Deutschen Kaiser zu Aachen warteten die anwesenden Fürsten auf. 15. Umsonst habe ich ihn darauf aufmerksam gemacht, er folgt nur seinem Kopfe. 16. Der Lehrer machte die Schüler darauf aufmerksam, wie wohl und gut Gott Alles in der Welt geordnet habe. 17. Der Richter fragte ihn vergebens, warum er dieses Verbrechen begangen habe; der Angeschuldigte hatte nichts darauf zu antworten. 18. Ich habe das Schreiben erhalten; allein ich weiß nicht, was ich darauf antworten soll. 19. Ich wüßte schon, was ich darauf antworten würde, wenn ich an ihrer Stelle wäre. 20. Die Männer, von denen Sie sprechen, sind eben nicht die besten Vertreter des Landes. 21. Ich ließ meiner Zunge freien Lauf und erzählte das mir widerfahrene Unrecht. 22. Er ließ seiner Rede freien Lauf und sagte in seiner Begeisterung mehr, als er hätte thun sollen. 23. Der Ankläger ließ den Angeklagten nicht zu Worte kommen, sondern fuhr immer mit seinen Beschuldigungen fort, ohne auf die Entschuldigungen zu hören. 24. Der Lärm übertönte die Stimme des Redenden und ließ ihn nicht zu Worte kommen.

1. Your friend whom we saw the day before yesterday is sick; is he not? 2. It was an agreeable evening; was it not, my friend? 3. Yes, it was, and I shall never forget the pleasure we had. 4. Your brother was also there; was he not? 5. It is yet early; is it not? 6. No, it is very late, and we must go. 7. I have waited already an hour for my friend, but still he has not come. 8. I am waiting for our servant. 9. Do not wait for him, I have just sent him out. 10. After I arrived in London I went directly and waited upon my friend, for whom I had letters of recommendation. 11. May I serve you with a cup of chocolate. 12. No, I thank you. 13 Will you not visit us before you go to the continent? 14. Ye, I shall pay you a visit. 15. May I help you to a glass of ale? 16. I thank you, I never drink it. 17. I have heard the news, but I do not know what to say to it. 18. You speak French and German, don't you?

LESSONS IN GEOGRAPHY—No. XIX.

MAP OF EUROPE.

Of all the *islands* which belong to Europe, the most important in political and commercial importance are the British Isles. Under this head are included Great Britain, anciently called *Albion* or *Britannia*, and divided into the two countries of England and Scotland; and Ireland, anciently called *Hibernia*; with various interjacent (*lying between*) and circumjacent (*lying around*) islands of much smaller dimensions. The principal of the latter are the Isle of Man, in the Irish Sea, situated at nearly an equal distance from the three countries, England, Scotland, and Ireland; the Isle of Anglesea, which is separated from the mainland in Wales (a part of England) by the Menai Strait; the Scilly Isles, anciently called *Cassiterides* or the *Islands of Tin*, adjacent to Cornwall, the real tin region; the Isle of Wight, south of and forming part of Hampshire; the Hebrides, or western islands of Scotland; the Orkney and Shetland Islands, north of Scotland; and the Channel Islands, Guernsey, Jersey, Alderney, and Sark, which lie to the north-west of France. Next to the British Islands, the most important in the north of Europe are those which belong to and form part of the kingdom of Denmark, and lie in the channel or passage to the Baltic, called the Kattegat, viz., Zealand, which contains the capital of that kingdom; with Funen, Laaland, Falster, Moen, Fermern, Langland, Alsen, and various others. In other parts of the Baltic, are the islands of Rugen, Bornholm, Oland, Gothland, Aland, Oesel, and Dago. The islands called the Azores, or Western Islands, which are generally considered to belong to Europe, and of which Terceira and St. Michael are the principal, are situated about 800 miles W. of Portugal, to which they belong. The Island of Iceland, which belongs to Denmark, and is celebrated for its hot springs and its volcanoes, is situated on the edge of the arctic circle, and having its northern point within the Arctic Ocean; the Faroe Isles, which belong to the same kingdom, and are situated N.W. of the Shetland Isles, once formed the site of the *first meridian*, to which all nations referred the longitude, and it is to be regretted that this did not retain its position as the *universal meridian* for the world at large, and for the simplification of the mode of reckoning the longitude in different countries. The islands which lie in the most northern regions of Europe, are the Loffoden Isles, W. of Norway; Spitzbergen, and Nova Zembla, in the Arctic Ocean; and Greenland, which lies chiefly in the same ocean.

The *islands* of the greatest importance in the south of Europe, and which lie in the Mediterranean Sea, are the following:—Corsica, which belongs to France, lying in the Tuscan Sea; Sardinia, S. of Corsica, and separated from it by the Strait of Bonifacio; the Balearic Isles, viz., Majorca, Minorca, Ivica, and Formentera, E. of Spain; Sicily, S.W. of Naples, and separated from it by the Strait of Messina; Malta, S. of Sicily and belonging to Britain; the Ionian Islands, viz., Corfu, Cephalonia, Zante, Sta. Maura, Thiaki or Ithaca, Cerigo, Paxo, &c., W. of Greece, and S.W. of Turkey in the Ionian sea; Candia or Crete, S.E. of Greece; the islands of the Archipelago, viz., Negropont (anciently *Eubœa*), Andro, Syra, Naxia, Paros, Antiparos, Hydra, Spezzia, Egina, &c., lying E. and S.E. of Greece; and Lemnos or Stalimene, Lesbos or Mitilini, Scio or Chios, Samos, Patmos, Rhodes, and many others, lying to the E. of Turkey in Asia, or rather Asia Minor; Cyprus, situated in the Levant, which belongs to Egypt, and whose chief town is Nicosia.

The principal *Capes* (Lat. caput, *a head*) in Europe are the following:—The North Cape, on the Island of Mageroe, in lat. 71° 10′, and long. 26° 1′ E., is commonly reckoned the most northern point of Europe,—but this, according to some authors, is Nordkün, in lat. 71° 6′ N.; the north point of Nova Zembla is in lat. 77° 4′ N., and long. 77° 5′ E.; the Naze (German, the *nose* or *beak*), the most northern point of Norway, on the Skager-rack; the Skaw, or most northern point of Jutland, in Denmark; Cape La Hogue, in France; Capes Ortegal and Finisterre, in Spain, of which the latter, as the name indicates, (Lat. finis, *the end*, terræ, *of the earth*,) was deemed by the ancients the end or uttermost extremity of the world; Cape Roca, near Lisbon, and Cape St. Vincent, in Portugal; Cape Trafalgar and Europa Point, lat. 36° 6′ N., long. 5° 21′ W., in Spain, of which the latter is the most southerly point in Europe, although Tarifa Point, lat. 36° 1′ N., long. 5° 36′ W., is often considered as this point; Cape Spartivento and Cape di Leuca in Italy, and Cape Matapan, in Greece (the Morea), the latter cape being in lat. 36° 22′ N., and long. 22° 28′ E.; Cape Passaro, in Sicily; and others of less importance. In the British Islands, Dunnet Head, and not Cape Wrath, is the most northerly point of Great Britain; also, Lizard Point, and not Land's End, is the most southerly point; the most northerly point of Ireland is Mullin or Malin Head, and the most southerly point Mizen Head, and not Cape Clear, which is on an island, called Clare Island.

The northern *Highlands* of Europe are those which contain the Scandinavian chain of mountains, extending from the Naze to the North Cape, and consisting of the Lang-field, the Dovre-field, and the Kölen ranges, of which the highest point is Sneehätten in the middle range, about 8,120 feet above the level of the sea; and the Uralian or Ouralian chain, extending from the shores of the Arctic Ocean to beyond the source of the Ural river, which falls into the Caspian Sea, and forms, with both, the boundary between Europe and Asia. The south-eastern *Highlands* of Europe are the Caucasian chain of mountains, between the Caspian Sea and the Black Sea, of which the highest peak is Mount Elburz, about 18,500 feet above the level of the sea, and the highest mountain in Europe. The southern *Highlands* of Europe consist of the Balkan (anciently *Hæmus*) mountains in Turkey, the highest points being about 10,000 feet above the level of the sea; the Eastern Alps (German, *mountains*), stretching from the Balkan range to the commencement of the Western Alps, north of the Adriatic, of which the highest summits are Mont Blanc and Mont Rosa, each more than 15,000 feet above the level of the sea, and which border Switzerland on the south, and Italy on the north; the Carpathian Mountains in the north of Hungary; the Hercynian Mountains, in Germany; the Cevennes and the Vosges, in France; the Pyrenees, between France and Spain, of which the highest points or peaks are Mont Perdu and Maladetta, each more than 11,000 feet high; Venletta and

Mulhacen, the highest points of the Sierra Nevada, in Spain; and Ætna, the Sicilian volcano, which are all nearly of the same elevation as the Pyrenean peaks.

The principal *Rivers* in Europe are the following:—The Volga, which rises in the Valdai Hills, in Russia, about 1,100 feet high, runs a course through that country of more than 2,000 miles, and falls into the Caspian Sea at Astrakan, where its delta (or mouths in the shape of the Greek letter of that name) is about fourteen miles wide. The Ural or Jaik, which rises in the Ural Mountains, runs a course of more than 1,000 miles, and falls into the Caspian Sea; the Don, which, after a course of more than 1,000 miles, falls into the Sea of Azov, at the town of Azov; the Dnieper, which, after a course of 1,200 miles, falls into the Black Sea at Kherson; the Dniester, which flows from the Carpathian Mountains, and, after a course of 700 miles, falls into the same sea at Akerman; the Danube, which has its source in the Black Forest (Schwarzwald), flows through Bavaria, Austria, and Turkey, and, after a course of about 1,630 miles, falls into the Black Sea at Ismail; the Rhine and the Rhone, which both spring from the Swiss Alps, take opposite courses: the former, running through the Lake of Constance, after a northern course of about 800 miles through Germany, France, and the Netherlands, falls into the German Ocean, after losing itself in the Waal, the Maese or Meuse, the Leck, and the Old Rhine, and forming the great Delta of Holland between Rotterdam and Amsterdam; the latter, running through the Lake of Geneva, after a southern course of about 500 miles through France, falls into the Mediterranean at the Gulf of Lyons, where it also forms a delta; the Arno and the Tiber, on the west of Italy, fall into the Tuscan Sea; and the Po and the Adige, on the east of Italy, fall into the Adriatic; the Xucar and the Ebro, of Spain, fall into the Mediterranean; the Douro and the Tagus, of Portugal, with the Guadalquivir of Spain, fall into the Atlantic; the Dwina and the Onega, of Russia, fall into the White Sea; the Vistula and the Oder, of Germany, fall into the Black Sea; and the Elbe, of the same country, into the German Ocean, at Hamburgh.

The chief *Lakes* of Europe are the following:—In the north, Ladoga and Onega, in Russia, the largest in Europe, the former being 130 miles long and 70 miles broad—the latter smaller; Peipus and Ilmen, in the same country, very considerably less; the latter is connected with Lake Ladoga and the River Volga by means of canals, and thus a line of communication is formed between the Baltic and the Caspian Seas; the Lakes Wener, Wetter, and Maeler, in Sweden, with the River Gotha, which form a line of communication between the middle of the Baltic Sea and its entrance; in the south of Europe, the Lakes of Constance, Lucerne, and Geneva, in Switzerland; and of Maggiore, Lugano, and Como, in Italy,—all remarkable for the beauty of their scenery. The following table contains some useful particulars relating to the lakes of Europe.

TABLE OF EUROPEAN LAKES.

Lakes.	Countries	Area in Square Miles.	Elevations in Feet.	Greatest Depths in Feet.
Ladoga	Russia	6,330		
Onega	Russia	3,280		
Ilmen	Russia	390		
Peipus	Russia	1,250		
Saima	Russia	2,000		
Enara	Russia	1,200		
Wener	Sweden	2,136	144	288
Wetter	Sweden	840	288	432
Maeler	Sweden	760		
Geneva	Switzerland	240	1,230	1,012
Neufchatel	Switzerland	115	1,437	426
Lucerne	Switzerland	99	1,430	600
Zurich	Switzerland	76	1,332	600
Constance	Switzerland	228	1,299	964
Neusidler See	Hungary	150	350	13
Platten See	Hungary	250	918	36
Maggiore	Italy	152	678	2,622
Como	Italy	66	684	600
Garda	Italy	183	320	

The following additional table relating to Europe, compiled from the latest authorities, and exhibiting the surface in square miles, the population, the number of inhabitants to every square mile, the amount of the government revenue, and the number of the standing army of every country, empire, kingdom, and state which it contains, will form a companion to the table in our last lesson, and give additional interest to the study of geography.

STATISTICAL TABLE OF EUROPE.

Countries.	Surface in square miles.	Population.	Inhabitants to every square mile.	Revenue in £ sterling.	Army.
Russia in Europe Poland Norway Sweden Denmark Holstein, &c. England & Wales Scotland Ireland	2,000,000 292,700 25,585 120,723	60,000,000 4,644,000 2,766,000 27,452,000	30 16 108 227	14,000,000 1,745,000 1,200,000 53,000,000	674,000 57,800 75,000 135,000
France	203,736	35,400,000	173	56,000,000	396,000
Germany	223,805	40,224,500	179	35,936,500	675,155
Austria Hungary Austrian Poland Austrian Italy	257,741	36,000,000	140	16,096,000	485,000
Prussia	107,960	16,331,900	151	14,000,000	325,000
Holland	13,598	3,243,000	238	5,736,000	24,000
Belgium	11,376	4,359,000	383	4,704,000	90,000
Bavaria	29,628	4,519,000	152	2,644,000	57,000
Wurtemburg	7,658	1,727,000	225	905,000	13,900
Saxony	5,776	1,836,000	317	870,000	25,000
Hanover	14,846	1,759,000	118	1,120,000	21,000
Baden	5,918	1,363,000	230	2,065,000	18,000
2 Mecklenburg states	5,612	630,000	112	335,700	6,500
3 Hessen states	8,806	1,632,000	196	1,375,000	74,000
Brunswick	1,531	269,000	175	299,000	3,000
Nassau	1,760	425,000	242	259,000	3,500
Luxemburg	1,842	389,000	211		
6 Saxon states	3,699	706,000	190	322,000	6,600
3 Anhalt states	1,020	156,500	152	258,200	1,000
2 Schwarzburg states	659	130,000	197	48,600	800
2 Hohenzollern states	453	64,000	141	34,000	
2 Lippe states	615	137,000	212	72,800	1,230
2 Reuss states	593	110,000	185	56,000	745
Waldeck	461	58,000	125	37,000	520
Lichtenstein	53	6,300	118	2,200	60
Hamburg	151	188,000	1245	518,000	1,800
Lubeck	127	47,000	378	47,000	490
Bremen	106	73,000	688	122,000	500
Frankfort	38	68,000	178	76,000	1,500
Switzerland	14,700	2,395,000	162	31,000	64,000
Spain	179,500	15,400,000	84	10,800,000	119,000
Portugal	35,260	3,413,000	93	2,246,000	25,000
Italy	104,576	18,745,000	179	12,442,000	227,400
The Two Sardinias	29,000	4,650,000	160	4,800,000	146,000
Tuscany	8,553	1,700,000	198	836,000	12,000
Popedom	17,860	2,908,000	163	2,068,000	14,500
The Two Sicilies	44,510	8,423,000	190	4,348,000	48,000
Modena	2,331	562,000	241	130,000	3,500
Parma	2,300	495,000	215	240,000	3,300
San Marino	22	7,000	318		
Turkey in Europe	210,000	15,500,000	73	3,000,000	300,000
Greece	15,200	637,700	42	483,000	8,900

The numbers placed against Germany in this table form the aggregates of all the numbers placed against the respective countries and states of which it is composed, as given in the table; the same is to be understood in reference to the numbers placed against Italy. As some of our readers may be curious to know some of the particulars relating to the British empire separately, we here give them on the same authorities:—

BRITISH EMPIRE IN EUROPE.

Countries.	Surface in sq. miles.	Population.	Inhabitants to every sq. mile.
England and Wales	57,813	17,923,000	308
Scotland	30,084	2,871,000	96
Ireland	32,513	6,515,000	200
European dependencies	1,540	496,400	322

ON COMETS.—No. I.*

Comets are planets which describe ellipses of very great length round the sun, that is, the distance between the two foci of such ellipses is very great, and the sun occupies one focus; so that, at one time, comets are very near the sun, and at another they are very remote. These bodies are often accompanied by a vaporous and transparently luminous tail, through which the stars are visible. At first, when a comet becomes visible to us, there appears to be only a nebulosity or cloudiness surrounding the comet. This increases as it approaches the sun, and sometimes forms an immense train; the train in some comets reached to the length of 90°, or a fourth part of the whole circuit of the heavens. The forms of comets are also very variable; that which appeared at the birth of Mithridates, 130 years before the commencement of the Christian era, is reported to have presented to the spectators for the period of 80 days, a disc as large as that of the sun. Ten years before the last-mentioned date, a comet had appeared which seemed to extend over the whole face of the heavens. Justin, the historian, in Book 37, chap. 2nd, relates that it had a glare of light greater than the sun, and that it occupied a fourth part of the heavens. The comet which appeared in the year 117 A.D., presented the same phenomenon, and, according to Freret, that which appeared in 479, eclipsed the sun in a very extraordinary manner.

In the year 400 A. D., a comet was seen in the form of a sword, which extended from the zenith to the horizon. Another comet appeared in 531, which was denominated Lampadias; it was very large, and presented an alarming appearance to the beholder. The moon, if we believe history, compared with those which appeared in A.D. 1066, and 1505, presented a smaller disc than they did. The historians, however, of those early ages, unacquainted with the laws of nature, and surrounded by people as ignorant as themselves, would, no doubt, from fear and other causes, be led to exaggerate the accounts of such extraordinary sights as they had either heard of or seen in the heavens; and consequently, we may conclude that there is much exaggeration mixed with truth in the records which they have transmitted to us of these singular bodies. Besides, either they or their informants may have mistaken occasional atmospheric phenomena, such as balls of fire, and the like, for astronomical phenomena; and thus sometimes they may have attributed to the heavens appearances which really belonged to the earth or its atmosphere. Even in the present day, the ignorant are often astonished by a very common appearance, viz., that of falling stars, which are nothing more than particles of ignited matter floating in the atmosphere; and, as soon as the combustion has nearly ceased, from the almost total consumption of the matter which supported it, the residue sinks in the air and presents the appearance to which the appellation of *falling stars* has been given. An *ignis-fatuus*, or what is vulgarly termed Will-o'-the-Wisp, may be traced to the same source.

The most remarkable comets were those which appeared in the years A.D. 837, 1106, 1456, 1618, 1680, 1744, 1759, 1769, and 1811. The comet of 1744 had six tails, arranged in the form of a fan. There have been some, on the other hand, which had neither tail nor any sort of detached and diminished light, such as those which are popularly denominated beards, whiskers, or nebulosities. The phases which were observed in the comet of 1744, led to the opinion that these bodies are opaque, formed of a nucleus or inner orb, accompanied by, or surrounded with, a vaporous atmosphere or train of variable intensity and extent. The opinion respecting the opacity of comets is confirmed by the latest experiments of M. Arago, on the polarisation of the light of the comet of 1819. A comet has never any tail when it is at a great distance from the sun; but as soon as it comes so near the sun as to be only at the distance of eighty millions of miles, the tail or vapour begins to appear; it increases in extent, in proportion as the comet approaches the sun; and the tail acquires its greatest extent a little after passing the perihelion. After passing that point, in proportion as the comet goes to a greater distance from the sun, the tail diminishes in the same manner as it increased; it soon becomes no more than a cloud; and at last, the comet itself even ceases to be perceptible. It is observed that the tail of a comet is always thrown in the direction of the straight line which joins the sun and the comet produced; if the comet be to the east of the sun, and set after it, the tail is thrown towards the east; if it be to the west of the sun, and set before him, the tail is thrown towards the west. These phenomena induce the belief that the tail of a comet is but a torrent of vapours raised by the heat of the sun, and driven by the impulse of the particles of light thrown out by that body; and that these vapours are condensed in the region to which they are afterwards carried. Moreover, these vapours, in starting from the nucleus or body of the comet to which they belong, have less velocity than it, and remain a little behind it; this makes them take the form of a curve at the extremity of the tail. This explanation, however, is not quite sufficient to account for the singular forms which comets sometimes present, and particularly that of 1774, which had six tails. The proximity of the sun, and the continuity of the transmission of heat, must render its accumulation enormous, and capable of melting and vapourising every substance or matter in the comets similar to what is found in the earth; and it might even happen that the nucleus itself should lose its solidity. The comet of 1680, when in perihelion, was one hundred and sixty-six times nearer the sun than the earth is, or sixty-four times nearer than the planet Mercury; in other words, if the distance of the earth from the sun were divided into one thousand parts, the perihelion distance of that comet was only six of those parts! The heat which it then received from the sun, was twenty-eight thousand times greater than that which the earth receives from it; the temperature thus produced was about two thousand times greater than that of melted iron, and two hundred and seventy-five thousand times greater than that of summer heat. It would require fifty thousand years to cool such a body, were it to be placed in the same physical circumstances as the earth, and had it the same size as our globe. With a telescope the tail of a comet is scarcely visible: this vapour, light haze, or mist, can only be observed by means of its density. The nucleus itself is sometimes a substance amazingly rare or thin: as an instance, it was observed that when the comet of 1811 passed over a star, a circumstance itself rather uncommon, the star was seen even through the nucleus or body of the comet.

Comets differ from planets not only in the phenomena which they exhibit, but also in the diversity of their motions; these motions are neither always in the direction from east to west, nor in an orbit of small eccentricity, and little inclined to the ecliptic; yet several comets agree in these circumstances with one another. In general, their orbits are ellipses very greatly elongated; and as a comet is only visible to us when it approaches the perihelion, its orbit then, to all appearance, coincides with a parabola, which is a curve of the same origin as the ellipse, being indeed an ellipse, one of whose foci is supposed to be at an infinite distance from the other. When a comet appears, astronomers make three observations on it, so as to ascertain its distance from two known stars, and thus they ascertain its right ascension and declination at those times; three points being sufficient to determine the form of the parabolic curve, it is concluded from these observations that the visible curve which it describes is a parabola. In this manner, three observations, even very near each other, give the perihelion distance, the position of the perihelion point, the instant of the comet's passing this point, and the nodes of the orbit; from these data are obtained the hour of its rising and setting for the whole period of its appearance to us,—the stars that will be near it in its course, &c.

Nearly one hundred comets, which have been observed with care, have their orbits exactly represented by the parabolic curve, in the part of their orbits which is visible to us; consequently, this fact is established beyond a doubt. In the regions of space, where a comet escapes our observations, it completes its immense elliptical orbit: it may even be the case that several of these bodies actually describe parabolas or hyperbolas, and consequently, they will never return to our system again, but follow some other sun. Burkhardt, the celebrated astronomer, believed from his observations, that the comet of 1771 described an hyperbola. The sun occupies the focus of all these orbits, whether elliptic, parabolic, or hyperbolic. Comets, like all the other heavenly bodies, partake of the apparent diurnal motion, which is only the effect of the rotation of the earth on its axis in twenty-four hours; their motions are agreeable to the laws of Kepler, like all the bodies of our system; but the calculation does not enable us to determine the return so correctly as the return of the planets in their revolutions; because the arcs of their orbits which have hitherto been observed, are too small to lead to an exact determination of the whole of their orbits. The planets are almost always visible, and from numerous observations of them, we are enabled to correct the elements of their motions. It is evident, therefore, that the same comet must be observed in its return to the perihelion several times, before we

can determine with precision its periodic revolution; but we can judge only by the circumstance that the elements of the motions which are observed at one time, are the same as those observed at a former time, whether a comet which reappears be the same as one that has been formerly seen. This comparison is the sole method of resolving the problem.

The causes, therefore, which have hitherto prevented the prediction of the return of comets, and the determination of their orbits, are the following:—1°. These bodies are only visible in a small part of their course, and that being very near the sun, is described with a prodigious velocity. But the more the ellipse is elongated, the more is the progress of the comet slackened from the action of the sun; so that it may happen towards the aphelion, that the comet may be almost immoveable, and cannot return to our system, till after the lapse of thousands of years. 2°. Observations have only been made with care for about two hundred years past; and many comets must have escaped the observation of astronomers. This fact may be argued from the circumstance of the lateness of the discovery of the new planets revolving in the immense void which separates Mars and Jupiter. Even Uranus, of which the revolving period is but eighty-four years, had been previously observed by four astronomers, and yet it was not recognised as a planet till 1781; and it may be added that Mercury, whose period of revolution is only eighty-eight days, is so difficult to observe without optical assistance, that the celebrated Copernicus, who first promulgated the true theory of the present system of astronomy, died with this regret among others, that he never observed that planet.

In addition to all this, when a comet is above our horizon during the day, we cannot see it, though it be under our very eyes. That fine comet which *astronomers* observed only in July, 1818, after everybody else had seen it, was present in all its brilliancy (but in the daytime), a long time before its discovery. The comet which appeared sixty years before the Christian era, is related to have been visible only when a total eclipse of the sun took place, because that it was too near that body to be seen otherwise.

3°. The appearances which comets present are very variable, because they depend on the place which the earth occupies in its orbit when they are so near the sun as to be visible; and this place must vary considerably in an orbit of one hundred and ninety millions of miles diameter. From this cause, a comet which may have at one time presented a very fine appearance, may, on its return, appear very small, or be even not at all visible, although near enough to the sun to be visible at another point of the earth's orbit, and its tail may have disappeared owing to a difference in its position. So many circumstances concur to produce changes in its aspect! The comet of 1811 was scarcely visible in April and May; it was afterwards immersed in the rays of the sun, and it only appeared at the end of August, beyond its perihelion point; but what a difference was there to us in its brilliancy, and how astonishingly magnificent was the appearance which it presented! Who could have recognised it as the same body? No one could have been certain on this point, except from the agreement of the elements of the orbit. But if the attraction of such masses as Jupiter and Saturn, and even Uranus, changes these elements, how shall the comet be recognised? This is a question that can only be solved by the application of the profoundest knowledge of the mathematical sciences.

4°. The greatest causes of error arise from the inaccuracy of observation. Small comets appear only as vaporous points; large ones seem to form a cloud, variable and ill-defined. The comet of 1729 was visible during six months; three astronomers calculated its orbit, and their results did not agree. What could be the reason but inaccuracy in the data obtained by observation? The comets of 1762, 1763, 1743, 1759, and 1766, afforded examples of the same description. How, then, is it possible to predict the returns of comets with such defective elements? It will not be considered surprising, therefore, if among one hundred and thirty comets, of which the course has been calculated, *there are only three whose return can be predicted with certainty*.

The first is that which bears the name of Dr. Halley, an English astronomer, who observed it in 1682: he found that the elements of its orbit were the same nearly as those of the comets observed in 1531 and 1670; he therefore concluded that it made its revolution in about seventy-six years, a shorter period than that of the planet Uranus. It had appeared in 1006, it then seemed four times greater than Venus, and threw out as much light as the fourth part of the light of the moon. History affords us no account of its returns, till 1456, when it passed near the earth: its tail then occupied about 60° of the heavens, and had the form of a huge sabre. This appearance, which took place at the epoch when the Turks had made themselves masters of Constantinople, became a general subject of alarm, especially when the comet was seen approaching the moon at the full, at the very instant of an eclipse. Halley predicted that this comet would return in 1757, but it was not observed that year; Clairault, the French astronomer, showed, in 1758, that it had been retarded by 618 days in consequence of the action of Jupiter and Saturn; so that, in fact, this comet only passed its perihelion about the 12th of March, 1759. This comet which had only been seen with dread and consternation in 1456, excited at that time a lively interest. The long train which it drew after it had formerly spread terror over Europe, which had been thrown into alarm by the rapid success of the Turks, who destroyed the Greek empire. The Pope Callixtus ordained on this occasion a prayer to be composed and read in the churches for allaying both the comet and the Turks. In those times of ignorance, men were far from thinking that the only means of arriving at a knowledge of nature, is to investigate her phenomena both by observation and calculation. According as those phenomena happened and followed each other with regularity or without apparent order, they made them depend on final causes or on chance; and when they presented anything extraordinary, and seemed to run contrary to the order of nature, they were regarded as so many signs of the anger of heaven. But these imaginary causes have been successively bounded by the limits of our knowledge, and should entirely disappear before sound philosophy, which perceives in them only the expression of our ignorance of the true causes. This comet was seen in the year 1835, first at Rome, on the 5th August, and then in Europe generally, on the 20th of the same month; but it may be asked, which of its former appearances did it then resemble? The other two comets whose returns are correctly predicted *have short periods*; for they return, to the perihelion, the one after 1,210 days, or about three years and four months, and the other after 2,465 days, or about six years and nine months. The first is called Encke's comet, and the other Biela's, because these astronomers calculated the elements of their orbits, and discovered the period of their revolution. The comet of Encke has been seen with and without a nucleus, with and without a tail, and under different appearances in 1786, 1795, 1801, and 1805; it ought to have returned in 1808, 1812, and 1815; but it escaped our observation in these three returns from its being so very small, in addition to the causes that have been already explained; but it reappeared in December 1818.

FRENCH EXTRACTS.

PENSEES MORALES ET MAXIMES

DOUTE.

Dans le doute, abstiens-toi.—*Pythagore.*

Il vaut mieux pencher vers le doute que vers l'assurance, aux choses de difficile preuve et dangereuse créance.—*Saint Augustin.*

DURETE.

L'insensibilité à la vue des misères, peut s'appeler dureté; s'il y entre du plaisir, c'est cruauté.—*Vauvenargues.*

Ne soyez pas trop rigoureux dans le châtiment. Il est rude, quelque léger qu'il soit. Ne vous en servez pas non plus trop fréquemment, vous pouvez arriver à votre but par d'autres voies que par celle-là.—*Maximes des Orientaux.*

ECONOMIE.

L'économie est fille de l'ordre et de l'assiduité.—*Lévis.*

Tout homme qui ne veut pas que sa fortune décroisse et qui veut rester constamment au niveau, doit se faire une loi de ne dépenser que la moitié de son revenu, et celui qui veut augmenter son bien ne doit dépenser que le tiers de sa rente.—*Bacon.*

EDUCATION.

Formez l'enfant à l'entrée de sa voie; car il ne s'en éloignera point, même dans sa vieillesse.—*Salomon.*

L'avenir d'un enfant est toujours l'ouvrage de sa mère.—*Napoléon.*

EGOISME.

L'égoïsme est une combinaison, un système, une volonté de tout ramener à son bonheur.—*La Bruyère.*

L'égoïste brûlerait votre maison pour se faire cuire un œuf.—*Chamfort.*

ELOQUENCE.

La véritable éloquence consiste à dire tout ce qu'il faut, et à le dire comme il faut.—*La Rochefoucauld.*

Il faut qu'il y ait dans l'éloquence de l'agréable et du réel; mais il faut que cet agréable soit réel.—*Pascal.*

ENNEMI.

Nos véritables ennemis sont avec nous. Déracinons de nos cœurs l'ambition, l'avarice et la jalousie, nous rétablirons l'ordre et l'harmonie qui doivent régner dans la société; tous les hommes seront amis.—*Fénelon.*

ENNUI.

L'ennui est entré dans le monde par la paresse.—*La Bruyère.*

L'ennui est une maladie dont le travail est le remède; le plaisir n'est qu'un palliatif.—*Lévis.*

ENVIE.

Ceux qui font bien mériteraient seuls d'être enviés, s'il n'y avait encore un meilleur parti à prendre, qui est de faire mieux; c'est une douce vengeance contre ceux qui nous donnent cette jalousie. —*La Bruyère.*

L'envie qui parle et qui crie est toujours maladroite; c'est l'envie qui se tait qu'on doit craindre.—*Ricarol.*

L'envie est un sentiment de haine mêlé de désirs, sentiment que fait naître en nous le chagrin de voir posséder par un autre un bien que nous désirons. C'est la plus triste et la plus honteuse des passions. Elle devient le tourment de ceux qu'elle possède et de ceux qu'elle attaque. Elle est le fruit d'un amour-propre désordonné.—*Locke.*

ERREUR.

Une des erreurs les plus communes est de prendre la suite d'un événement pour sa conséquence.—*Lévis.*

ESPERANCE.

L'espérance est un emprunt fait au bonheur.—*Ricarol.*

Jouissez de ce que vous possédez; espérez ce qui vous manque.—*Lévis.*

ESPRIT.

Le mot esprit est un mot générique qui a toujours besoin d'un autre mot qui le détermine....Ce qu'on appelle esprit est tantôt une comparaison nouvelle, tantôt une allusion fine; ici, l'abus d'un mot qu'on présente dans un sens et qu'on laisse entendre dans un autre; là, un rapport délicat entre deux idées peu communes; c'est une métaphore singulière; c'est un recherche de ce qu'un objet ne présente pas d'abord, mais de ce qui est en effet dans lui; c'est l'art, ou de réunir deux choses éloignées, ou de diviser deux choses qui paraissent se joindre, ou de les opposer l'une à l'autre; c'est celui de ne dire qu'à moitié sa pensée pour la laisser deviner.—*Voltaire.*

On n'est pas un homme d'esprit pour avoir beaucoup d'idées, comme on n'est pas un bon général pour avoir beaucoup de soldats. —*Chamfort.*

Il est encore plus facile de juger de l'esprit d'un homme par ses questions que par ses réponses.—*Lévis.*

L'esprit de parti abaisse les plus grands hommes jusqu'aux petitesses du peuple.—*La Bruyère.*

L'esprit de quelques personnes est comme une lanterne sourde, qui ne sert qu'à celui qui la porte, et qui n'éclaire que son chemin. —*Pope.*

L'une des marques de la médiocrité de l'esprit est de toujours conter.—*La Bruyère.*

A mesure qu'on a plus d'esprit, on trouve qu'il y a plus d'hommes originaux. Les gens du commun ne trouvent pas de différence entre les hommes.—*Pascal.*

ETUDE.

L'étude la plus utile est celle de soi-même: les peines et les travaux des écoles ne servent à cette dernière étude que comme de degrés.—*J. J. Rousseau.*

L'acier n'a l'avantage sur le fer que par le travail qui lui a fait acquérir plus de perfection.—*Epictète.*

Étudiez, non pour savoir plus, mais pour savoir mieux que les autres.—*Sénèque.*

EXPERIENCE.

Il est sage d'interroger nos heures passées, leur réponse forme ce que l'on nomme l'expérience.—*Young.*

FAIBLESSE.

Les gens faibles sont les troupes légères de l'armée des méchants: ils font plus de mal que l'armée même; ils infestent et ils ravagent. —*Chamfort.*

FATUITE.

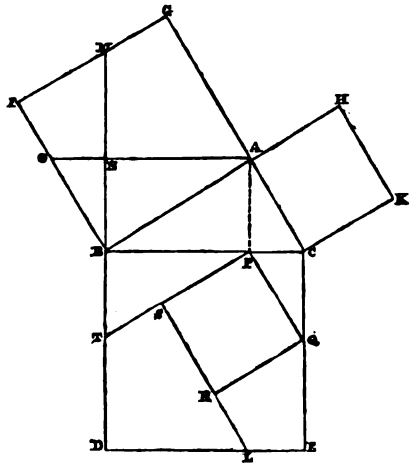
Un fat est celui que les sots croient un homme de mérite.—*La Bruyère.*

Je n'aime pas un homme que je ne puis aborder le premier ni saluer avant qu'il me salue sans m'avilir à ses yeux et sans tremper dans la bonne opinion qu'il a de lui-même.—*Idem.*

SOLUTIONS OF PROBLEMS AND QUERIES.

NEW GEOMETRICAL DEMONSTRATION OF THE PYTHAGOREAN THEOREM.

In any right-angled triangle, the square which is described upon the side subtending the right angle is equal to the squares described upon the sides which contain the right angle



On B C describe the square B D E C (I. 46), and on B A, A C, the squares G B, H C; produce D B to meet F G in M (Post. 2); through it, draw A C, parallel to B C, meeting B M in N, and A F, *parallel* to M D (I. 31); from F, draw F T and F Q, parallel to A B and A C respectively; from F, in F T, make F S equal to F Q (I. 3); and, from S and Q, draw S L and Q R, parallel to F Q and F S respectively (I. 31).

Then, because the angle B A C is a right angle (hyp.), and that the angle B A G is also a right angle (Def. 30), the two straight lines, A C, A G, upon the opposite sides of A B, make with it, at the point A, the adjacent angles equal to two right angles; therefore, A C is in the same straight line with A G (I. 14); for the same reason, B A and A H are in the same straight line. And because A N is parallel to B F (cons.), and A F to N B, therefore N A F B is a parallelogram (Def. A.); whence N B is equal to A F (I. 34); for a similar reason, B T is equal to A F; wherefore, N B is equal to B T (Ax. 1), and the triangle A N B is equal to the triangle F B T (I. 38), being between the same parallels, A F and N T. And because A O B C is a parallelogram (cons.), the side O A is equal to the side B C, and O B is equal to A C (I. 34); but N A is equal to B F, therefore the remainder N O is equal to the remainder F C (Ax. 3). And because A C Q F is a parallelogram (cons.), therefore F Q, Q C, are equal to C A, A F, respectively; but it has been shown that C A, A F, are equal to O B, B N, respectively; wherefore, F Q, Q C, are equal to O B, B N, each to each (Ax. 1), and the third side F C has been shown to be equal to the third side O N; therefore, the triangle F C Q is equal to the triangle O N B (I. 8 and I. 4). And because S R is parallel to F Q, and Q R to F S (cons.), therefore F Q R S is a parallelogram (Def. A.); whence its opposite sides are equal (I. 34), and the angles which T F or Q F make with B C, upon one side of it, are equal to two right angles (I. 13); but the angles B F T and C F Q, are equal to (I. 32) the angles A B F and A C F of the triangle A B C, respectively; wherefore the remaining angle S F Q is equal to the remaining angle B A C (Ax. 3), that is, to a right angle; therefore, the remaining angles of F Q R S are right angles (Cor. I. 46), and the side F S is equal to the side F Q (cons.); whence, F Q R S is equilateral, and is therefore a square (Def. 30); and it is equal to the square H C, because A C is equal to F Q.

Again, because the angle C B M is a right angle, as also the angle A B F, take from these equals the common angle A B M, therefore, the remaining angles C B A and M B F are equal (Ax. 3); hence, in the two triangles A B C and F B M, the side A B is equal to the side F B, and the angles C B A, B A C, are equal to the angles M B F, B F M, respectively; therefore, the side F M is equal to the side A C, and B M is equal to B C (I. 26), or to B D, of which the part N B is equal to the part B T; therefore the remainder M N is equal to the remainder T D (Ax. 3); now, F S is equal to F Q, or to A C, or to F M, and T F is equal to B A, or to F G; therefore, the remainder T S is equal to the remainder M G; and the angle S T D is equal to the angle G M N, because M D falls upon the parallels G M and S T

(I. 29); hence, the triangle S T D which would be formed by joining S D is equal to the triangle G M N which would be formed by joining G N (I. 6); whence, the straight line joining S D is equal to the line joining G N,* and the angles L D S and D S L are equal to the angles A N G and N G A, respectively, because their complements are equal in the former triangle; wherefore, the triangle S D L is equal to the triangle G N A (I. 26); therefore, the trapezium S T D L is equal to the trapezium G M N A (Ax. 2); in a similar manner, the trapezium Q E L R may be shown to be equal to the trapezium M N O F. And because the triangle A N B has been shown to be equal to the triangle P B T, and P C Q to O N B, as also the square M C to the square P Q R S, therefore the whole square B C E D is equal to the squares B G, C H (Ax. 2), which was to be demonstrated.

HORATIO ROBINSON, Sheerness.

NOTE.—The trapezium S T D L might have been shown to be equal to the trapezium G M N A, as also Q E L R to M N O F, by proving the sides and angles equal, on the same principle which Euclid employs in the fourth proposition of the first book,—the well-known principle of *superposition*, which results in coincidence and consequent equality.

* The reader will understand this part better, by actually drawing the lines D S and N G.—ED.

ANSWERS TO CORRESPONDENTS.

MUSIC.—F. J. J. (Bawtry): We have read your long and sensible letter on Colonel Thompson's theory of the "duplicity of the dissonances." We must judge the colonel's theory not by some counter theory, but by experiment. He makes an instrument according to his theory. It is played in the hearing of many. He thus puts the question to the human ear: Does my theory produce the intonations which suit you best? The human ear, represented by many good judges, answers, "Yes." If so, what becomes of our counter *theory*—that because there is *simplicity* in the consonances (notes consonant with the key-note), there can therefore be no *duplicity* in the dissonances? Nature's clear answer is stronger than our logic. We have never heard an objection to the beauty and accuracy of tone produced by Colonel Thompson's instruments, but only to the complexity of their structure, especially in the key-board—mechanical difficulties which must be overcome.—ELECTICUS: You will find in Lesson IX., p. 373, sufficient instructions in the German Concertina for your purpose. There is an error in the title of the Irish Air. It should be Key D, not Key F.—G. V. (Manchester): In Lesson III., p. 99, we dealt with the "time," "accent," and "measure," as they must be looked at apart from the manner in which they are expressed on paper. In the first preparation of that lesson we were aided by the learning and philosophy of Mr. Graham, of Edinburgh. After a few lessons we hope to satisfy our friend with the "notational" view of the subject.—T. G. will find the words *Grave, Largo*, &c., at the back of the tape in Schofield's Portable Metronome, which he can get at Novello's in the Poultry.—J. H., a lad of sixteen, who sends us his first effort at composition, should make the accent of the music correspond with the accent of the poetry.—E. S. B. asks, How a degree of Doctor of Music is to be obtained from any of the German academies? Can any one direct him?—I. THOMAS (Festiniog): Taking LAH for the key-note of the minor scale (as we do), the "mental effects" described do belong to both scales.—W. P. (Kerry): Lesson IX., p. 373, will guide you. You are *not* "doing what you are told" if you are troubling yourself at present with the staff and the crotchets.—JOHN SMITH (Paisley): We have sent your exercise in composition to Mr. J. Poyton, 32, John-street, Cambridge Heath, London, *who has kindly offered to correct any exercises our pupils may send to him.* If our pupils can afford it, a small fee, in postage stamps, should always be enclosed with the exercise; but he does not require this. Let Mr. Smith write to Mr. Poyton.—JOHN TAYLOR: See previous answers, p. 400.—Mr. BOOTH will see better glees than those he names in the P. E. soon.—A. H. M.: You will find it most convenient to make the middle C of your sixteen glass harmonicon your DOH with the higher octave marks; so that your lowest note would be TE with the "one" below,—your highest note DOH with "two" above. The glass harmonicon does not so easily get out of tune as the concertina, but the latter has many advantages.—LEWERY and JOSEPH COX: See Lesson IX., p. 373.—JOHN LEWIS: Sets of tongues for the harmonicon may, we believe, be obtained of Mr. W. Sprague, Flusbury-pavement, London—write to him.—M. B. S. C.: We are sorry to have misunderstood you.—PHILA: Hamilton's Grammar is cheap and good. Marx's "School of Composition" is the best, but expensive. The principles developed in our lessons give peculiar facilities for the study of "thorough bass."—LEILA: The vibrations of a pendulum are *longer*, not more *frequent*, in proportion as it is struck more forcibly. Why should those of a tuning fork or drum be different? By striking your tuning fork or guitar string more violently than usual, you make the vibrations longer or wider than usual, not more frequent. "The dead march" in the Oratorio of "Saul." COLONEL THOMPSON'S "Just Intonation" is out of print; any large Mechanics' Institution library, however, will supply you with his "exercises," where the same principles are developed.

CARACTACUS: "Lyell's Geology" and "Laplace's Astronomy" are reckoned the best.—J. T. MILNE, (Hull): In order to solve the question "in what time would 23 men reap a field which 40 women would reap in six days, if 7 men can reap as much as 9 women;" it is plain that 23 men would take *more time* than 40 women, supposing that the men and women were on an equality in point of strength; but this not being the case, the men will take *less time* than they would otherwise have done, in the ratio of 9 to 7, this being the ratio of the strength of the men to that of the women: hence, the propriety of the following statement according to rule; see Cassell's Arithmetic, page 106.

reapers		reapers		
23	:	40	}	: : 6 days : 8 days.
9	:	7	}	

Communications have been received from E. W. M. (Belfast); N.R. (Portsea); JACOB H. (Manchester); W. SOUTHERN (Leamington); J. T. RHODES, CIVILIS (Dumfries); W. GIBBONS (Pimlico); J. W. (East Bourne); G. ARCHBOLD (St. Peter's); G. WILD (Dalton-on-Tees); DAWSON (Knaresborough); H. RICHARDSON (Manchester); G. W. C; V—e. A—d (Godalming); E. WESTWELL (Blackburn); J. HOLT (Rochdale); B. B. (Yorkshire); P. THOMPSON (Manchester); F. H. BRIGHTWELL (Berks); D. M., N. B., S. O. (Essex); DEUX ECHELLES (Nottingham); J. WHITELEY ELLAND (Halifax); W. RENDWAN (Camden Town); P. W. S. (Camden New Town); W. S. B.; ROBERT (Canterbury); C. H. F. (Petersfield); WABIN (East Dereham); H. C.—XXV. (Sussex); J. O. BAYES (Halifax); T. L. D. (Thrapston); S. A. (Leeds); and W. J. M. (Hoxton).

LITERARY NOTICES.

THE AUTOGRAPHS FOR FREEDOM, just published, will be found deeply interesting to the readers of *Uncle Tom's Cabin*, and to all the friends of Slavery Abolition. The Volume contains the contributions of more than *thirty* eminent writers, on the great subject of Negro Emancipation, with fac-similes of their autographs. Among the contributions are three by Mrs. Harriet Beecher Stowe, one by her sister, Miss C. E. Beecher, a powerful tale, by Frederic Douglas; other articles, in prose and verse, by Professors Allen, Raymond, and Finney, Judge Birnie, Horace Mann, Lewis Tappan, Horace Greely, Rev. J. Pierpont, &c. Also letters from the Bishop of Oxford, Earl Carlisle, Joseph Sturge, Wilson Armistead, &c. The price at which this is published, one shilling, will, no doubt, be the means of securing for it a most extensive circulation.

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Printed and Published by JOHN CASSELL, 9, La Belle Sauvage-yard, Ludgate-hill.—February 19, 1853.

LESSONS IN DRAWING.—No. VI.

OUTLINE (*continued*).

THE forms of which we have hitherto spoken have been for the most part such as may be drawn in their natural or proper dimensions on a flat surface, as, for instance, the square or the pentagon; but, in the following figures of solid bodies (fig. 71), we see that only one side of each solid, viz., that nearest the eye, is properly represented. Take the figure of a cube, for instance: three of the six square faces of this solid are shown, but one only is seen as a square. This is a perspective view of the cube; its faces are drawn according to the principles of that art, and so are the faces of the other solids; and, in all,

Fig. 72

THE FOREST.

cases where the outline of a figure lies in more than one surface or plane—that is, where the figure is *not flat*,—perspective furnishes us with rules by which a perfectly correct representation may be given. Perspective, therefore, naturally comes in order as the next branch of the art of drawing; and, after the following considerations regarding outline, we shall take up the subject of perspective, that is, in the succeeding lesson.

Fig. 71.

Octohedron. Dodecahedron. Tetrahedron. Cube.

In the operations of a good draughtsman, the eye, the hand, and the judgment, act in concert; but this desirable combination is never seen except as the result of very considerable practice. In order to succeed in its attainment, the student must continue exercises on outline far beyond what we have yet given him in these pages. If he has made himself acquainted with the principles of form, he will soon master every difficulty; and he may then proceed occasionally to copy from the drawings of a master hand. In these, he has the consummation of what the eye, the hand, and the judgment can produce; and if he copy them with spirit and accuracy, and at the same time with freedom, he will go through really valuable exercise. Good examples of outline are easily attainable: in Mr. Cassell's publications, "The Illustrated Magazine of Art," and "The History of the Painters of all Nations," specimens of drawings executed by the very first masters abound. But, as these drawings are for the most part filled up with light and shade, and made into complete pictures, if the student attempts to copy these, or any other drawings of the same description, he will need to exercise much care and observation; and, with this view, the following remarks will be of assistance to him. We shall suppose that he attempts to copy a simple subject, such as "The Forest," fig. 72; and, first, that he wishes to make a copy of the same size as the original. Let him *imagine* a perpendicular line to pass through the picture, dividing it into halves: this will pass through a point close to the fork in the upper branches of the tree, and will come downward near the dark spot in the principal branch. Its complete course downward is then easily followed. Having noticed the leading points through which this imaginary perpendicular passes, he must next *imagine* a horizontal line to pass through the picture, also dividing it into two equal parts. Two lines drawn visibly on the original would, of course, settle these points at once; but, in accustoming the eye to observation, it is much better to have them visible only to the mind, as this exercises the judgment also. The student should now *draw* two such lines faintly *on his paper*, and then proceed to make his copy, measuring by his eye the distance of one point from another, in which he will find these lines of great assistance.

Let us next suppose that his copy is *not* to be of the same size as the original. In order to attain greater correctness, the student should endeavour to determine the length and breadth of his copy, so that they shall be in just proportion to those of the original. If the dimensions of the original are taken in inches, the *halves* of these numbers will be the dimensions of a copy *one-fourth* of its size; *one third* of each of these numbers will be the dimensions of a copy *one-ninth* of its size;—and so on: the squares of the ratios of their dimensions being the exact ratios of the sizes of the picture and its copy. The meaning of this is, that if the ratios of the dimensions be $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, &c., the ratios of the sizes will be $\frac{1}{2} \times \frac{1}{2}$, $\frac{1}{3} \times \frac{1}{3}$, $\frac{1}{4} \times \frac{1}{4}$, &c.; or, simply, $\frac{1}{4}$, $\frac{1}{9}$, $\frac{1}{16}$, &c. If the proposed length is given by means of a straight line, the height or breadth may be found by the following method:—In fig. 73, draw two lines making gle with each other; in one of them, set off with the s the length of the original, as A E, and in the other t, as A D; join D E; then, if A C be the proposed f the copy, set this length off on A E with the compand through C draw B C parallel to D E; then A B proportionate height of the copy. This diagram es that *reduced* dimensions are required; but, if the straight lines A B and A C were the dimensions of the original, and A E the length of the copy, then the straight line D E drawn parallel to B C will give A D, the proportionate height. Where the given or required dimensions are so extended as to make this method troublesome in practice, the length A B may be easily found by the rule of proportion in arithmetic; for a fourth proportional to the numbers expressing the engths of A E, A D, and A C, in inches, will give the required height. The proposition here referred to is the twelfth of the sixth book of Euclid; see Cassell's edition, page 134.

Fig. 73.

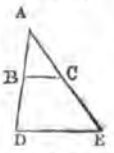
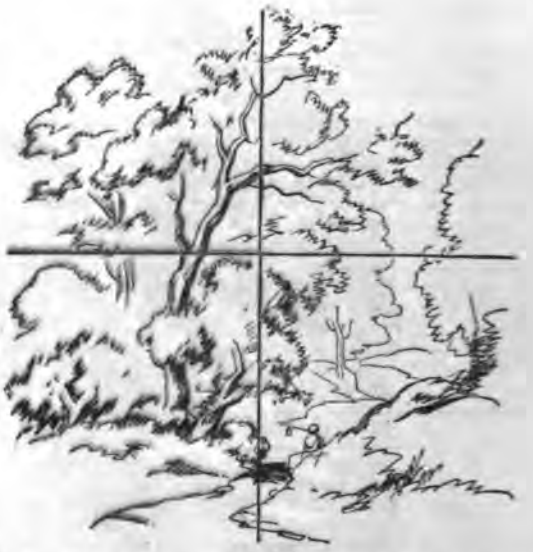


Fig. 74.



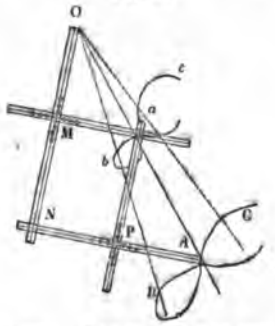
Having thus determined the size of his copy, the student will now refer to the perpendicular and horizontal line drawn, or supposed to be drawn, as described above. Of course, he should not give any attention to the smaller details of the picture until all the larger parts and outlines are properly drawn; the latter are then easily added. This, indeed, is a general principle of procedure applicable to the whole range of the art,—to outline, to colour, and to effect,—to original drawing as well as to copying. We call the attention of the student particularly to this principle, as there is none which he is more apt to overlook. Fig. 74 is an outline of fig. 72 to a scale of one-half of its linear dimensions. This will exemplify and illustrate, to some extent, the nature of the preceding observations; but this mere sketch is intended more as a hint than as a perfect example to the student.

It is proper here to remind the student of the method of *points* mentioned in Lessons III. and IV.; for he will find it eminently useful in making such copies as we are now speaking of; indeed, he should mark off all the principal masses in the manner referred to, in whatever copy he may undertake to draw. It will be observed that, in the small outline exhibited in fig. 74, the effect of light and shade is given to some parts by a thickening of the line on the shadow side; and the effect of distance, by making all the outlines of the more forward objects bolder than those of the more distant. This has a pleasing effect when well managed; but the student must take this only as a hint at present: future examples will bring this subject more fully under his observation. We shall conclude this lesson with a short account of an instrument used by artists for copying drawings on a reduced scale, for the purposes of copper-plate or other engravings.

The *Pantograph*, (from the Greek *pas, pantos*, all, and *grapho*, I write,) is an instrument for copying, in a continuous manner,

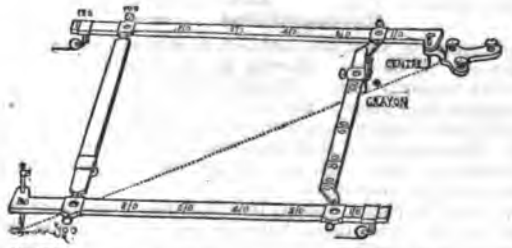
any figure whatever, and reducing it to any size, so that all its dimensions shall have, to those of the given copy, a given ratio. This instrument is figuratively called *singe*, that is, *monkey*, by the French, because it imitates in small that which

Fig. 75.



man has done in large. The principle of this instrument will be understood from fig. 75, in which M N P *a* is a parallelogram composed of four levers or rods, which are jointed at the four angles, and are moveable round the joints or pins. A crayon or pencil is placed at *a*, and a point or tracer at A on the prolongation of the lever N P, and these are adjusted so that the straight line A *a*, when produced, passes through the point O, which is preserved in a fixed position. By tracing with the point or tracer at A the whole of the outline of any figure or curve, O A B, the crayon or pencil at *a* will produce a figure, *c a b*, exactly similar to the former. The levers M N and *a* P are furnished with holes previously numbered and adjusted, so that the artist can at pleasure place the pins in them, alter the position of the joints, and draw a copy to any determinate scale. In fig. 76, there is a representation of an

Fig. 76.



instrument of this kind carefully constructed in brass, and having its sides decimally divided. In this figure, you see the fixed point or *centre*, and the extremities of the pencil or *crayon*, and of the *tracer*, all placed in the same straight line, which is represented as dotted. The instrument rests upon the *centre* and *tracer* at opposite extremities of two parallel levers, and upon small wheels at their two other opposite extremities. The pantograph was described in a book published at Rome in 1631, entitled *Pantographia, seu Ars delineandi res quaslibet, &c.*

The principle on which the operation of the preceding instrument is founded is the same as that on which the construction of fig. 73 depends, and is contained in the *second* proposition of the sixth book of Euclid, page 125, Cassell's edition; or, rather, under a more extended view in the *fourth* proposition of the same book, at page 128, Cassell's edition.

LESSONS IN LATIN.—No. XLIII.

By JOHN R. BEARD, D.D.

VARIOUS KINDS OF VERBS.

As there are several kinds of verbs in Latin, it seems desirable to take a brief notice of the more important. The most comprehensive division is formed by considering verbs as either simple or derivative.

SIMPLE VERBS.

Simple verbs consist of a monosyllable, which, in general, is short in regard to quantity, and may be vocal, that is, such as end in a vowel, or, what is more common, consonantal, or such as terminate in one consonant or in two consonants. In order to obtain the root or stem, we must cut off the personal ending *o*, e. g., lŭ-*o*, ĕm-*o*, flŭ-*o*, frĕm-*o*, scand-*o*. A short syllable is sometimes, for the sake of force in pronunciation, made long by the addition of a consonant, thus: lab (labium, *a lip*) becomes lamb-o, *I lick*; jug (jugum, *a yoke*) becomes jung-o, *I join*; tag (hence, tĕtĭgi) becomes tang-o, *I touch*; tud (hence, tutŭdi) becomes tund-o, *I pound*; scid (scĭdi), scind-o, *I cleave*; tem becomes temn-o, *I despise*; sper becomes spern-o, *I spurn*; sig (sig-illum, *a seal*), sign-o, *I sign*. The number of primitive verbs is comparatively small.

DERIVATIVE VERBS.

Derivative verbs are formed first from nouns, thus: from color, *colour*, we have colorare, *to colour*; from fulgur, *lightning*, fulgurare, *to lighten*; from fulmen, *thunder*, fulminare, *to thunder*; from monstrum, *an indication*, monstrare, *to show* (compare moneo); from regnum, *a kingdom*, regnare, *to rule*; from pugnus, *a fist* (compare Gr. pux, *with clenched fist*, pugna, *a fight*, E. R. *pugilist*), pugnare, *to fight*; from fastidium, *nausea* (compare fastus, *pride*), fastidire, *to be disgusted with*. In some cases, it may be doubted whether the noun or the verb is the primitive, e. g.,

Pax, pāc-is, *peace*, pācare, *to pacify*; root, pāc.
Lux, lūc-is, *light*, lūc-ere, *to be light*; root, lŭc (compare lŭcerna, *a lamp*).
Finis, *a boundary*, finire, *to bound or limit*.
Sors, sort-is, *a lot*, sortiri, *to cast or draw lots*.
Flos, flōr-is, *a flower*, florere, *to flower or blossom*.
Foed-us, *foul*, foedare, *to pollute or make foul*.
Laus, laud-is, *praise*, laudare, *to praise or laud*.
Gravis, *heavy*, gravare, *to make heavy, to load*.
Largus, *abundant*, largiri, *to give abundantly*.

Those, also, are derivative verbs which indicate a repetition of the act indicated by the verbs. They are formed by the insertion of *t* or *it*, and are called *frequentatives*. They follow the first conjugation, thus:

Verbs formed by *t*: From dicĕre, *to say*, dictare, *to repeat*; from cano, *I sing*, can-tare, *to chant*; from capere, *to take*, captare, *to snatch*; from salire, *to leap*, sal-tare, *to dance*; from trahere, *to draw*, trac-tare, *to drag*; root, trah; from specĕre, *to look*, spec-tare, *to look at, to view*.

Verbs formed by *it*: From ago, *to do*, ag-itare, *to be always doing*; from cogĕre, *to drive*, cog-itare, *to revolve*; from clamare, *to cry*, clam-itare, *to shout*; from rogare, *to ask*, rŏg-itare, *to entreat*; fluĕre, *to flow*, flŭ-itare, *to float*; volare, *to fly*, vŏl-itare, *to flutter*; quaerĕre, *to seek*, quaer-itare, *to look for*; noscĕre, *to know*, nosc-itare, *to be acquainted with*; pavēre, *to fear*, păv-itare, *to fear greatly*; latēre, *to be hid*, lăt-itare, *to lie hid often*; minari, *to hang over*, min-itari, *to threaten*; polliceri, *to offer*, pollic-itari, *to promise*; nego, *to deny*, nĕg-itare, *to deny often*; sciscĕre, *to learn*, scisc-itari, *to inquire*.

Verbs formed by *t* and *it*: From dictare, *to repeat*, dict-itare, *to repeat often*; cantare, *to chant*, cant-itare, *to chant often*; ventare, *to come often*, vent-itare, *to frequent*; legĕre, *to read*, lect-itare, *to read often*; vivĕre, *to live*, vict-itare, *to feed upon*; scribo, *to write*, script-itare, *to write often*; the three latter verbs are, as it were, derived from lectare, victare, scriptare, which were not in use.

DESIDERATIVE VERBS.

There is, also, a class of derivative verbs named *desideratives*, inasmuch as they express a desire (desiderium). They are formed first by the suffix *tur*, and are of the fourth conjugation; the full termination of the present is in *turio*, e. g., coenaturio, *I desire a meal*, from coena, *a meal*; emturio, *I desire to purchase*; parturio, *I wish to bring forth*. The *t* is in some cases dropped, e. g., esurio, *I wish to eat*, from edo, *I eat*. Another way of forming desideratives is by means of *ss* with the connecting vowel *e*, or, in the older forms of the language, *i*; as, lac-esso, *I excite*, from lacio, *I entice*; cap-esso, *I seize*, from capio, *I take*; fac-esso, *I perform*, from facio, *I do*; pet-isso, also pet-esso, *I strive after*, from peto, *I seek*; incip-isso, *I attempt*,

from incipio, *I begin*. From the idea of repetition, these verbs become frequentatives; as, incesso, *I assault*, from incedo, *I approach*. Arcesso, for accesso (from accedo, *I come to*), has a causal force; as, *I cause to come, I send for*.

Diminutive Verbs.

Another class of derivative verbs bear the name of *diminutives*: they express the idea of diminution, what is little, or what is contemptible. They are formed by the suffix *ill*, and follow the first conjugation, e. g., cant-illare, *to sing small*, from cantare, and that from cano; conscrib-illare (from scribo), *to scribble together*; sorb-illare, *to sip*, from sobĕre, *to sup*.

Inchoative Verbs.

Finally, there are the inchoative verbs, so called because they denote a beginning (from inchoo, *I begin*). The suffix is here *sc*, which is united to the root by means of *a*, *e*, *i*. Their inflexions are after the third conjugation, e. g., from labāre, *to totter or fall*, is formed the inchoative (called also, inceptive, from incipio, *I begin*) labasco, *I begin to fall or totter*; from pallēre, *to be pale*, comes pallesco, *I grow pale*; from gemĕre, *to groan*, gemisco, *I sob*; from dormire, *to sleep*, obdormisco, *I fall asleep*.

Compound Verbs.

Verbs are compound as well as primitive and derivative. Compound verbs are made up of two or more parts. These parts may be verbs, and then compound verbs are said to be formed of

Verbal Stems.

Are-facio (from arēre, *to be dry*), *I make dry*.
Cale-facio (from calēre, *to be hot*), *I make hot*.
Made-facio (from madēre, *to be wet*), *I make wet*.
Pate-facio (from patēre, *to be open*), *I make open*.
Assue-facio (from assuēre, not in use), assuescĕre, } *I grow*
Consue-facio (from consuere, not in use), consuescĕre, } *accustomed*.
Commone-facio (from commonēre, *to remind*), *I remind, advise*.
Condoce-facio (from condocēre, *to instruct*), *I instruct*, or *train up*.

Of these compounds, the four which stand first are composed of two verbs. The four last have each a preposition besides. Thus, assue is made up of ad and sue. Facio is the second verb in all the instances. The specific meaning is in each case given by the first verb, which is for the most part an intransitive.

Nominal (nouns and adjectives) *Stems.*

Take, as an example, tergi-versor, literally *I turn my back* (E. R. *tergiversation*), which consists of tergum, *the back*, and versor, from verto, *I turn*.

This combination, as with the former one, is made chiefly by means of facere, in the form of ficare.

Aedi-ficare (from aedes, *a chapel, a house*), *to build* (E. R. *edify*).
Nidi-ficare (nidus, *a nest*), *to build a nest*.
Signi-ficare (signum, *a sign*), *to make a sign* (E. R. *signify*).
Ampli-ficare (amplus, *broad*), *to enlarge* (E. R. *amplify*).
Grati-ficare (gratus, *pleasant*), *to please* (E. R. *gratify*).

Compound verbs are made also by

Adverbial and Prepositional Stems.

Satis-facere (from satis, *enough*), *to satisfy* (E. R).
Satis-dare (from satis, *enough*), *to give security*.
Bene-dicĕre (from bene, *well*), *to speak well of*.
Male-dicĕre (from male, *ill*) *to speak ill of*.
Ma-velle (from magis, *rather*), *to prefer*.
Ad-stare (from ad, *to, near*), *to stand near*.
Pro-ferre (from pro, *before*), *to bring forward*.
De-cedere (from de, *down*), *to depart*.
Prae-videre (from prae, *before*), *to foresee*.

Some elements in compound verbs which were originally prepositions no longer exist as such, but in their natural form are found only in combination, and may therefore take the indefinite name of particles.

Particle Stems.

Amb, from the Greek amphi, *around* (ambo, in Latin), *on both sides*, is found in ambigŏ (ago), *I drive hither and thither, I doubt*; amburo (uro), *I set on fire all round*; anquiro (ambquiro, quaero), *I investigate*.

Dis, di, dif, denoting *division* and *negation*, e. g., discedo, *I part from*; dimitto, *I send away*; dissipo (sipo, or rather, supo, *I cast*), *I scatter*; diruo (ruo, *I fall*), *I pull down, destroy*; diffido (fido, *I trust*), *I distrust*.

Ne, *not*, e. g., nescire, *to be ignorant*; nequire, *to be unable*.

Re, *back, again, away*, e. g., revertor, *I return*; redeo, *I go back*; revello, *I tear away*; resĕco, *I cut off*; resisto, *I stand against, resist*.

Se (sine, *without*), denoting *separation*, appears in secedo, *I withdraw* (E. R. *secede, secession*); sepono, *I lay aside*, sejungo, *I separate*.

Sus, su (sub, *under*), denoting *from under*, that is, *upwards*, as in suspendo, *I hang up*; su-spicio, *I look up*.

Com, con, coo, co (cum, *with*), signifying *together, union*, is of common occurrence, and may be seen in compono, *I put together* (E. R. *compose, composition*); congredior (gradior, gressus), *I come together* (E. R. *congress*); coeo, *I go together*. In some instances, this particle seems to do little else than strengthen the verb with which it is joined, e. g., concedo, *I yield*; congratulor, *I wish joy*; cohortor, *I encourage*.

Verbs Transitive and Intransitive.

The widest distinction between verbs is made when they are divided into the two classes of *transitive* or *intransitive*. The word transitive (from trans, *over*, and eo, *I go*) denotes verbs, the action of which *goes over* from the subject to the object. The intransitive are those verbs in connexion with which this transition *does not* (in *act*) take place. Here are two examples:

	Subject.	*Verb.*	*Object.*
I. Transitive:	Pater	amat	filium
	Father	*loves*	*(his) son*
II. Intransitive:	Filia	dormit	——
	(The) daughter	*sleeps*	——

Here, you see, amat has a subject, a verb, and an object, but dormit has no object. Having an object after it, the verb amat is a *transitive* verb. Observe that the act implied in the verb passes from pater to filium, from the subject to the object. A transition of this nature is the characteristic of a transitive verb. The absence of that transition is the characteristic of an *intransitive* verb; and, accordingly, in the use of dormit, there is no such transition.

By a sort of poetic license, indeed, some intransitive verbs have an object after them, but only an object of the same meaning, or of similar import with the verb, e. g., somniavi somnium, *I have dreamt a dream*.

Occasions there are where a really transitive verb stands without an object; as, quid agis? lego; *what art thou doing? I am reading*. Here no object is expressed; yet is lego a transitive verb, for it is by the idea, not the mere form of expression, that these things are determined, and in the idea of reading an object is of necessity involved. If I read, I read something; you may ask: *What* do you read? but you cannot ask, *What* do you sleep?

Transitive verbs are subdivided into two sorts—the active and the passive.

Active:	Pater amat filium,
	The father loves the son
Passive:	Pater amatur a filio,
	The father is loved by the son.

These distinctions are called *voices*; we speak of the *active* voice and the *passive* voice. It is only transitive verbs that admit the distinction of active and passive. The passive voice is the counterpart of the active voice, and, when the latter does not exist, the former cannot be found. Hence it appears that there are verbs which are neither active nor passive; such verbs being neither the one nor the other, are called neuter (*neither*). Thus dormit, *he sleeps*, is a neuter verb. Dormit, you see, denotes a certain state; and, in general, intransitive or neuter verbs denote a state, e. g., currit, *he runs*; volat

avis, *the bird flies*. A transitive verb, however, has action for its essence, e. g.,

Subject.	*Verb.*	*Object.*
Pugiles	feriunt	adversarium
Boxers	*strike*	*their opponent*

You see the blow given by the hand. Feriunt is a transitive verb, because the action which it conveys passes from the subject to the object. It is also a transitive verb in the active voice. Transitive verbs are in the active voice when they have the terminations of the active voice. Or, to define the matter according to the sense, transitive verbs are in the active voice when they have an object, as feriunt, the object of which is adversarium. The same sense may be expressed by a passive voice, thus:

Subject.	*Verb.*	*Instrument.*
Adversarius	feritur	a pugilibus
Their opponent	*is struck*	*by boxers*

By comparing together this and the last example, you see the object has become the subject; and the subject is converted into the instrument; and observe, the instrument is preceded by the preposition *a*. By that preposition (a, ab, abs, *by* or *with*) the instrument—when a person or an animate object—must always be accompanied. If the instrument is a thing,—an inanimate object, it is put in the ablative case without any preposition, e. g.,

Puer feritur *baculo*,
The boy is struck with a stick.
Miles interficitur *gladio*,
The soldier is slain by the sword.

In the instance just given of an active voice converted into a passive voice, the sense remains the same. But in the previous example the sense is altered. This will best appear by the two cases being put together.

The sense altered	Act.	Pater amat filium
	Pass.	Pater amatur a filio
The sense unaltered	Act.	Pugiles feriunt adversarium
	Pass.	Adversarius feritur a pugilibus

In the first instance, you see the subject of the active voice remains the subject in the passive voice. But in the second, the subject of the active voice has in the passive become the instrument.

It is the essential feature of the passive voice that the action of the verb, instead of passing over to an object, either turns back on the subject, or remains with the subject. In amor, *I am loved*, the act of loving turns back on the subject *I*. Hence a reflex action is involved in many passive verbs. Moveor, *I am moved*, may signify *I move myself*, or simply, *I move*. This peculiarity of meaning in Latin, is in Greek denoted by a peculiarity of form which is called *the middle voice*.

A much more definite peculiarity is that by which verbs, which, being passive in form, have an active signification. These are already known to the student as the class of *deponent verbs*. Minute accuracy would require a division to be made of *deponent verbs* into transitive and intransitive, for while hortor, *I encourage*, has an object, proficiscor, *I go*, is without an object.

There are, also, verbs which, though active in form, have a neuter signification; for vapulo signifies *I am beaten*, and veneo, *I am sold*.

In some verbs the two forms, the active and the passive, are blended together, and that without a passive meaning. As these verbs have not a passive import, so are they intransitive or neuter, and, for the sake of a name, are called *neuter passives*, e. g.,

Present.	*Infinitive.*	*Perfect.*
Audeo, *I dare*,	audēre,	ausus sum.
Gaudeo, *I rejoice*,	gaudēre,	gavisus sum.
Soleo, *I am accustomed*,	solēre,	solitus sum.
Fideo, *I trust*,	fidēre,	fisus sum.

Here, while the present tenses are of the active voice, the perfect tenses are in the passive voice. These verbs, then, are active and passive *in form*, and *in signification* intransitive; or, verbs are

Transitive. *and* *Intransitive.*

active, passive · neuter
deponent, neuter-passive
transitive, intransitive

Vocabulary.

Elephas, ntis, m. (also, elephantus, i, m.) *an elephant*; ventilo 1, *I hesitate, delay*; quadrigae, arum, f. *a chariot drawn by four horses.*

Exercises.—Latin-English.

Pictura ornat domum; salutamus parentes nostros; postulavi librum meum; stellae superant terram magnitudine; homines cibo satiantur; hic passer necatus est ab accipitre; corpus humanum optime duratur labore; amamur a Deo, et ab eo semper amati sumus; saepe exercitus servatur virtute unius militis; reges olim creati sunt a populo; miseri consolantur se spe meliorum temporum; maximi elephantes vagantur in silvis et montibus Indiae; agitantur quadrigae; Coelius, ut dictitabat, ad Caesarem pervenit; animus, qui ex inflammatā animā constat, superiora capessit; solus coenitabat apud me pater; solet accipiter trepidas agitare columbas; spes est nos esurituros esse; omnes imperio laeti parent ac jussa facessunt; ipse metuere incipies ne innocenti periculum facesseris; ex legionibus fabros delegit, et ex continenti alios arcessiri jubet; cui maledixit unquam bono? benedixit? imo; quem fortem et bonum civem non petulantissime est insectatus? cupio te ad me venire; ventum in insulam est; quam stultum est, quum signum pugnae acceperis, ventilare! volitat ante oculos istorum juba regis filius; pennis volare haud facile est homini.

English-Latin.

The house is ornamented with pictures; the birds fly; the birds flit; I can fly with wings; he has caused danger to me, an innocent man; he spoke well of his general; is there any hope of eating? he drives the enemy about; an elephant wanders in the forest; God loves good men; good men are loved by God; the earth is surpassed in magnitude by the stars; we are saluted by our parents; the boy saluted his mother; I have been sent for by the king; the king sent for the general; the general saved the army by his valour; by the wisdom of good men the world is saved (preserved); the young man executes his uncle's commands; thou art satisfied with food; labour strengthens the husbandman; husbandmen are strengthened by labour; the hawk killed the sparrow; of old, the people created kings.

LESSONS IN GERMAN.—No. XXXVII.

Section LXXVI.

Schmerzen, to pain, is used like the corresponding English word. Ex.: Der Gedanke ſchmerzt mich; the thought pains me. Die Wunde ſchmerzt ihn; the wound pains him.

I. **Weh**, (*pain*) joined with **thun**, (*to do, to make*) forms the phrase, **Weh thun**, to pain, to grieve; literally, to make, or cause pain. Ex.: Das thut mir weh; that grieves me (it causes me pain). Er hat dem Kinde weh gethan; he has hurt the child. Die Hand thut ihm weh; the hand pains him. Das Kind hat ſich weh gethan; the child has hurt itself.

II. **Leid thun**, (literally, to make, or cause pain,) is employed to denote *mental* sufferings; *sorrow;* as, Es thut ihm leid, daß er es gethan hat; he is sorry, that he has done it. Es thut mir leid, ihn nicht geſehen zu haben; I am sorry not to have seen him.

III. **Fehlen**, to fail, to miss, to lack, is often used impersonally. Ex.: Es fehlt ihm an Verſtand; he was lacking in understanding. So also, Was fehlt dem Manne? What *ails* the man? Was fehlt Ihnen? What ails you? or what is the matter with you?

Exercise 79.

Abweichen, to deviate;
Abermals, again, once more;
Begegnen, to encounter;
Ding, *n.* a thing;
Erwer'ben, to earn, get, obtain;
Fehl'gehen, to go wrong, to miss the way;
Gereu'en, to cause to repent;
Gottloſigkeit, *f.* wickedness;
Hinzufügen, to add to, to join, adjoin;
Leid, (See II.);
Meiden, to avoid, shun, to abstain from;
Nie'derſchlagen, to deject, discourage, dishearten;
Pfad, *m.* path;
Sagen, to say, tell;
Scheiden, to part from another;
Schmerzen, (see above);
See'lenruhe, *f* tranquillity, peace of mind;

Streit, *m.* contest, contention; Tugend, *f.* virtue; Unschuldig, innocent; Verken'nen, to mistake, to take for another; Verstimmt', out of humour, out of tune; Vorsichtig, careful; Wahl, *f.* choice; Weh, (See I.); Volkslied, *n.* national song; Vorfallen, to happen, to come to pass; Zufriedenheit, *f.* contentedness; Zu'fügen, to cause, to inflict.

Es fiel nichts von Bedeu'tung vor. Nothing important happened.
Es schmerzt nichts länger und tiefer, als das Bewußt'sein, seine (§ 135. 4.) Jugend in Thorheiten vergeu'det zu haben. Nothing pains longer and more deeply, than the consciousness of having spent one's (his) youth in folly.
Sagen Sie mir, was Ihnen fehlt, und was die Ur'sache Ihrer Thränen ist. Tell me what ails you, and what is the cause of your tears.
Es fehlt mir an Geduld, das Ende meiner Leiden ab'zuwarten. I lack patience to await the end of my sufferings.
Ein Lobspruch, den ich mir nicht zueignen kann, thut mir weher, als ein verdien'ter Verweis'. A eulogium, that I cannot appropriate, pains me more than a merited reproof.
Er thut das schon weh, was andern nur leid thut. That already pains me which makes others only sorry.

1. Es schmerzt mich, so viele Menschen unglücklich zu sehen. 2. Die Wunde schmerzt ihn mit jedem Tage mehr. 3. Es schmerzt nichts mehr, als von Leuten verkannt zu sein, deren Liebe und Achtung man sich gern erwerben möchte. 4. Es thut mir leid, ihn beleidigt zu haben. 5. Scheiden und Meiden thut weh, sagt ein altes deutsches Volkslied. 6. Mein Kopf thut mir weh. 7. Es thut mir in der Seele weh, ihm nicht helfen zu können. 8. Was fehlt, mein Freund, warum so traurig? 9. Es fehlt mir weiter nichts, als daß ich ein wenig verstimmt bin. 10. Sind Sie krank? 11. Ja, ich bin ein wenig unwohl. 12. Was fehlt Ihnen. 13. Ich habe Kopfweh. 14. Sie sind reich und angesehen, und doch sind Sie niedergeschlagen, — was fehlt Ihnen? 15. Es fehlt mir viel, „Zufriedenheit und Seelenruhe." 16. All (Sect. 41. VI.) meine Freunde, die versprochen hatten zu kommen, waren da, nur Einer fehlte. 17. Alle Menschen fehlen. 18. Mein Bruder ist abermals fehl gegangen; statt in mein Haus, ist er in das meines Nachbars gekommen. 19. Seine Worte gereuten ihn, und er versprach dieselben nie wieder sagen zu wollen. 20. Als dieses vorfiel, war ich nicht zu Hause. 21. Dieser Streit fiel in der Nähe meiner Wohnung vor. 22. Ich habe dem bereits Gesagten nur noch wenig hinzuzufügen. 23. Diesem Geschenke fügte sie ein kleines Briefchen hinzu. 24. Er fügte mir vorsätzlich dieses Leid zu; deshalb kann ich ihm nicht verzeihen.

1. It pains a father to hear of the wickedness of his son. 2. Nothing pains more than to be accused innocently. 3. It pains me, that so many persons have been found killed by the last storm. 4. I am sorry that you did not find me at home. 5. The wound which the soldier received in the contest pains him. 6. What ails you, my friend? 7. Oh, nothing particularly. 8. You look very ill, what is the matter with you? 9. I am not well, I have hurt myself. 10. He has fallen out of the window. 11. This boy lacks understanding. 12 You have been offended by me; I am sorry, for I esteem you much. 13. You dare not lack courage, to encounter the contest with your enemy. 14. I lack patience to await the event of this matter.

Section LXXVII.

Damit (therewith) is often to be rendered by "in order to, in order that, to that, &c." Ex.: Ich muß eilen, damit ich nicht zu spät ankomme; I must hasten, in order not to arrive too late. Ich wollte bitten, daß Sie das thäten, damit ich es nicht thun müßte; (Gellert.) I would beg you to do that, in order that I might not be obliged to do it.

I. Seitdem = since, since then, since the or that time. Ex.: Seitdem sie in Deutschland war, spricht sie nichts als Deutsch; since she was in Germany, she speaks nothing but German. Seitdem ist er glücklich; since then (or that time) he is happy.

II. Gefälligst, an adverb in the superlative degree from the ...ive gefällig, pleasing, agreeable, answers to our phrase, please, if you please. Ex.: Wollen Sie mir gefälligst* sagen, wieviel Uhr es ist? Will you please to tell me what time it is? Geben Sie mir gefälligst meinen Hut; please to give me my hat.

Exercise 80.

Auf'setzen to put on; Beispiel, *n.* example; Eilen, to hasten; Elterlich, parental; Ereig'nen, to happen, occur; Erkennt'niß, *f.* knowledge; Fort, away (Sect. 83. II.); Fort'eilen, to hasten away; Fremde, *f.* foreign country, abroad; Gefäll'igst, (See II.); Geschwin'digkeit, *f.* celerity, swiftness; Heimath, *f.* home, native place; Hungern, to hunger, starve; Krönen, to crown; Nachricht, *f.* intelligence; Pelzhandschuh, *m.* fur-glove; Phantasie', *f.* fancy; Post'wagen, *m.* stage-coach; Prassen, to gormandize; Schwelgen, to revel, carouse; Seitdem, (See I.); Stürmisch, stormy; Um'hängen, to hang round, put on; Umher'irren, to wander about; Versäumen, to miss, neglect, lose; Um'werfen, to throw about; Vortheil, advantage; Weichen, to give way, retire; Weshalb, why, wherefore.

Die Deutschen können erst über Literatur' ur'theilen, seitdem' sie selbst eine Literatur' haben. Göthe. The Germans can now (for the first) judge of literature, since they themselves have a literature.
Er ist an'gezogen mit dem Kleide der Gerech'tigkeit. He is clothed with the garment of justice.
Der Onkel setzte seinen Hut auf und hängte seinen Mantel um. The uncle put on his hat and cloak (hung his cloak about).
Er eilt heim mit sor'gender Seele, damit' er die Frist nicht versäu'me. Schiller. He hastens home with anxious soul in order that he may not miss the appointed time.

1. Seitdem ich hier angekommen bin, hat sich schon Manches ereignet. 2. Seitdem er diese That begangen hat, scheint aller Friede von ihm gewichen zu sein. 3. Seitdem er fort ist, habe ich keine recht frohe Stunde mehr. 4. Seit dieser Zeit hat man nichts wieder von ihm gehört. 5. Seit meinem zehnten Jahre habe ich das elterliche Haus verlassen. 6. Seit gestern befinde ich mich nicht ganz wohl. 7. Seit dem Tode seiner Eltern irrt er ohne Heimath in der Fremde umher. 8. Seitdem er zur Erkenntniß seiner selbst gekommen ist, ist er ein ganz anderer Mensch geworden. 9. Er zog sich in aller Geschwindigkeit an. 10. In der Eile vergaß er seine Stiefeln anzuziehen, und eilte in den Pantoffeln fort. 11. Seine Kleider sind ganz durchnäßt, deshalb mußte er sich anders anziehen. 12. Er setzte diesen Morgen seinen Hut nicht auf, sondern seine Mütze. 13. Der Diener hängte ihm nicht, wie gewöhnlich, seinen Mantel um, sondern er warf ihn selber um. 14. Vergessen Sie nicht, Ihren Mantel umzuwerfen, es ist sehr kalt und stürmisch. 15. Hängen Sie mir gefälligst meinen Mantel um und setzen Sie mir meinen Hut auf, denn ich habe schon meine dicken Pelzhandschuhe angezogen. 16. Er stieg auf den höchsten Baum, damit er den König sehen könne. 17. Er war sehr eilend, damit er den Postwagen nicht versäumen möchte. 18. Er erzählte mir dieses, damit ich mir ein Beispiel daran nehmen möchte. 19. Der Schüler entschuldigte sich damit, daß er keine Zeit gehabt hätte, seine Aufgabe zu lernen. 20. In großen Staaten müssen Hunderte hungern, damit Einer prasse und schwelge: Zehntausende werden gedrückt und in den Tod gejagt, damit ein gekrönter Thor oder Weiser seine Phantasie ausführe.

1. Will you please to give me a cup of coffee or tea? 2. Since yesterday I have felt myself not quite well. 3. Since he quitted his parental house we have not heard anything of him. 4. Since the twelfth year of my age, I have not visited my native land. 5. Since he received the intelligence, he has had no peace. 6. In order that my friend may not come in vain, I shall stop at home. 7. I have not seen my friend, since he arrived from Germany. 8. Instead of putting on his boots he went out in his slippers. 9. Tell your friend, if you please, he may visit us at any time. 10. Why does he not take advantage

* Note, that gefälligst, unlike the phrase Sect. L. 75. I., is employed in *soliciting* and not in *acknowledging* a favour.

of his youth, in order to acquire the knowledge he wants? 11. How have you been since I saw you last? 12. Finish your exercise if you have not yet finished it, then you will not be punished by your master.

Section LXXVIII.

Lieb, beloved, dear, agreeable, may, when applied to *persons*, be rendered (like gern with haben Sect. 44. I.) "*dear.*" Ex.: Ich habe ihn ſehr lieb; he is very "*dear*" to me. Applied to *things*, lieb with ſein, signifies to be *agreeable, to please, &c.*; as Dieſes kleine Geſchenk iſt mir lieb; this little present *pleases* (is pleasing) me. Es iſt mir lieb, daß Sie damit zufrieden ſind; I am *glad* (it is pleasing) that you are satisfied with it.

I. Böſe auf (literally, bad upon) and böſe über (bad over or *towards*) signify ill-disposed; the former being applied chiefly to *persons*, the latter to *things*. Ex.: Warum ſind Sie böſe auf ihn? Why are you angry at *him*? Er iſt böſe über mein Lachen; he is angry at my *laughing*.

II. Kennen lernen (kennen, Sect. 26. III.) signifies to become acquainted with. Wollen Sie ihn kennen lernen? Do you wish to become acquainted with him? Ich habe ihn ſchon kennen gelernt; I have already become acquainted with him.

Exercise 81.

Antreffen, to meet with;	Einführen, to usher in, introduce, import;	Schmuggler, *m.* smuggler;
Befriedigend, satisfactory;	Erfolg', *m.* result;	Unmöglichkeit, *f.* impossibility;
Beſänftigen, to pacify;	Gelingen, succeed;	Verbieten, to forbid;
Eigenſinnig, stubborn, wilful;	Geſetz, *n.* law;	Vorſtellen, to represent, introduce, personate.
	Mit'theilen, to impart, communicate, bestow, give;	

Wollen Sie mich in dieſe Geſellſchaft einführen?	Will you introduce me to this company?
Ich will Sie meinen Bekannten vorſtellen.	I will introduce you to my acquaintances.
Ich will Sie mit meinen Freunden bekannt machen.	I will make you acquainted with my friends.
Mein Vetter ſtellte den Kaiſer vor.	My cousin represented (personated) the emperor.
Sein Bruder ſtellte mir vor, daß es unrecht ſei.	His brother represented to me that it was wrong.
Es iſt ihm ſehr lieb, daß Sie wegen dieſer Sache nicht böſe auf ihn ſind.	He is very glad that you are not angry at him on account of this affair.
Ueber was ſind Sie ſo böſe?	At what are you angry?
Ich habe Herrn K. voriges Jahr kennen gelernt.	I have become acquainted with Mr. K. (during) the past year.

1. Es iſt mir lieb, daß ich Sie hier antreffe, ich habe Ihnen Wichtiges mitzutheilen. 2. Es iſt mir lieb, Sie ſo wohl zu ſehen. 3. Es wäre mir lieb, Sie bald wieder zu ſehen. 4. Er iſt böſe über das Betragen ſeines Neffen. 5. Er iſt böſe über das Ausbleiben ſeines Sohnes. 6. Sie iſt böſe über ſich ſelbſt. 7. Der Freund war böſe auf mich, aber ich habe ihn wieder beſänftigt. 8. Die Mutter iſt böſe auf ihr eigenſinniges Kind. 9. Ich bin böſe auf ihn, weil er mich beleidigt hat. 10. Kennen Sie Herrn N.? 11. Ja, ich habe ihn letzte Woche in dem Hauſe Ihrer Frau Tante kennen gelernt. 12. Ich lerne ihn mit jedem Tage mehr kennen. 13. Man lernt Jedermann eher kennen, als wie ſich ſelbſt. 14. Wo ſind Sie mit dieſem Herrn bekannt geworden? 15. Wir kennen uns von Jugend auf, und lernen uns mit jedem Tage mehr kennen. 16. Kennen Sie Fräulein B.? 17. Nein, aber ich hoffe noch mit ihr bekannt zu werden. 18. Dieſer Mann wird durch ſeine trefflichen Werke bald bekannt werden. 19. Herr N. ſtellte mich dieſer Familie vor. 20. Er wurde der Geſellſchaft durch ſeinen Bruder vorgeſtellt. 21. Das Aeußere dieſes Mannes ſtellt nichts vor. 22. Dieſer Schauſpieler ſtellte Karl XII. vor. 23. Durch wen wurden Sie eingeführt? 24. Ich verdanke (Sect. 44. VI.) dieſe Ehre der Nichte des reichen Kaufmanns. 24. Der Freund führte mich in die Geſellſchaft ein. 26. Der Franzoſe führte dieſe neue Mode ein. 27. Der Schmuggler führte verbotene Waaren ein. 28. Die Regierung führt neue Geſetze ein. 29. Er ſuchte ihm die Unmöglichkeit eines glücklichen Erfolges vorzuſtellen.

1. It would be very agreeable to me if you could leave me to myself. 2. It was very satisfactory to me to see my brother well. 3. I am very glad to hear that your undertaking has succeeded. 5. He is angry at the conduct of his brother. 6. My brother introduced me to Mr. G. 7. Has your sister already become acquainted with my brother? 8. Yes, she became acquainted with him at the last concert. 9. Do you know why your brother is so angry? 10. He is angry at me because I laughed at him. 11. The actor personated Henry IV. very well. 12. That government has introduced good laws. 13. This fashion has been introduced by the French. 14. The import *of* wine from France is very great.

LESSONS IN ENGLISH.—No. XXXVII.

By John R. Beard, D.D.

LATIN STEMS.

I may now give an instance or two of curious etymologies. *Husband* is said to be *house-band*, the *band* and bond of the *house* This view is indicated in the couplet—

> "The name of the *husband* what is it to say?
> *Of wife*, and the *household*, the *band* and the stay."
> *Tusser*, "Points of Husbandry."

Tariff, a fixed scale of duties levied on imports, comes, it would seem, from *Tarifa*, the Moorish name of a fortress standing on a promontory, on which, as it commanded the entrance of the Mediterranean, a *custom*-house was erected. A *sauntérer* is one who whiled away his time in La Sainte Terre, *the Holy Land*, after the first enthusiasm of the crusades had gone off, and pilgrimages became a sort of religious fashion for the idlers of the day. A *poltroon*, from the Latin, pollice truncus, *deprived of his thumb*, is one who through fear has cut off his thumb rather than go to war: such mutilations are still not unknown. From *poltroon*, in French poltron, some derive to *palter* and *paltry*. The word *post* may well claim a place among etymological curiosities. *Post* coming from the Latin, positus, *placed*, may signify a *stock placed in the ground, a post*; or such a stock (or something like a *post*), with a hole in it to receive letters; hence, a *post* or *post-office*: it may also be applied to a military station, because a person or persons are *posted*, that is, placed at the particular spot to keep and defend it. Hence it is easy to see how the epithet may be applied to horses or carriages, as *post*-horses, *post*-chaise, and *post*ing-house, because at that house horses and carriages were placed for hire. And as persons travelling from posting-house to posting-house would naturally, as being away from home, and intent on same business, probably business of an urgent nature, make all possible speed, so *to post* and to *travel post-haste*, came to signify rapid travelling. And thus a post, a wholly stationary and immoveable thing, came by natural deviation and easy steps to represent the utmost speed in travelling known before the laying down of railways.

If we fix our eye on the etymology of words we shall in some cases become aware of marked incongruities. What for instance shall we say of calling a weekly newspaper a *Journal* (jour, F. a *day*)? Nay, here is lying before me a *Journal of Sacred Literature* which makes its appearance every three months. So a *journeyman* is one who works under a master, though to appearance he is a *day*-labourer. To *adjourn*, is properly to hold meetings from day to day, whereas now it signifies to break up an assembly, or to fix some time in the future for coming together again.

> "An *adjournment* is no more than a continuance of the session from one day to another, as the word itself signifies."—*Blackstone.*

False spelling has been the parent of false etymology. A *country-dance* is not a dance in the country, but a contre danse, a dance where each one stands *opposite* to his partner in the long line of couples; the French term contre signifying *opposite*. *Shamefacedness* and *shamefaced*, have properly nothing to do with the face or countenance, but are misspellings under a false notion for *shamefastness* and *shamefast*, like *steadfast* and *steadfastness*. *Hurricane* is, in origin, whatever it may be in fact, totally innocent of *hurrying* away the *canes* of the sugar plantations in the West Indies, and comes to us from our Gallic neighbours, who, borrowing an oriental term *uracan*, to describe an oriental storm or tornado, designate it *ouragan*.

The *alligator*, or crocodile of the New World, was very appropriately designated by the Spaniards who first saw it, el largato, that is, *the lizard*, *the* lizard, the largest lizard, the type of the lizard species. In time the article el, *the*, blended with the noun and formed *alligator*. We have a similar combination in Eldorado, *the gold country*. In Ben Jonson, who writes aligarta, we see the word in the process of its transformation. For this word, Dr. Johnson could find no etymology, and Sir T. Herbert made it to be a compound of German and Spanish.

LATIN STEMS.

Latin words.	*Stems.*	*English words.*
unus, *one*	*un, uni*	*un*animous, *uni*form
urbs, *a city*	*urb*	*urb*an, sub*urb*
ustus, *burnt*	*ust*	combus*tion*
utilis, *useful*	*util*	*util*ity
uxor, *a wife*	*uxor*	*uxor*ious
vacca, *a cow*	*vacc*	*vacc*ination
vaco, *I am empty*	*vac, vacu*	*vac*ation, *vac*aney, e*vacu*ate, *vacu*um
vado, *I go*	*vad, vade, vas*	*vade*, in*vade*, in*vas*ion
vagor, *I wander*	*vag, vagr*	*vag*abond, *vagr*ant
valeo, *I am strong*	*val, vail*	*val*id, prev*ail*ent, prev*ail*
vasto, *I lay waste*	*vast, waste*	devas*tation*, *waste*
veho, *I carry*	*vehi, vey*	*vehi*cle, con*vey*
venio, *I come*	*ven*	con*vene*, contra*vene*
ventum, *to come*	*vent*	ad*vent*, con*vent*
ver, *the spring*	*ver*	*ver*nal
verto, *I turn*	*ver*	re*vert*, con*vert*, di*vert*
versus, *turned*	*vers*	di*verse*, re*verse*, *vers*atile
verus, *true*	*ver*	*ver*ity, a*ver*
vestis, *a garment*	*vest*	*vest*ment, in*vest*
vetus (veteris), *old*	*veter*	*veter*an, in*veter*ate
via, *a way*	*vi*	ob*vi*ate, ob*vi*ous
video, *I see*	*vid*	pro*vide*, in*vid*ious
visus, *seen*	*vis*	*vis*ible, *vis*ion
vigil, *watchful*	*vigil*	*vigil*ant
teneo, *I hold*	*ten, tain, tin*	*ten*ant, con*tain*, con*tin*ent
tentus, *held*	*tent*	de*tent*ion, con*tent*
tenuis, *thin*	*tenu*	*tenu*ity, atte*nuate*
tepeo, *I am warm*	*tep, tepe*	*tep*id, *tepe*faction
terra, *the earth*	*terr, ter*	*terr*aqueous, in*ter*, disin*ter*
testis, *a witness*	*test*	*test*ify, at*test*
textus, *woven*	*text*	*text*, *text*ure, con*text*
tollo, *I lift up*	*tol*	ex*tol*
tortus, *twisted*	*tort*	*tort*uous, ex*tort*, dis*tort*
traho, *I draw*	*trah*	sub*trah*end
tractus, *drawn*	*tract*	*tract*able, sub*tract*
tritus, *rubbed*	*trit*	*trit*uration, at*trit*ion
trudo, *I thrust*	*trud*	in*trude*, de*trude*
trusus, *thrust*	*trus*	ob*trus*ion
tueor, *I look at*	*tuit*	*tuit*ion, in*tuit*ion
tutus, *protected*	*tut*	*tut*or
turba, *a crowd*	*turb*	*turb*ulent, dis*turb*
turpis, *base*	*turpi*	*turpi*tude
uber, *fertile*	*uber*	ex*uber*ant
umbra, *a shadow*	*umbr*	*umbr*ageous, *umbr*ella
unda, *a wave*	*und*	*und*ulate, in*und*ate
ungo, *I anoint*	*ungu*	*ungu*ent
unctus, *anointed*	*unct*	*unct*ion
vinco, *I conquer*	*vinc*	in*vinc*ible
victus, *conquered*	*vict*	*vict*ory, *Vict*oria
vita, *life*	*vit*	*vit*al, *vit*ality
vivo, *I live*	*viv*	*viv*id, sur*vive*
victum, *to live*	*vic*	*vic*tuals
voco, *I call*	*voc, vok*	*voc*ative, in*voke*, re*voke*
volo, *I will, wish*	*vol*	*vol*untary, bene*vol*ent
volo, *I fly*	*vol*	*vol*atile
volvo, *I roll*	*volv*	re*volve*, de*volve*
volutus, *rolled*	*volut*	revo*lut*ion, involu*tion*
voro, *I devour*	*vor*	*vor*acious, carni*vor*ous
vulgus, *the rabble*	*vulg*	*vulg*ar, di*vulge*
vulsus, *pulled, torn*	*vuls*	con*vuls*ion

Inter and *disinter* may be compared with *inhumation* and *exhumation*. The four words are made up of Latin elements, but they are not pure Latin words. To inhume (inhumo) or *to put in the ground*, is good Latin, and the Romans practised inhumation; indeed for a corpse to remain uncovered with earth was accounted a great calamity among them. But the practice of burial to which these four words point, owes its origin and prevalence to the Christian church, from the usages of which the words themselves are derived. The doctrine of the resurrection of the body made an article of the Christian's creed, and entering into his heart and life, naturally led to the discontinuance of burning dead bodies, and to their being *inhumed* or *interred*, put into the earth, there to await their resurrection or rising again.

Umbrella, from umbra *a shade*, is etymologically *a little shade*. Umbrella is a mediæval word used to represent a Greek word (skiadion) of the same import. Umbrellas are of Eastern origin. In Constantinople, under the Greek empire, they were used for the same purpose as our ladies now use parasols, namely, to shade the head and face from the heat of the sun. Such a protection was less needful in our cold moist climate, and doubtless the rough and sturdy manners of our old English forefathers were averse to a foreign fashion, and so (to them) effeminate. The use of the umbrella in the shape of a parasol found a home in France, and was made prevalent in this country probably by Catherine of Braganza, though it was known here before her time, as may appear from the following quotations:—

"I saw in the court of Spain once
A lady falling in the king's sight, along;
And there she lay, flat spread, as an umbrella."
B. Jonson.

"Are you at ease now, is your heart at rest,
Now you have got a shadow, an umbrella,
To keep the scorching world's opinion
From your fair credit?"
Beaumont and Fletcher.

The latter passage makes it very clear that the umbrella at the time it was written was intended not as now to keep off the rain, but to cover the face from the sun. But what are we to say of the description in the former quotation, in which it clearly appears that the umbrella was "flat" when "spread?" The explanation is offered in the fact that the first kind of parasols were a large fan. I cite a few words from Miss Strickland's "Queens of England" (vol. 8, p. 355). "The courtly belles used the gigantic green shading-fans which had been introduced by the Queen (Catherine) and her Portuguese ladies, to shield their complexion from the sun, when they did not wish wholly to obscure their charms by putting on their masks. Both the mask and the fan, or umbrella, were in general use in this reign. The green shading-fan is of Moorish origin; and far more than a century after the marriage of Catharine of Braganza, was considered an indispensable luxury by our fair and stately ancestral dames, who used them in open carriages, in the promenade, and at prayers, when they ostentatiously screened their devotions from public view, by spreading them before their faces when they knelt. The India trade, opened by Catherine's marriage treaty, soon supplied the ladies of England with fans better adapted, by their lightness and elegance, to be used as weapons of coquetry at balls and plays. Addison has devoted several papers in the 'Spectator' to playful satire on these toys, from whence the now general terms of flirt and flirtation have been derived."

Undoubtedly the practice of flirtation grew and prevailed in and before the days of Addison; but as to the origin of the word flirt Miss Strickland is in error. Derived from to fleer, flirt or flurt, signifying a light and silly tossing, is of Saxon origin, and may be found in some of our earliest writers. This flirting of the fan is termed by Addison, *flutter*. The piece in which he describes this flutter is in his best style for quiet satire, and I shall therefore transcribe it as your lesson in composition, requesting you to send to some friend an account both of the ensuing and of my observations on the umbrella, the parasol, and the fan.

COMPOSITION.

MR. SPECTATOR.—Women are armed with fans, as men with swords, and sometimes do more execution with them. To the end therefore that ladies may be entire mistresses of the weapons which they bear, I have erected an academy for the training up of young women in "the exercise of the fan," according to the most fashionable airs and motions that are now practised at court. The ladies who "carry" fans under me, are drawn up twice a-day in my great hall, where they are instructed in the use of their arms, and exercised by the following words of command:

Handle your fans.
Unfurl your fans.
Discharge your fans
Ground your fans
Recover your fans.
Flutter your fans.

By the right observation of these few plain words of command, a woman of tolerable genius, who will apply herself diligently to her

exercise for the space of but one half-year, shall be able to give her fan all the graces that can possibly enter into that little modish machine.

But to the end that my readers may form to themselves a right notion of this exercise, I beg leave to explain it to them in all its parts. When my female regiment is drawn up in array, with every one her weapon in her hand, upon my giving the word "to handle their fans," each of them shakes her fan at me with a smile, then gives her right hand woman a tap upon the shoulder, then presses her lips with the extremity of her fan, then lets her arms fall in an easy motion, and stands in a readiness to receive the next word of command. All this is done with a close fan, and is generally learned in the first week.

The next motion is that of "unfurling the fan," in which are comprehended several little *flirts* and vibrations, as also gradual and deliberate openings, with many voluntary fallings asunder in the fan itself, that are seldom learned under a month's practice. This part of the exercise pleases the spectators more than any other, as it discovers on a sudden an infinite number of cupids, garlands, altars, birds, beasts, rainbows, and the like agreeable figures, that display themselves to view, whilst every one in the regiment holds a picture in her hand.

Upon my giving the word to "discharge their fans," they give one general crack that may be heard at a considerable distance when the wind sets fair. This is one of the most difficult parts of the exercise; but I have several ladies with me, who at their first entrance could not give a pop loud enough to be heard at the farther end of the room, who can now "discharge a fan" in such a manner that it shall make a report like a pocket-pistol. I have likewise taken care, in order to hinder young women from letting off their fans in wrong places or unsuitable occasions, to show upon what subject the crack of a fan may come in properly: I have likewise invented a fan with which a girl of sixteen, by the help of a little wind which is inclosed about one of the largest sticks, can make as loud a crack as a woman of fifty, with an ordinary fan.

When the fans are thus "discharged" the word of command in course is to "ground their fans." This teaches a lady to quit her fan gracefully when she throws it aside in order take up a pack of cards, adjust a curl of hair, replace a fallen pin, or apply herself to any other matter of importance. This part of the exercise, as it only consists in tossing a fan with an air upon a long table (which stands by for that purpose) may be learned in two days' time as well as in a twelvemonth.

When my female regiment is thus disarmed, I generally let them walk about the room for some time; when on a sudden, like ladies that look upon their watches after a long visit, they all of them hasten to their arms, catch them up in a hurry, and place themselves in their proper stations upon my calling out—"recover your fans!" This part of the exercise is not difficult, provided a woman applies her thoughts to it.

The "fluttering of the fan" is the last, and indeed the masterpiece of the whole exercise; but if a lady does not mis-spend her time, she may make herself mistress of it in three months. I generally lay aside the dog-days and the hot time of the summer for the teaching this part of the exercise, for as soon as ever I pronounce—"flutter your fans," the place is filled with so many zephyrs and gentle breezes as are very refreshing in that season of the year, though they might be dangerous to ladies of a tender constitution in any other.

There is an infinite variety of motions to be made use of in the "flutter of a fan:" there is the angry flutter, the modish flutter, the timorous flutter, the confused flutter, the merry flutter, and the amorous flutter. Not to be tedious, there is scarce any emotion in the mind which does not produce a suitable agitation in the fan; insomuch that if I only see the fan of a disciplined lady, I know very well whether she laughs, frowns, or blushes. I have seen a fan so very angry, that it would have been dangerous for the absent lover who provoked it to have come within the wind of it; and at other times so very languishing, that I have been glad, for the lady's sake, the lover was at a sufficient distance from it. I need not add that a fan is either a prude or a coquette, according to the name of the person who bears it. To conclude my letter, I must acquaint you that I have from my own observations compiled a little treatise for the use of my scholars, intitled "the Passions of the Fan;" which I will communicate to you, if you think it may be of use to the public. I shall have a general review on Thursday next; to which you shall be very welcome, if you will honour it with your presence. I am, &c.

P.S. I teach young gentlemen the whole art of gallanting a fan.

N.B. I have several little plain fans made for this use, to avoid expense.

LESSONS IN FRENCH.—No. XLVII.

By Professor Louis Fasquelle, LL.D.

§ 14-2.—Qualifying Adjectives.

(1.) These adjectives may express qualities: 1. Simply; 2. With comparison; 3. Carried to a very high degree. Thence the three degrees of qualification: the positive, the comparative, and the superlative.

(2.) The positive is nothing but the adjective in its simplest signification:—

Moi, je suis à Paris, *triste, pauvre reclus.* Boileau.	*At Paris I am sad, poor, and secluded.*

(3.) The comparative is the adjective expressing a comparison between two of several objects. There is, then, between the objects compared, a relation of *equality*, *superiority*, or *inferiority*.

(4.) The comparison of equality expresses a quality in the same degree, in the objects compared; it is formed* by placing aussi, *as*, or autant, *as much*, before the adjective, and the conjunction que, *as*, after it:—

L'Allemagne est *aussi* peuplée *que* la France. Voltaire.	*Germany is as populous as France.*
A leur tête est le chien, superbe *autant qu'*utile. Delille.	*At their head stands the dog, as noble as useful.*

(5.) The relation or comparison of superiority expresses a quality in a higher degree in one object than in another; this comparison is formed by placing plus, *more*, before the adjective, and que, *than*, after it:—

Les actions sont *plus* sincères *que* les paroles. Mlle. de Scudery.	*Actions are more sincere than words.*
Le pied du cerf est *mieux* fait que celui du bœuf. Buffon.	*The foot of the stag is better formed than that of the ox.*

(6.) The comparison of inferiority expresses a quality in a lower degree in one object than in another; it is formed by placing moins, *less*, before the adjective, and que, *than*, after it:—

Le naufrage et la mort sont *moins* funestes *que* les plaisirs qui attaquent la vertu. Fenelon.	*Shipwreck and death are less fatal than those pleasures which attack virtue.*

(7.) We have only three adjectives which are comparative of themselves: meilleur, *better*†; moindre, *less*; pire, *worse*.

Meilleur, instead of *plus bon*, which is never used in the sense of *better*:—

Il n'est *meilleur* ami ni parent que soi-même. La Fontaine.	*We have no better friend, no better relation than ourselves.*

Pire, instead of *plus mauvais*, which may however be used:—

Le remède est parfois *pire* que le mal. Lenoble.	*The remedy is at times worse than the evil.*

* In French, adjectives cannot be compared, as in English, by means of changes in the termination: with the exception of meilleur, *better*; moindre, *less*; and pire, *worse*, all comparisons must be formed by means of adverbs.

† Mieux, *better*; pis, *worse*; moins, *less*. The English words better, worse, less, are sometimes adverbs, and when they are so, should be rendered by the several words placed at the commencement of this note. A practical way of determining the nature of those words in English is:—

1. To change the word *better* into the expression "*in a better manner*." If this change may be made without changing the sense the word *better* is an adverb, and must be rendered by *mieux*:—

He reads better (in a better manner) than his brother.	Il lit *mieux* que son frère.

2. If you change *worse* into "*in a worse manner*," it should be translated *pis*, or more elegantly, *plus mal*:—

He reads worse (in a worse manner) than his brother.	Il lit *pis* (plus mal) que son frère.

3. When you may substitute "*a smaller amount* or *quantity*" for the word *less*, it should be rendered *moins*:—

He reads less (a smaller amount) than his brother.	Il lit *moins* que son frère.

Moindre, instead of *plus petit*, an expression also in use :—

Ce n'est pas être petit que d'être *moindre* qu'un grand. BOISTE.	*Being 'ess than great is not being small.*

(8.) The *superlative*, or third degree of qualification, expresses the quality carried to a very high, or to the highest degree; thence there are two sorts of superlatives: the relative and the absolute.

(9.) The superlative relative marks a very high or the highest degree *relatively*, or with comparison: it is formed by placing le, la, les, *the*; mon, *my*; ton, *thy*; son, *his*; notre, *our*; votre, *your*; leur, leurs, *their*, before the comparative of superiority or inferiority :—

Un bienfait reçu est *le plus sacré* de toutes les dettes. MME. NECKER.	*A benefit received is the most sacred of all debts.*
La probité reconnue est *le plus sûr* de tous les serments. (THE SAME.)	*Acknowledged probity is the most secure of all oaths.*

(10.) The words *le plus*, *le moins*, must be repeated before every adjective :—

Ce sont les livres *les plus* agréables, *les plus* universellement lus, et *les plus utiles*. BERNARDIN DE ST. PIERRE.	*These books are the most agreeable, the most universally read, and the most useful.*

(11.) The superlative absolute expresses also a very high degree, but, absolutely, without comparison: it is formed by placing before the adjective one of these words, *très*, *fort*, *infiniment*, *extrêmement*, &c. :—

Il y a à la ville, comme ailleurs, de *fort* sottes gens. LA BRUYERE.	*There are in cities, as elsewhere, very silly people.*
Je vous prie de croire que je ne songe qu'à vous, et que vous m'êtes *extrêmement* chère. MME. DE SÉVIGNÉ.	*I beg you to believe that you are my only thought, and that you are extremely dear to me.*

§ 15.—GENDER AND NUMBER OF ADJECTIVES.

(1.) The adjective has, of itself, neither gender nor number; it must assume the gender and number of the noun to which it belongs.

(2.) The termination of the adjective varies according to the gender and number of the noun which it qualifies or determines :—

Un homme *prudent*	Une femme *prudente*.
A prudent man.	*A prudent woman.*
Des hommes *prudents*.	Des femmes *prudentes*.
Prudent men.	*Prudent women.*

§ 16.—FORMATION OF THE FEMININE OF ADJECTIVES.

(1.) All adjectives ending with *e* mute, remain unchanged in the feminine :—

Masculine.	*Feminine.*
Un homme *agréable*.	Une femme *agréable*.
An agreeable man	*An agreeable woman.*
Un mur *solide*	Une maison *solide*.
A strong wall.	*A strong (well built) house.*

(2.) Adjectives not ending in *e* mute, form their feminine by the addition of *e* :—

Masculine.	*Feminine.*
Un garçon *diligent*.	Une fille *diligente*.
A diligent boy.	*A diligent girl.*
Un homme *poli*.	Une dame *polie*.
A polite man.	*A polite lady.*

(3.) EXCEPTIONS :—

			Masc.	*Fem.*	
Adjectives ending in EL, EIL, EN, ET, ON, F, S, X	*Change those terminations for the feminine into*	ELLE,	tel,	telle,	*such*
		EILLE	pareil,	pareille,	*like*
		ENNE,	ancien,	ancienne,	*ancient*
		ETTE,	muet,	muette,	*mute*
		ONNE,	bon,	bonne,	*good*
		VE,	neuf,	neuve,	*new*
		SSE,	gras,	grasse,	*fat*
		SE,	heureux,	heureuse,	*happy*

(4.) The following, although ending with these terminations form their feminine otherwise :—

complet,	*complete*,	*make in the feminine*	complète
concret,	*concrete*,		concrète
discret,	*discreet*,		discrète
inquiet,	*uneasy*,		inquiète
secret,	*secret*,		secrète
replet,	*replete*,		replète
mauvais,	*bad*,	*follow the general rule and make in the feminine*	mauvaise
niais,	*silly*,		niaise
ras,	*close-shorn*,		rase
doux,	*soft, sweet*,	*make in the feminine*	douce
faux,	*false*,		fausse
préfix,	*prefixed*,		préfixe
roux,	*reddish*,		rousse
tiers,	*third*,		tierce.

(5.) Adjectives ending in *eur*, as also some substantives of the same termination, have three several modes of forming the feminine :—

1st. Those which are derived from the participle present of a French verb by dropping *ant*, and substituting *eur*, change the final (*r*) into *se*, as :—

Pres. Part.		*Masculine.*		*Feminine.*
dansant	whence	danseur	and thence	danseuse
trompant,	,,	trompeur	,,	trompeuse.

Here, however, note that *chanteur*, when signifying a *professional singer*, takes for the feminine *cantatrice*. Like anomalies appear in the following :—

ambassadeur, *ambassador*,	*make in the feminine*	ambassadrice
bailleur, *lessor*,		baillaresse
chasseur, *hunter*,		chasseresse
demandeur, *plaintiff*.		demanderesse
défendeur, *defendant*,		défenderesse
devineur, *guesser*,		devineresse
enchanteur, *enchanter*,		enchanteresse
gouverneur, *governor*,		gouvernante
pécheur, *sinner*,		pécheresse
serviteur, *servant*,		servante.

2nd. Those ending in *teur* and derived from the Latin, and, consequently, not falling under the rule (1st) just given, form the feminine by changing *teur* into *trice*; as,

Masculine.	*Feminine.*
acteur, *actor*	actrice, *actress*
administrateur, *administrator*	administratrice, *administratrix*.

Exceptions to this, however, are the following :—

débiteur, *debtor*,	*make in the feminine*	débitrice
exécuteur, *executor*,		exécutrice
inspecteur, *inspector*,		inspectrice
inventeur, *inventor*,		inventrice
persécuteur, *persecutor*,		persécutrice

3rd. Those ending in *erieur*, also *majeur*, *mineur*, *meilleur*, follow the general rule, that is, add *e* to form the feminine; as,

extérieur, *exterior*,	*make in the feminine*	extérieure
supérieur, *superior*,		supérieure
majeur, *of age, major*,		majeure
mineur, *minor*,		mineure
meilleur, *better*,		meilleure.

(6.) Adjectives, as also nouns, indicating occupation chiefly exercised by men, are alike in the masculine and the feminine ; as,

auteur, *author*. litérateur, *literary man*.

(7.) The following adjectives having two forms for the masculine, form their feminine as follows :—

Masculine before a consonant.	*Masculine before a vowel or h mute.*	*Feminine.*	
beau,	bel,	belle,	*handsome*
fou,	fol,	folle,	*foolish*
mou,	mol,	molle,	*soft*
nouveau,	nouvel,	nouvelle,	*new*
vieux,	vieil,	vieille,	*old.*

Irregular Adjectives.

(8.) The following adjectives form their feminine irregularly :—

Masculine.	*Feminine.*
absous, *absolved*	absoute
bénin, *benign*	bénigne
blanc, *white*	blanche
caduc, *decrepit, infirm*	caduque
coi, *quiet*	coite
dissous, *dissolved*	dissoute
favori, *favourite*	favorite
frais, *fresh*	fraiche
franc, *free, frank*	franche
gentil, *pretty, genteel*	gentile
grec, *Grecian, Greek*	grecque
hébrew, *Hebrew*	hébraïque, used only of the Hebrew tongue
jouvenceau (obsolete), *a stripling*	jouvencelle
jumeau, *twin*	jumelle
long, *long, slow*	longue
maître, *master, masterly*	maîtresse
malin, *cunning, malignant*	maligne
mulâtre, *mulatto*	mulâtre *or* mulâtresse
muscat, *muscat*	muscade
nul, *null, none*	nulle
oblong, *oblong*	oblongue
public, *public*	publique
résous, *resolved, changed*	résolue
sec, *dry, barren*	sèche
sot, *silly,*	sotte
traître, *traitor, treacherous*	traîtresse
turc, *Turkish*	turque
vieillot, *oldish*	vieillotte.

(9.) The following have no feminine :—

artisan, *mechanic*	partisan, *partisan*
châtain, *chesnut colour*	témoin, *witness*
dispos, *active*	vélin, *vellum, of vellum.*

LESSONS IN GEOMETRY.—No. XVI

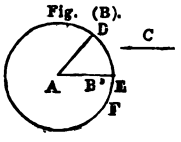
LECTURES ON EUCLID.

EXERCISE ON PROP. III. BOOK I.

To produce the smaller of two given straight lines so that, with the part produced, it may be equal to the greater.

In fig. (B) let AB and C be the two given straight lines of which AB is the less. It is required to produce AB so that, with the part produced, it may be equal to the greater C.

Fig. (B).



From the point A in the straight line AB draw the straight line AD equal to the given straight line C (I. Prop. 2); and from the centre A with radius AD, describe the circle DEF (I. Post. 3), and produce AB to E (I. Post. 2). Then the straight line AE is equal to C.

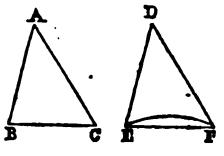
For, by I. Def. 15, the straight line AE is equal to the straight line AD; and, by construction, the straight line C is equal to the straight line AD. Therefore, by I. Axiom 1, the straight line AE is equal to the straight line C, and the straight line AB has been produced to E, so that, with the part BE produced it is equal to C. Q. E. F.,—that is, Quod Erat Faciendum, *Which Was To be done.**

PROP. IV. THEOREM.

If two triangles have two sides of the one equal to two sides of the other, each to each, and have likewise the angles contained by these sides equal to one another, their bases or third sides, *are equal; the two triangles are equal; and their other angles are equal, each to each; viz., those to which the equal sides are opposite.*

In fig. 4, let ABC and DEF be two triangles, which have the two sides AB and AC equal to the two sides DE and DF, each to each; viz., AB to DE, and AC to DF; and the angle BAC equal to the angle EDF. Then the base BC is equal to the base EF; the triangle ABC is equal to the triangle DEF; and the remaining angles of the one are equal to the remaining angles of the other, each to each; viz., those to which the equal sides are opposite; that is, the angle ABC is equal to the angle DEF, and the angle ACB to the angle DFE.

Fig. 4.



For, if the triangle ABC be applied to the triangle DEF, so that the point B may be on the point E, and the straight line BA on the straight line ED, the point A shall coincide with the point D, because the straight line BA is equal to the straight line ED. Now, BA coinciding with ED, the straight line AC shall coincide with the straight line DE, because the angle BAC is equal, *by hypothesis* (i. e., by supposition), to the angle EDF. Also, the point C shall coincide with the point F, because, by hypothesis, the straight line AC is equal to the straight line DF. But, *by supraposition* (placing upon), the point B coincides with the point E. Therefore, the base BC shall coincide with the base EF. For, the point B coinciding with the point E, and the point C with the point F, if the base BC does not coincide with the base EF, the two straight lines BC and EF, would enclose a space, which by I. Ax. 10, is impossible. Wherefore the base BC coincides with the base EF, and is, therefore, by I. Ax. 8, equal to it. Wherefore, also, the whole triangle ABC coincides with the whole triangle DEF, and is, therefore, equal to it. And the remaining angles of the one coincide with the remaining angles of the other, and are therefore equal to them, each to each; viz., the angle ABC to the angle DEF, and the angle ACB to the angle DFE. Q. E. D.

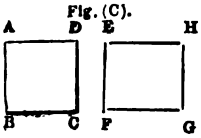
This proposition holds equally true, when the angles contained by the two sides, of the one triangle is the *same* as that contained by the two sides of the other; as, in the triangles FAC and GAE, see fig. 5; or, when the triangles have a *common* base, as in the triangles FBC and GCB, see fig. 5 next lesson; or when they have a common side.

EXERCISE ON PROP. IV. BOOK I.

If two squares have one side of the one equal to one side of the other the squares are equal in all respects.

In fig. (C) let ABCD and EFGH be two squares, which have one side AB of the one equal to one side EF of the other; these two squares are equal in all respects.

Fig. (C).



Because AB is equal to EF, by hypothesis, and AB to BC by I. Def. 30, therefore, EF is equal to BC, by I. Ax. 1., but EF is equal to FG, by I. Def. 30; therefore, BC is equal FG, by I. Ax. 1. In the same manner, it may be shown that CD is equal to GH, and HE to DA. Wherefore all the sides AB, BC, CD, and DA of the square ABCD, are respectively equal to all the sides EF, FG, GH, and HE of the square EFGH. Also, by I. Ax. 11, all the angles ABC, BCD, CDA, and DAB, of the square ABCD, are respectively equal to all the angles EFG, FGH, GHE, and HEF of the square EFGH. Now, if the square ABCD be applied to the square EFGH so that the point A may be upon the point E, and the straight line AB upon the straight line EF, the point B will coincide with the point F, because AB is equal to EF; and AB coinciding with EF, the straight line BC will coincide with the straight line FG, because the angle ABC has been proved equal to the angle EFG; also, the point C will coincide with the point G, because the straight line BC has been proved equal to the straight line FG. In the same manner it may be shown that the straight lines CD and DA will coincide with the straight lines GH and HE respectively, and the angles BCD, CDA, and DAB, with the angles FGH, GHA, and HEF, respectively. Therefore, the whole square ABCD coincides with the whole square EFGH in all respects, and the square ABCD is equal to the square EFGH, by I. Axiom 8. Q. E. D.*

In Dr. Thomson's edition of the "Elements," there is a corollary appended to this proposition, by which he is enabled to shorten the demonstration of the next, which from its difficulty to be understood by some minds, is the Pons Asinorum, the *Asses Bridge*. This corollary appears to us to need demonstration; this we shall give in our next lesson. It will then be seen how much it shortens and simplifies Euclid's demonstration of the Pons.

* This exercise, as well as the preceding one referred to in our last lesson, was performed correctly by J. H. Eastwood (Middleton); F. H. (Brightwell); E. C. Hughes (Islington); T. Boocock (Great Warley); A. Z. (St. Neot's); J. Bourton (Paddington); A. Coats (Glasgow); and others.

* This exercise was performed by J. H. Eastwood (Middleton); A. Z (St. Neots'); J. Bourton (Paddington); F. H. (Brightwell), T. Boocock (Great Warley); E. J. Bremner (Carlisle); A. Coats (Glasgow); E. C. Hughes (Islington); and others.

LESSONS IN ARITHMETIC.—No. XXII.

VULGAR FRACTIONS.

The following answers to the exercises given in our last lesson have been sent to us by W. C. (Aylesbury), and some others:—

1.—$\frac{12}{17}$, $\frac{12}{22}$

2.—$\frac{111}{222}$, $\frac{111}{333}$, $\frac{111}{444}$

3.—$\frac{11}{44}$, $\frac{11}{55}$, $\frac{11}{66}$, $\frac{11}{77}$, $\frac{11}{88}$

4.—$\frac{10}{110}$, $\frac{11}{110}$, $\frac{55}{110}$, $\frac{99}{110}$

5.—$\frac{1111}{4444}$, $\frac{1111}{5555}$, $\frac{1111}{6666}$, $\frac{1111}{7777}$

6.—$\frac{11}{55}$, $\frac{11}{66}$, $\frac{11}{77}$, $\frac{11}{88}$, $\frac{11}{99}$

7.—$\frac{333333}{444444}$, $\frac{111111}{222222}$

8.—$\frac{4000}{10000}$, $\frac{5000}{10000}$, $\frac{9000}{10000}$

9.—$\frac{81}{243}$, $\frac{27}{243}$, $\frac{9}{243}$, $\frac{3}{243}$, $\frac{1}{243}$

10.—$\frac{33}{66}$, $\frac{33}{44}$, $\frac{33}{55}$, $\frac{33}{77}$, $\frac{33}{88}$, $\frac{33}{99}$

11.—The fraction $\frac{11}{111}$ is the greater; their difference is $\frac{10}{9990}$; and their sum $\frac{2442}{9990}$.

12.—A and B have each $\frac{1}{2}$ of the concern to which they belong.

Problem III.

To find the integral or mixed value of an improper fraction; or, in other words, *to reduce an improper fraction to a whole or mixed number.*

Rule.—Divide the numerator by the denominator, and the quotient, with the remainder properly expressed, will be the answer required.

The reason of this rule is explained at p. 133. vol. II, where the definitions of an improper fraction and a mixed number are given; see also p. 141, vol. I.

Example.—Find the integral or mixed value of the following fractions:—$\frac{15}{4}$, $\frac{19}{7}$, $\frac{25}{5}$, $\frac{48}{6}$, and $\frac{4147}{176}$.

Given fractions.	Values required.
Here, $\frac{15}{4} = 15 \div 4 = 3\frac{3}{4}$	mixed number,
$\frac{19}{7} = 19 \div 7 = 2\frac{5}{7}$	mixed number,
$\frac{25}{5} = 25 \div 5 = 5$	whole number,
$\frac{48}{6} = 48 \div 6 = 8$	integral number,
$\frac{4147}{176} = 4147 \div 176$; $= 23\frac{99}{176}$	mixed number.

Exercises.

1. Find the integral or mixed value of the fractions $\frac{37}{5}$, $\frac{84}{7}$, $\frac{101}{10}$, $\frac{33}{11}$, $\frac{96}{48}$, $\frac{120}{98}$, $\frac{400}{12}$, and $\frac{7888}{3784}$.

Problem IV.

To reduce a whole or mixed number to the form of an improper fraction of equivalent value.

Rule 1.—When the given number is integral or whole, place unity or 1 under it, for the improper fraction required.

The reason of this rule is evident; because if you divide any number by 1, the quotient is the same as the dividend, that is, the given number is not altered in value.

Rule 2.—When the given number is integral, and is required to have a given denominator. Make the given number an improper fraction by rule 1, and then multiply both of its terms by the given denominator, the products will be the terms of the fraction required; see principle 1, p. 134, vol. II.

Example.—Reduce the number 12 to an improper fraction, by rule 1; and then, to an improper fraction whose denominator shall be 7, by rule 2.

$$\text{Here, } 12 = \frac{12}{1}\text{, answer } \textit{first};$$

$$\text{and, } \frac{12 \times 7}{1 \times 7} = \frac{84}{7}\text{, answer } \textit{second}.$$

Exercises.

1. Reduce the whole numbers 25, 48, 301, 4,000, and 5,876,934, to improper fractions.

2. Reduce the preceding whole numbers to improper fractions whose denominators shall be 12, 6, 5, 4, and 2, respectively.

Rule 3.—When the given number is mixed, that is, composed of a whole number and a fraction. Reduce the given whole number, by rule 2, to an improper fraction whose denominator shall be the same as that of the given fraction, and then find the sum of this fraction and the given fraction, the result will be the fraction required. Or, which is the same thing, multiply the given whole number by the denominator of the given fraction, and to the product add its numerator, the sum placed over the said denominator will give the fraction required. The first part of this rule explains the reason of the second part, which is the rule usually given in books; see also definition 4, page 134.

Example.—Reduce the following mixed numbers to improper fractions:—$5\frac{1}{2}$, $7\frac{2}{3}$, $12\frac{3}{4}$, $18\frac{5}{7}$, $101\frac{9}{10}$, and $1234\frac{11}{111}$.

Given mixed numbers. Fractions required.

$$5\tfrac{1}{2} = \tfrac{2}{1} + \tfrac{1}{2} = \tfrac{10}{2} + \tfrac{1}{2} = \tfrac{11}{2}$$
$$7\tfrac{2}{3} = \tfrac{7}{1} + \tfrac{2}{3} = \tfrac{21}{3} + \tfrac{2}{3} = \tfrac{23}{3}$$
$$12\tfrac{3}{4} = \tfrac{12}{1} + \tfrac{3}{4} = \tfrac{48}{4} + \tfrac{3}{4} = \tfrac{51}{4}$$
$$18\tfrac{5}{7} = \tfrac{18}{1} + \tfrac{5}{7} = \tfrac{126}{7} + \tfrac{5}{7} = \tfrac{131}{7}$$
$$101\tfrac{9}{10} = \tfrac{101}{1} + \tfrac{9}{10} = \tfrac{1010}{10} + \tfrac{9}{10} = \tfrac{1019}{10}$$
$$1234\tfrac{11}{111} = \tfrac{1234}{1} + \tfrac{11}{111} = \tfrac{136974}{111} + \tfrac{11}{111} = \tfrac{136985}{111}$$

Exercises.

Reduce the following mixed numbers to improper fractions: $15\frac{1}{4}$, $17\frac{2}{3}$, $25\frac{3}{5}$, $49\frac{4}{7}$, $31\frac{7}{12}$, and $21\frac{111}{113}$.

Problem V.

To reduce compound fractions to simple fractions.

Rule.—Multiply all the numerators of the given compound fraction together for the numerator, and all the denominators of the given compound fraction for the denominator, of the simple fraction required, which may then be reduced to its lowest terms.

The reason of this rule is evident from the explanations given under definition 3, page 133, vol. II.

Example.—Reduce the following compound fractions to simple fractions:—$\frac{1}{2}$ of $\frac{3}{4}$ of $\frac{4}{9}$ of $\frac{7}{8}$; $\frac{3}{4}$ of $\frac{5}{7}$ of $\frac{8}{9}$ of $\frac{14}{17}$; $\frac{5}{8}$ of $\frac{9}{10}$ of $\frac{15}{27}$ of $\frac{48}{5}$; and $\frac{1}{2}$ of $\frac{3}{10}$ of $\frac{11}{4}$ of $\frac{4}{11}$.

Given compound fractions.	Required fractions.	Lowest terms.
$\frac{1}{2}$ of $\frac{3}{4}$ of $\frac{4}{9}$ of $\frac{7}{8} = \frac{1 \times 3 \times 4 \times 7}{2 \times 4 \times 9 \times 8}$	$= \frac{84}{576}$	$= \frac{7}{48}$
$\frac{3}{4}$ of $\frac{5}{7}$ of $\frac{8}{9}$ of $\frac{14}{17} = \frac{3 \times 5 \times 8 \times 14}{4 \times 7 \times 9 \times 17}$	$= \frac{1680}{4284}$	$= \frac{20}{51}$
$\frac{5}{8}$ of $\frac{9}{10}$ of $\frac{15}{27}$ of $\frac{48}{5} = \frac{5 \times 9 \times 15 \times 48}{8 \times 10 \times 27 \times 5}$	$= \frac{32400}{10800}$	$= \frac{3}{1}$

15. An important principle much employed denominated *consisting of factors*, and of great utility in the practice of the preceding rule and many others in arithmetic, may be brought under the notice of the student at this point of his studies. *If the product of one set of numbers is to be divided by the product of another set, or employed in a fractional form as above, the quotient in the one case or the fraction in the other, will not be altered, if we throw out factors common to both sets of numbers*; see principle 1, page 134. On this principle, we found the following rule for cancelling the factors in any such operations as the preceding.

Rule.—Separate the numbers which form the dividend or numerator into their component factors, and those which form the divisor or denominator into theirs, omit the factors which are common to both, and use the remaining numbers instead; that is, multiplying the remaining numbers in the dividend or numerator for the new dividend or numerator, and the remaining numbers in the divisor or denominator for the new divisor or denominator; these products will produce the quotient or fraction required. Taking the three examples above given, they will be treated according to this rule, as follows:—

Given Compound Fractions.	Required Fractions.
$\frac{1}{2}$ of $\frac{3}{4}$ of $\frac{4}{9}$ of $\frac{7}{8} = \frac{1 \times 3 \times 4 \times 7}{2 \times 4 \times 3 \times 3 \times 8} = \frac{1 \times 7}{2 \times 3 \times 8}$	$= \frac{7}{48}$
$\frac{3}{4}$ of $\frac{5}{7}$ of $\frac{8}{9}$ of $\frac{14}{17} = \frac{3 \times 5 \times 4 \times 2 \times 7 \times 2}{2 \times 2 \times 7 \times 3 \times 3 \times 17} = \frac{5 \times 4}{3 \times 17}$	$= \frac{20}{51}$
$\frac{5}{8}$ of $\frac{9}{10}$ of $\frac{15}{27}$ of $\frac{48}{5} = \frac{5 \times 9 \times 5 \times 3 \times 3 \times 2 \times 8}{8 \times 5 \times 2 \times 9 \times 3 \times 5 \times 1}$	$= \frac{3}{1}$

In reference to the last example here, it is necessary to observe that

1 is a factor of every number, and that it must be put down as such, when all the other factors are to be cancelled either above or below the line; or when both above and below, that is, when there is a perfect equality of factors.

EXERCISES.

Reduce the following compound fractions to simple fractions, both by the rule to problem V, and by cancelling factors:

1.—$\frac{1}{7}$ of $\frac{7}{9}$ of $\frac{3}{5}$ of $\frac{4}{4}$ 4.—$\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{4}{5}$ of $\frac{5}{6}$ of $\frac{6}{7}$

2.—$\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{1}{2}$ of $\frac{5}{10}$ of $\frac{8}{8}$ 5.—$\frac{7}{8}$ of $\frac{8}{10}$ of $\frac{6}{17}$ of $\frac{9}{9}$

3.—$\frac{4}{5}$ of $\frac{5}{6}$ of $\frac{6}{8}$ of $\frac{8}{8}$ 6.—$\frac{3}{5}$ of $\frac{5}{6}$ of $\frac{13}{17}$ of $\frac{17}{20}$.

ADDITION OF FRACTIONS.

PROBLEM VI.

To add fractions, or mixed numbers together.

RULE 1.—When the given fractions have a common denominator, find the sum of the numerators, and under it place the common denominator, for the sum required. The sum should be reduced to its lowest terms, and if it be an improper fraction, it may be reduced to a whole or mixed number, by problem III.

EXAMPLE.—Find the sum of the fractions, $\frac{1}{8}$, $\frac{2}{8}$, $\frac{3}{8}$, $\frac{4}{8}$, $\frac{5}{8}$, $\frac{6}{8}$, and $\frac{7}{8}$.

Here, $\frac{1}{8}+\frac{2}{8}+\frac{3}{8}+\frac{4}{8}+\frac{5}{8}+\frac{6}{8}+\frac{7}{8}=\frac{28}{8}=\frac{7}{2}=3\frac{1}{2}$, the sum required.

RULE 2.—If the given fractions have different denominators, reduce them by problem II. p. 267, to fractions of equal value having a common denominator, and apply the preceding rule to these fractions, the sum will be the answer required.

The reason of these rules is explained at p. 168, vol. II.

EXAMPLE.—Find the sum of the following fractions: $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{4}{5}$.

Here, by problem II. p. 267, we have

$\frac{2}{3}$	=	$\frac{40}{60}$	Numerators.
$\frac{3}{4}$	=	$\frac{45}{60}$	40
$\frac{4}{5}$	=	$\frac{48}{60}$	45
		sum	48 / 133

Whence, $\frac{133}{60}=2\frac{13}{60}$, is the answer required. Or, $\frac{13}{60}+\frac{15}{60}+\frac{48}{60}+\frac{133}{60}=2\frac{13}{60}$, sum of the fractions.

RULE 3.—When the given numbers are mixed, find the sum of the whole numbers by the rule of simple addition, p. 56, vol. I. and the sum of the fractions by the preceding rules; then add these sums together, and the result will be the whole sum required. Or, reduce the mixed numbers to improper fractions, and find their sum by the preceding rules.

The reason of this rule is plain from the reasons assigned for the preceding rules.

EXAMPLE.—Find the sum of the following mixed numbers: $4\frac{1}{2}$, $7\frac{1}{3}$, $12\frac{1}{5}$, $118\frac{1}{8}$, $32\frac{1}{7}$, and $1149\frac{9}{10}$.

Here, $4+7+12+1189+32+1149=1322$ sum of the whole numbers.

And by Problem II., p. 267, we have

$\frac{1}{2}=\frac{60}{120}$
$\frac{1}{3}=\frac{40}{120}$
$\frac{1}{5}=\frac{24}{120}$
$\frac{1}{8}=\frac{15}{120}$
$\frac{1}{7}=\frac{17}{120}$
$\frac{9}{10}=\frac{108}{120}$

See page 268, col. 1.

Whence, $\frac{60}{120}+\frac{40}{120}+\frac{24}{120}+\frac{15}{120}+\frac{17}{120}+\frac{108}{120}=\frac{492}{120}=4\frac{12}{120}$ sum of the fractions; and $1322+4\frac{12}{120}=1326\frac{12}{120}$ the sum required.

Otherwise:

Given mixed numbers.			Mixed numbers reduced.		Numerators.
$4\frac{1}{2}$	=	$\frac{9}{2}$	=	$\frac{540}{120}$	540
$7\frac{1}{3}$	=	$\frac{21}{3}$	=	$\frac{930}{120}$	930
$12\frac{1}{5}$	=	$\frac{64}{5}$	=	$\frac{1536}{120}$	1536
$118\frac{1}{8}$	=	$\frac{945}{8}$	=	$\frac{14760}{120}$	14260
$32\frac{1}{7}$	=	$\frac{225}{7}$	=	$\frac{3944}{120}$	3945
$1149\frac{9}{10}$	=	$\frac{11492}{10}$	=	$\frac{137988}{120}$	137988
					159199 sum.

Whence, $\frac{159199}{120}=1326\frac{79}{120}$ sum required.

EXERCISES.

Find the sums of the following fractions and mixed numbers:—

1.— $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{6}$, $\frac{1}{4}$, and $\frac{2}{3}$.

2.— $\frac{4}{5}$, $\frac{4}{15}$, $\frac{7}{8}$, and $\frac{1}{7}$.

3.— $\frac{4}{6}$, $\frac{2}{5}$, $\frac{5}{11}$, and $\frac{1}{2}$.

4.— $5\frac{1}{3}$, $6\frac{1}{2}$, $7\frac{3}{4}$, and $21\frac{5}{7}$.

5.— $11\frac{3}{5}$, $18\frac{3}{8}$, $19\frac{5}{12}$ and $1\frac{1}{10}$.

6.— $635\frac{1}{6}$, $427\frac{1}{4}$, and $1625\frac{7}{8}$.

ON COMETS.—No. II.

SINCE the appearance of the comet of Encké, in 1811, its course has been determined. The return of this comet was looked for in 1822, and this event was only realised at Paramatta, in New South Wales, where it was observed during the month of June. The epoch or instant of its passing the perihelion only differed by three hours from that predicted by M. Encké. Its return in September, 1825, was equally predicted and verified; it has since appeared in 1828, 1832, &c. This comet, which is powerfully attracted by Mercury, presents much similarity to the planet Ceres in its elements, the inclination and the major axis or greatest diameter of the orbit being the same as those of that planet; its periodic revolution is forty-six days less than that of Vesta; its perihelion falls within the orbit of Mercury; the aphelion falls between that of Jupiter and the new planets. Is it possible that this comet is a fragment of our supposed Pluto? (see No. 31, p. 62). As to the comet of M. Biela, its course is also known; it was seen in 1806 and 1826, and was supposed to be the same that was seen in 1772; the mean duration of its revolution is six years and three quarters; and it passed its perihelion in 1838, &c.

There are still other two comets of which the course is supposed to be known; but as their returns have not been verified, we must wait till observation has confirmed these expectations. The first is the comet of 1680, which Newton made the subject of his researches, and to which he attributed a revolution of 575 years; this would be, according to him, the comet which appeared in 1106, 531, and in the years 34, and 619, before the Christian era; the second is that which was seen in 1264, and 1556, to which a revolution of 292 years is attributed. Of all the known comets, that of 1772 approached nearest to the earth; it appeared so rapid in its course that it described in one day 120° or two-thirds of the arc of the visible hemisphere of the heavens, retrograding through the signs of the Virgin, the Lion, and Cancer. The comet of 1770, calculated by Lexell, was only distant from the earth by six times the distance of the moon, or about one million and four thousand British miles; its distance from the sun was only about $\frac{1}{5}$ part of the distance of the earth: hence it went as near to the sun as it did to the earth. This comet has only continued to torment and perplex modern astronomers who have attempted to discover its course and its motions.

If it be not impossible that some comet should one day strike against the earth, there are at least a thousand probabilities that this event will not happen. It must be a very extraordinary occurrence in which two bodies so small, moving in the immensity of space, with every variety of velocity, in orbits of every kind of dimensions and with every degree of inclination, should happen to strike against each other. But this indefinitude of occurrence disappears before another, namely, that of time; indefinite duration admits of the conception of all possible events being realised; and the effect of such a concussion would, indeed, be terrible. Laplace has the following remarks on this subject:—"It is easy to represent the effects of the shock given to the earth by a comet. The axis and the motion of rotation would be changed; the seas, leaving their ancient beds, would spread themselves over the new equator; a great part of the human race and the animal tribes would be either drowned in this universal deluge or destroyed by the violent concussion impressed on the terrestrial globe; all the monuments of human industry would be demolished; such are the disasters which the shock of a comet would produce. Thus we see how the ocean has formerly covered the highest mountains, on which it has left indubitable marks of its presence; we see how the animals and plants of the south may have formerly existed in the climates of the north, where their remains and their impressions are still found; lastly, we see how the newness of the moral world may be accounted for, its monuments not reaching beyond 5,000*

* More than 7,000 according to the *Septuagint*.

years. The human race thus reduced to a small number of individuals, and to the most deplorable state, were uniformly occupied for a very long time with the care of providing a subsistence, and they must have entirely lost the remembrance of the sciences and the arts; and when the progress of civilisation made them feel anew the want of them, it was necessary to recommence the whole, as if the race had been newly placed upon the earth. Whatever cause may be assigned by some philosophers for these phenomena, we may be perfectly secure respecting such a terrible event, during the short interval of life. But man is so disposed to submit to the impression of fear, that in 1773, the most striking alarm spread over Paris, and was thence communicated to the whole of France, on the simple announcement of a memoir, in which Lalande had determined such of the observed comets as might approach the earth, the nearest; so true is it that error, superstition, needless alarm, and all the evils which ignorance brings in her train, are readily brought into action, when the light of science is extinguished." If it be true, as is supposed, that the comet of Newton accomplished seven revolutions in 4,028 years, it must have passed near the earth 2,349 years before the Christian era, about the year when the Mosaic deluge is related to have happened, according to the *Hebrew* text of the Scriptures. The celebrated Halley was the first who supposed that the revolutions of our globe, which are attested by historical facts, and by the observed state of its surface, were produced by the shock of some comet.

In America, an immense body has been seen passing with great rapidity through the atmosphere or space which surrounds the earth; if we suppose this moveable body or projectile to be a mass 2,000 times less than the earth itself, and to have the density of granite, it would form a globe of about 600 miles in diameter; if this body had struck the earth with a velocity of forty-five miles per second, M. Olbers has calculated that the shock would have reduced our globe to shivers, as perhaps has been the case with the twenty new planets, which we have supposed formerly to be one, a conjecture made by this astronomer when only three or four were discovered. Aerolites or meteoric stones are supposed to have had a similar origin; some of them have been found of an immense size. That described in the "Philosophical Transactions," vol. 6, was estimated at 120 millions of quintals or about five millions of tons; some of its fragments only were thrown upon the earth; its velocity was about nineteen miles per second; and it passed the earth within a distance of about twenty-two miles. If it had struck the earth, terrible effects would have been the result; a general earthquake and a change in the axis of rotation, or in the place of the poles, would have been among the consequences. It is not impossible, therefore, that aerolites may be non-luminous bodies belonging to the solar system, moving in space according to the laws of gravitation, and which become only visible when they fall to the earth. We are only acquainted with the nature of aerolites, after they reach us, when they have traversed the atmosphere, where probably they are formed in a state of incandescence, or perhaps even of fusion; for some have been seen which have evidently undergone this process, and were even burning at the moment of their fall. Of 240 of these meteoric stones examined by M. Chladni, some have appeared as tails, belts, or streams of light, which were collected into a globe of fire; their rapid course has been observed, and their explosions have been heard. Falling stars are, perhaps, only meteoric fragments, luminous and wandering points, a species of small comets rendered visible, while traversing our atmosphere, by the prodigious heat which they develope in their extremely rapid course. The bulk of many aerolites has exceeded that of some of the new planets; for it has been calculated that Ceres is only 200 miles in diameter. The meteoric stone, which fell in Calabria, in March, 1813, was accompanied with such extraordinary circumstances as have led philosophers to suppose that such stones are the fragments of some cometary mass. "In fact," says M. Francoeur, "there has been seen coming from the sea, from the eastern quarter, a red cloud which spread darkness and alarm; there have been heard in the air a tremendous noise and a groaning like that of the angry deep; there have been seen flashes and trains of fire; and there have fallen huge drops of water, masses of stones and red sand, which have been scattered all around. This sand was composed of clay, lime, iron, and chrome." Such are the phenomena which accompany the fall of meteoric stones.

Many philosophers suppose that comets have only a small quantity of matter, and that they are only a species of condensed vapour; as an evidence of this, astronomers have hitherto observed that no derangement has been caused in our system, even by their nearest approach. The comet of 1770 which was very near the earth, occasioned no disturbance in its motion. Laplace has calculated that if its mass had been equal to that of the earth the action of this comet would have increased the sidereal year by 2 h. 28 m. Its mass was certainly not the $\frac{1}{5000}$th part of that of our globe, and probably much less, since it passed Jupiter and his satellites without occasioning the least perturbation in their motion. The masses of the comets are, therefore, very small and are far from altering the motion of the planets; but they, themselves, must greatly experience the influence of the latter. In consequence of this influence some may have their elliptic orbits changed into parabolic or even hyperbolic orbits; these moving then in open curves infinitely extended, must depart from our system never to return; and, leaving the sun at all distances, must enter into the sphere of attraction of some other star in order to become a satellite or to describe a new parabola; thus incessantly changing the focus of attraction, alternately approaching to one or receding from another, until at last they are perhaps precipitated towards some central or attracting body, where they are either shivered to atoms or absorbed into the mass.

Thus the comet of 1770 observed in so large an arc of the heavens as 170° ought, according to the calculations of Lexell, to reappear every five years and a half; for his calculations were made and repeated again and again with care, and yet it has never been again observed, and never returned since its appearance that year. There is no doubt that the attraction of Jupiter and Saturn, between which its aphelion point was situated, had at first wheeled it round to us, as it were, to render it visible in 1770, the probability being that it was invisible before; but nine years after this, these same planets by a contrary action again altered the elements of the orbit, and rendered the comet invisible to us for ever, or at least impossible to be recognised as the same.

The substance of which the comets are composed is unknown, and there is only one probable supposition hitherto mentioned respecting the matter of the tails by which they are accompanied. In 1811, M. Chladni observed a prodigious ebullition in the comet of that year; the undulation or motion produced by it was transmitted in two or three seconds, from the nucleus to the end of the tail, a distance of about twelve millions of miles. This wonderful velocity surpasses our conception; it is even greater than the velocity of light. The tail of the comet of 1807 had exhibited the same phenomena to M. Chladni; so that there can be little reason to doubt the fact. The ancients generally believed on the authority of Aristotle, that comets were fiery meteors, composed of vapours emanating from the earth, and which were condensed in the air. This opinion now-a-days, could not sustain examination; we are certain that comets are conical bodies moving, like the planets, in consequence of an original impulse, and of the attraction of the sun. But if we are asked what is the nature of the substance of which they are formed, we must confess our total ignorance. Thus the indefatigable researches of man, the waves of the troubled sea, have their limits beyond which they cannot pass; and more than once, in the course of his investigations, has it been said to him, "hitherto shalt thou go, and no further; and here shall thy proud triumphs be stayed." It is one consolation, however, that the knowledge of the composition of these bodies is rather a branch of the boundless science of natural philosophy, than of astronomy, and that the triumphs of the latter science remain unaffected by our ignorance of such a fact, and irreproachable on its account.

Comets are not seen for a longer period than six months together. Those which were visible for the longest period, as we learn from history, were the comet which appeared in 64, in the reign of Nero; that in 603, in the time of the impostor Mahomet; that in 1240, at the period of the irruption of Tamerlane; that in 1729; and that which some of our readers will remember, the comet of 1811. The *number* of the comets is unknown; of 130 which have been observed in the last ten centuries, seventy-two have been observed since the invention of the telescope. There is no doubt that a much greater number of those bodies has escaped observation. Only two were seen in the thirteenth century, and two in the fourteenth, because the attention of mankind was only turned to those which were rendered remarkable by a large disk or a long tail. Some astronomers conjecture (we think rather gratuitously) that there are, perhaps, 250 millions of comets which never approach nearer to the sun than Uranus, and on which we can never make any observation. We have seen that in former ages a baleful influence was attributed to the appearance of comets. Science has at last dissipated these imaginary terrors; and in proportion as events were

discovered not to correspond with the predictions of the ignorant or the designing, the fears produced by their appearance have ceased. The comet of 1664, first seen in the constellation called the *Crow*, was to have caused the death of all crowned heads; and yet that year passed away without any death of the kind! The two comets of 1402, which seemed to be ornamented with tufts of feathers, were attended with no other misfortune than the death of a duke of Milan; and those which recently appeared in the midst of so many political convulsions, have not, thanks to the march of intellect, been accused of having produced any of the untoward events that have occurred. We have even a delightful recollection of the abundant crops which accompanied the appearance of the comet of 1811!

Many of the daily papers in France having asserted, no doubt on the authority of some astronomers in that country, that one of the recently observed comets would impinge on the earth and break it to pieces; the French Board of Longitude thought it advisable to give a statement of all that was known with certainty on the subject, in a memoir written by M. Arago, one of that learned body. From the laborious calculations of M. Damoiseau, another member of the same body, it was announced:—1°. That in the middle of November, 1939, we should see again, passing near the sun, that comet which in 1456, with a tail of 60° in length, terrified all Europe by its brilliancy, by its giving plentiful birth to astronomical predictions, and by a superstitious application of its appearance to the fearful progress of the arms of the Mahometans. 2°. That the comet of Enké should reach its perihelion on the 4th of May, 1832; but that the astronomers of the Cape of Good Hope and New Holland should be much more advantageously situated for observing it than those of Europe. 3°. That the comet of Biela, whose period is six years and three quarters, is that which was announced as threatening our globe with such dreadful ruin during the year 1832! Concerning it M. Damoiseau determined by long, minute, and laborious calculations, that it would cross the plane of the ecliptic, that is, the plane in which the earth moves, on the 20th of October, 1832, before midnight. Now, as the earth during its course round the sun never quits the plane of the ecliptic, it is in that plane alone that a comet can strike against it; so that whatever dangers were to be feared from this comet should have happened on the 29th of October, 1832, before midnight! M. Arago, in the memoir referred to, proceeded to argue from the possibility of a change in the elements of the comet before it reached the said point, that no mischief could happen to the world on the night in question. Independently however, of the uncertainty attending all astronomical calculations regarding the course of comets, a theory still far from being complete, we might have rested in the assurance that no catastrophe could overtake the globe on which we are placed, till the prophecies of Scripture and the decrees, *the revealed decrees*, of the Almighty were fulfilled.

Glossary of Terms used in the preceding articles on Comets.

Aerolites, stones which fall in the atmosphere.

Aphelion, that point in the orbit or path of a comet, or planet, the most distant from the sun.

Arc, any portion of a circle; such as the visible arc of the heavens, which is a semicircle.

Axis, the diameter of a sphere, on which it revolves, &c.

Conical, of a sugar-loaf like shape.

Constellation, a collection of bright stars in the heavens, arranged according to the practice of astronomers.

Disc, the face of a comet or planet which appears to us enlighened

Eclipse, the darkening of a luminous body by the intervention of an opaque body between it and the eye; as an eclipse of the *sun*, by the intervention of the *moon*.

Ecliptic, the plane of the orbit or path of the earth round the sun.

Ellipse, an oval curve, or path of a comet or planet, explained at p. 225, col. 2. vol. II.

Elongation, a stretching out, extending, or making longer, any distance.

Focus, the central point of a curve, or path of a comet or planet, in which the attracting body is placed.

Foci, two points in the ellipse equally central.

Hyperbola, an open curve somewhat like a parabola explained at p. 226., col. 1, vol. II.

Meteor, an unusual body which appears in the atmosphere.

Nodes, the points where the orbit or path of one comet or planet intersects the plane of another.

Nucleus, the interior of a comet which is considered to be more solid than its exterior.

Opaque, non-transparent; what cannot be seen through.

Orb, any round body, such as the earth.

Orbit, the path of any orb or planet, or comet.

Parabola, an open curve like part of an ellipse, explained at p. 225, col. 2, vol. II.

Perihelion, that point in the orbit of a comet or planet the nearest to the sun.

Period of revolution, the number of years, &c., which a planet or comet takes to complete its revolution in its orbit.

Phenomenon (plural, *phenomena*), any appearance in the heavens common or extraordinary.

Plane, the level space included in any orbit and considered as capable of indefinite extension beyond it.

Polarization, a peculiar property of light, by which it is deprived of its power of reflection in certain circumstances.

SOLUTIONS TO PROBLEMS AND QUERIES.

We have so often been requested to answer queries similar to the following, that we proceed to give a general solution which will be applicable to all.

"At what time will the hands of a clock or watch be together between four and five o'clock?"

The time between the meeting or conjunction of the hour and minute hands of a clock may be likened to the conjunction of two planets moving in different orbits. Suppose that the two are in conjunction at any given instant,—for instance, the hour and minute hands are in conjunction at noon,—then, after any elapsed time, the hour-hand will have described an angle m, and the minute-hand an angle M, round the centre of the dial. Now M is greater than m, therefore, at the end of a given time, say one hour, the separation of the minute-hand from the hour-hand (measuring this separation by an angle formed by the two hands, considered as straight lines, at the centre of the dial,) will be $M - m$; at the end of *two* hours, the angle of separation will be $2(M - m)$; at the end of *three* hours, it will be $3(M - m)$; and, at the end of t hours, it will be $t(M - m)$. When the angle of separation is 360°, that is, when $t(M - m) = 360°$, then there will be another conjunction. Whence,

$$t = \frac{360°}{M - m}$$

In this equation t denotes the time between one conjunction and another, M and m denoting the hourly motions of the two hands. Let p and P denote the times employed by the minute and the hour-hands, respectively, to complete one entire revolution of the dial; then, because

1 hour : P hours : : $M°$: 360°, and 1 hour : p hours : : $m°$: 360°; we have $M = \frac{360°}{P}$, and $m = \frac{360°}{p}$; whence $t = \frac{360°}{360°\left(\frac{1}{P} - \frac{1}{p}\right)} = \frac{Pp}{p - P}$

Substituting, in this formula, the values of P and p, which are 1 hour and 12 hours respectively, we have

$$t = \frac{1 \times 12}{12 - 1} = \frac{12}{11} = 1\tfrac{1}{11} \text{ hour.}$$

Whence, the time of a complete conjunction is one hour and *one-eleventh* of an hour; of two complete conjunctions, two hours and two-elevenths of an hour, and so on; consequently, the time of n complete conjunctions is $n \times 1\frac{1}{11}$. The following table shows the number of conjunctions which happen after noon, and between noon and midnight, and the times of each.

Number of Conjunctions.	Times of Conjunction.
1	$1\frac{1}{11}$ hours, or $5\frac{5}{11}$ minutes past 1
2	$2\frac{2}{11}$,, $10\frac{10}{11}$,, 2
3	$3\frac{3}{11}$,, $16\frac{4}{11}$,, 3
4	$4\frac{4}{11}$,, $21\frac{9}{11}$,, 4
5	$5\frac{5}{11}$,, $27\frac{3}{11}$,, 5
6	$6\frac{6}{11}$,, $32\frac{8}{11}$,, 6
7	$7\frac{7}{11}$,, $38\frac{2}{11}$,, 7
8	$8\frac{8}{11}$,, $43\frac{7}{11}$,, 8
9	$9\frac{9}{11}$,, $49\frac{1}{11}$,, 9
10	$10\frac{10}{11}$,, $54\frac{6}{11}$,, 10
11	12 ,, midnight.

This general solution of the preceding question leads to the solution of another proposed by Isaac Lowthian, in No. 34, vol. II., p. 120, viz., "At what time between 7 and 8 o'clock are the hour and minute hands exactly in opposition or in the same straight line." Here it is plain, the periods of time between one opposition and another, and between one conjunction and another, will be exactly the same; so that we have only to add the times above calculated to the period when the *first opposition* is known to take place, that is, exactly at 6 o'clock, as shown in the following table:—

Number of Oppositions.	Times of Opposition.			
1	0	minutes	past	6
2	$5\frac{5}{11}$	"	"	7
3	$10\frac{10}{11}$	"	"	8
4	$16\frac{4}{11}$	"	"	9
5	$21\frac{9}{11}$	"	"	10
6	$27\frac{3}{11}$	"	"	11
7	$32\frac{8}{11}$	"	"	12
8	$38\frac{2}{11}$	"	"	1
9	$43\frac{7}{11}$	"	"	2
10	$49\frac{1}{11}$	"	"	3
11	$54\frac{6}{11}$	"	"	4

This question was solved by Dawson (Knaresborough); A Subscriber (Tiverton); N. B. (Portsea); Omega (Dalbeattie); Jacob H. (Manchester); Warin (East Dereham); J. Lovett (Ashfordby); and others.

This question may be solved by other considerations, which may appear plainer to some minds, as follows:—It has been observed, and every one is conscious of the fact, that the first conjunction is at noon, or at 12 o'clock, whether noon or midnight. Let us now consider at what time they will be next together. When the minute hand has travelled over 12 hourly spaces on the dial, or 60 minutes, the hour hand will have travelled over 1 hourly space, or 5 minutes,—that is, when the minute hand is again at 12 o'clock, the hour hand will be at 1 o'clock; when the minute hand has reached 1 o'clock, the hour hand will have passed that point by $\frac{1}{12}$ part of the space between 1 and 2 o'clock; when the minute hand has passed over this space, the hour hand will have passed over $\frac{1}{12}$ part of it again, or $\frac{1}{144}$ part of the space between 1 and 2 o'clock; and so on. Hence, when the minute hand has passed over the *sum* of all the spaces denoted by the fractions, $\frac{1}{12}$, $\frac{1}{12}$ of $\frac{1}{12}$, $\frac{1}{12}$ of $\frac{1}{144}$ of $\frac{1}{12}$, &c., or $\frac{1}{12}$, $\frac{1}{144}$, $\frac{1}{1728}$, &c., to infinity, it will then have reached the hour hand, and the minute and the hour hand will be together. To find the sum of these fractions, let

$$s = \frac{1}{12} + \frac{1}{144} + \frac{1}{1728} + \text{&c. to infinity (A).}$$

Then, multiply each side of this equation by 12, and you have

$$12s = 1 + \frac{1}{12} + \frac{1}{144} + \frac{1}{1728} + \text{&c. to infinity (B).}$$

Now, subtract equation (A) from equation (B), and you have

$$11s = 1; \text{ whence, } s = \frac{1}{11}.$$

Thus, it appears that the minute hand will overtake the hour hand at $\frac{1}{11}$ of the distance or space between 1 and 2 o'clock; but $\frac{1}{11}$ of the space between 1 and 2 o'clock, or 5 minutes, is $\frac{5}{11}$ of a minute; so that, after 12 o'clock, when the two hands are first together exactly at the same hour, the next time that they will be together again, will be 5 minutes and $\frac{5}{11}$ of a minute past 1 o'clock; the next again, 10 minutes and $\frac{10}{11}$ of a minute, and so on; as shown in the first table above.

In conclusion, it may be observed that when it can be ascertained what angle the two hands make with each other, viz., 360°, 180°, 90°, or any other angle, at any given instant of time; then, the next time that they form the same angle, will be $5\frac{5}{11}$ minutes after that instant, and so on all round the dial.

ANSWERS TO CORRESPONDENTS.

D. L. E. (Edinburgh): Gum water is used to *enrich* the shades in water-colour drawings; it may be mixed with the colours or used as a varnish after they are laid on. It should not be used thick in either case, a little honey or sugar-candy dissolved with the gum (Gum Arabic) will prevent its cracking, which it is otherwise apt to do when dry. Water-colour will be fully treated of.—T. F. Fordham (Blackfriars-road): "Is it of I you are talking?" is very bad English; you should say "is it of me, &c."—G. S. Wilkins, and G. H. H. (Argyle-square, Faversham): See vol. I, P. E. p. 268. vol. II, line 49.—Sigma (Somerset): There is no chronology of Ancient Egypt we can recommend. Astronomers must know every part of mathematics.—A. B. B. Staines: The "Society of Arts" boxes of instruments may, we understand, be obtained there.—D. Smith (Hinshley): Students are not taken in at the London University, but at the colleges of which it is composed.—Tuus Proprius (Sadock): Greek will be commenced when Latin is finished. A carpenter must be apprenticed for some time in order to acquire a knowledge of estimates, &c.—H. D. W. (Oldham): Should first study Cassell's Euclid, and his eyes will open as he goes along.—Guilielmus: We recommend Andrew's Latin Dictionary, being a translation from the German of Dr. Freund; Zumpt's Latin Grammar is the thing. Bagster's Bible stands first in our estimation. Our P. E. is just treating of etymology in the best manner for a learner. Every letter ought to be accounted for in the composition of a word; but many are inserted for the sake of euphony, that is *good-sound-ingness*. A. H. Jack (Glasgow): Should specially study Cassell's Arithmetic and Wallace's Bookkeeping.—Philo (Berwick-on-Tweed): Solutions read; thanks for hints.—A Constant Subscriber (Grimsby): the word *agapimoni* is derived from the greek *agapimos* which signifies the *object of love, delights*; but we are sorry to have to warn our correspondent against having anything to do with the society so called.—Causality: Yes.—J. N. P. (Buckingham): Directions for mapping, &c., will be given in the P. E.—A. G. Gillingham (London): has sent us a prospectus of classes which meet at Crosby Hall, City, where persons desirous of learning *Spanish* may attend, terms 3s. 6d. per quarter.—M. Brooks (Westminster): The "Elements of Algebra" by Dr. J. Wood, revised and enlarged by *Thomas Lund*, is a very excellent book; but *Thompson's Algebra* is better for a beginner; *Hind's Algebra* is also a very good book, and may be read after Thomson's with great advantage.—P. H. (Barnsbury): The Italian language is of course contemplated, and many others.—H. T. (Rugeley): Should certainly prepare a Lecture on Physiology, making the lessons in the P. E. the ground-work.—John Rhodes (Bradford): Begin with Hymer's Astronomy.—Youthful Thinker (London): *Talent* means the capacity to acquire all that is known; *Genius*, the ability to invent what is unknown. *Esquire*, in law, means a gentleman worth £300 a-year; in courtesy, it is applied to *professional* and *official* men, who have no other title, always excepting the clergy.—J. W.: *Mirage* is a word used by the French to signify a phenomenon belonging to the *unusual refraction* of the atmosphere, by which the land assumes the appearance of water, and villages appear as islands in the midst of it. See Optics, p. 238, *Cabinet Cyclopædia*.—Un Jeune Maitre (Sherston): We can't tell.—J. W. (Ipswich): See vol. I. P. E., p. 320, col. ii., line 8 from bottom.—J. L. (Stirling): The Lessons in English will comprise composition. Geometry should be studied before algebra; two hours daily for each for six months would go a great way for either of these studies; Logic and Rhetoric should follow in their order.—S. Partman (Wotton-under-edge) is wrong about *Terp-sic'h-o-re*. As to the two dots above the vowels, read the first lesson in German.—J. P. (Newtown): the subject will be discussed in the P. E.—W. Truitt (Ilminster): *Rhythm* means regular time, measure and proportion, especially in reference to verse and poetry.

LITERARY NOTICES.

The Autographs for Freedom, just published, will be found deeply interesting to the readers of Uncle Tom's Cabin, and to all the friends of Slavery Abolition. The volume contains the contributions of more than *thirty* eminent writers, on the great subject of Negro Emancipation, with fac-similes of their autographs. Among the contributions are three by Mrs. Harriet Beecher Stowe, one by her sister, Miss C. E. Beecher, a powerful tale, by Frederick Douglass; other articles, in prose and verse, by Professors Allen, Raymond, and Finney, Judge Birnie, Horace Mann, Lewis Tappan, Horace Greeley, Rev. J. Pierpont, &c. Also letters from the Bishop of Oxford, Earl Carlisle, Joseph Sturge, Wilson Armistead, &c. The price at which this is published, one shilling, will, no doubt, be the means of securing for it a most extensive circulation.

Atheism Considered Theologically and Politically. This Volume, just issued, consists of thirteen Lectures, by the Rev. Lyman Beecher, D.D. (father of Mrs. H. B. Stowe.) These Lectures enter fully into the momentous question now at issue, or, at least, under discussion, between "Secularism" and Christianity. For close reasoning and eloquent declamation, these Lectures have rarely been surpassed. The Volume is well printed, and is published at 2s. 6d. bound in cloth.

The Altar of the Household: a Series of Services for Domestic Worship for every Morning and Evening in the Year; Select Portions of Holy Writ, and Prayers and Thanksgivings for Particular Occasions; with an Address to Heads of Families. Edited by the Rev. John Harris, D.D., Principal of New College, St. John's Wood; Author of "The Great Teacher;" "Mammon;" "Pre-Adamite Earth," &c. &c., assisted by eminent contributors. The Work will be completed in Twelve Parts, one to appear on the First day of each successive month; the whole forming One Handsome Volume, with Frontispiece engraved on steel by a first-rate Artist. The First three Parts are now ready, price 1s. each; or in One Quarterly Section, price 3s.

Cassell's Euclid.—The Elements of Geometry. Containing the First Six, and the Eleventh and Twelfth Books of Euclid. Edited by Robert Wallace, A.M., price 1s in stiff covers, or 1s. 6d. neat cloth.

The Self and Class Examiner in Euclid, containing the Examinations of all the Propositions and Corollaries in Cassell's Edition, for the use of Colleges, Schools, and Private Students, is now ready, price 3d.

Cassell's Elements of Arithmetic (uniform with Cassell's Euclid) is now ready, price 1s. in stiff covers, or 1s. 6d. neat cloth.

The Answers to all the Questions in Cassell's Arithmetic for the use of Private Students, and of Teachers and Professors who use this work in their classes, is preparing for publication, price 3d.

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LESSONS IN GEOLOGY.—No. XXVII.

By Thomas W. Jenkyn, D.D., F.R.G.S., F.G.S., &c.

CHAPTER II.

THE ACTION OF WATER ON THE EARTH'S CRUST

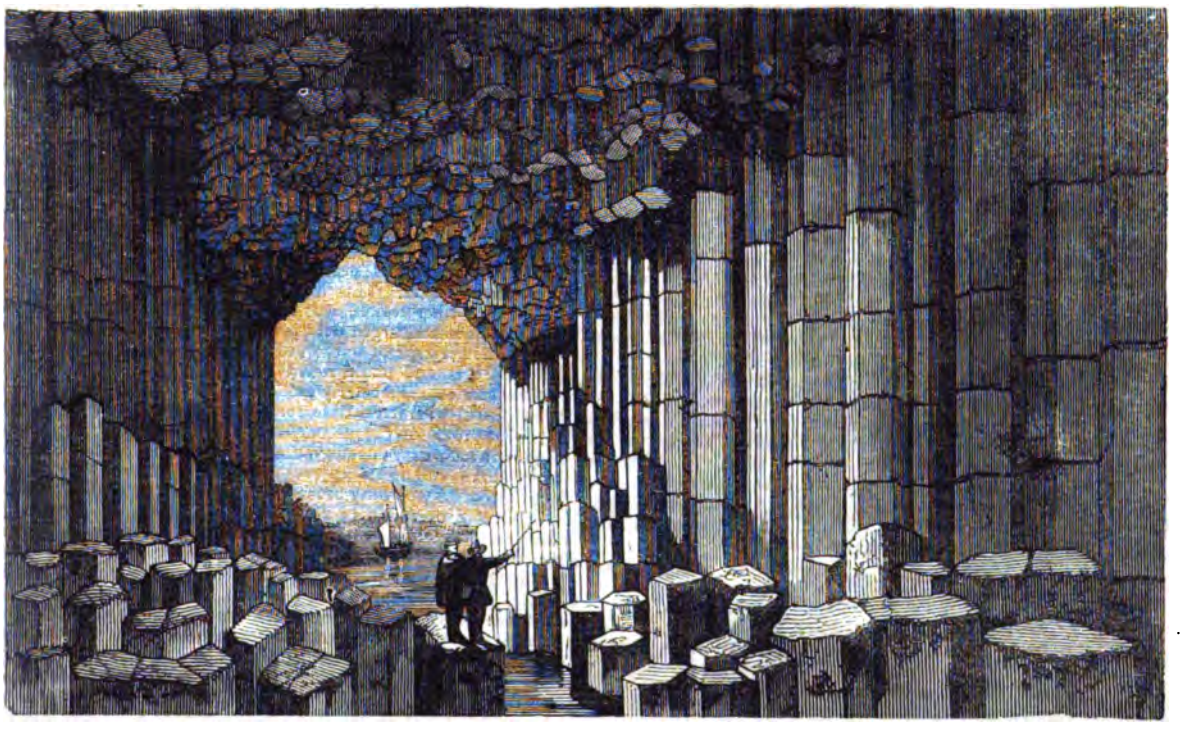
SECTION XI.

ON THE DESTRUCTIVE AGENCY OF THE OCEAN.

Your lessons on aqueous agency have hitherto been confined to rains, springs and rivers. We shall now proceed to the operations of the great Ocean upon the earth's crust. The effect of oceanic agency is twofold: it wears away the land, and it accumulates detritus in lines of shingles and sand-banks, so as to form new land. The mode or the means by which the ocean produces these two effects are threefold, viz.—by waves, by tides, and by currents.

This lesson will be limited to the destructive action of waves and breakers upon abrupt coasts.

Fig. 61.



FINGAL'S CAVE, ISLE OF STAFFA, SCOTLAND.

If you have ever been at the sea side, where there are high rocks or cliffs close to the shore, you have seen that, if the rock is composed of rather soft materials, such as chalk, sand-stone, or clay, the influence of the waves upon it is very powerful. The breakers either undermine the cliffs, or wear down their surfaces, and bring down large masses from the sides, which at the base are prepared for being carried by tides and currents into the bed of the sea. You have an instance of this on the shores of Yorkshire where, from the mouth of the Tees to that of the Humber, the whole coast is in a state of gradual and constant dilapidation. The cliffs composed of lias and oolite decay slowly, but about Flamborough-head, the chalk cliffs are worn into coves and needles, because they are more easily decomposed by the salt spray, and torn away by the breakers.

The destruction of cliffs of a given hardness will be almost always in proportion to the extent of open sea to which the coast may be exposed, as in the eastern shores of England, or the western shores of Ireland and Scotland. Along any rocky shore, the configuration of the coast is found to be determined by the hardness and softness of the rocks which compose it. If the rock be of chalk, sand-stone, or clay, its soft beds easily give way before the power of the breakers. If the rock be of granite, porphyry, or slate, it presents a greater resistance to the batterings of the surges, and preserves its form to a greater length of time.

This action of the sea is constant. But when the winds lash the ocean into a storm, the power of the breakers becomes much greater. At these seasons, the waves tear away from the cliffs enormous masses of rock, weighing scores and hundreds of tons. These masses fall to the base in shattered fragments, which the tide, at its leisure, breaks or wears into smaller portions, and

then removes towards the bed of the ocean, or rolls towards another part of the shore to form shingles.

If the rocks which form the cliffs are stratified, the amount of sea power upon them will depend much upon the dip of their strata. If the strata dip towards the sea, as in the case of the slaty rocks on the south coast of Devon and Cornwall, the waves have very little power upon them; for they can only remove some loose superficial materials with which they are covered, and, now and then, when aided by heat or frost, dislodge a lamina at the cleavage (see fig. 59). Skilful engineers have observed the capacity of such inclined beds to break the power of the waves, and, accordingly, form their artificial breakwaters, like that at Plymouth, with a dip towards the sea, over which the breakers sweep without the power to disturb a single block of the masonry.

Fig. 59.

The Waves sweeping over a Rock dipping towards the Sea.

If the strata of the cliffs be horizontal or dip towards the land, like Shakspeare's cliff at Dover, the power of the breakers upon them is most ruinous and devastating. (See fig. 60.) The amount and the extent of this agency upon such rocks, especially when it is aided by the force of gales and hurricanes, are developed along the whole line of the eastern shores of England, where the German Ocean has made very great encroachments upon the land. Many of these encroachments have taken place within a few centuries, and some of them are recorded in the history of our country.

It has been already remarked, that the masses which have been dislodged from the cliffs, by the battering of the waves, fall to the base. There the fragments will be acted upon by the sea, according to their respective weight, form, and solidity. The tide or the current will remove as much of them as it is able to transport. The heavier masses will remain within the reach and influence of the breakers, which will constantly abrade, grind, and wear them down into smaller portions, and will not cease this process until the mass is ground into sand or mud.

Fig 60.

The Waves dashing against a Rock dipping towards the Land.

When the same cliff consists of rocks or beds of different and unequal hardness, it then frequently happens that the harder fragments of the fallen mass settle down, if they are large, at the foot of the cliff, and, as in fig. 60, remain there as a protection to the rock against the impetuous and destructive power of the waves. These harder materials may consist of either compact concretions imbedded in marls and sand-stones, or perhaps of blocks of indurated strata. It is also likely that a soft rock may form the base of a cliff, and a hard rock the upper part of it. In this case the fall of the upper part, as in fig. 60, will have a conservative influence on the softer rock.

Let us now suppose the case of unstratified cliffs. If the rocks of an iron-bound shore be unstratified, they will exhibit a great variety of hardness or compactness. This accounts for the uneven and rugged form which a coast may present towards the ocean. The sea front of these cliffs abound in little bays, nooks, coves, and fissures. This indented aspect is owing to the more rapid decomposition and destruction of some parts of the rock than of other portions. Such cliffs present, sometimes, a remarkable appearance. When one unstratified rock is traversed by veins or dykes of another rock, or, it may be, of ore, such veins are generally of different compactness or solidity from that which they traverse. The result is, that on such sea-shores you may see either that these veins are standing out of the cliff in bold relief, or that coves are hollowed out between them or under them. On the other hand, there are, as in Shetland, cliffs on which veins or dykes of soft granite have mouldered away, while the matrix in which they were imbedded, being of the same substance but of a firmer texture, has remained unaltered.

When the sea has once formed in a cliff a cavern or cove, the vault of which does not rise above high water, it sometimes works a fissure upward at the inmost extremity. This up-going fissure is effected, partly by the breakers themselves, and partly by means of the compressed air which is held between each wave as it rolls into the cavern. Caves of this description, formed on a large scale, are frequently found in strata of carboniferous limestone. The noise which is caused by the blast of the compressed air, and the dash of the breaker upward, is so loud as to be heard at a considerable distance.

The power of breakers upon a cliff is not only increased by a gale, but it is also multiplied by the materials which such breakers may hold in suspension. When the shore between the cliff and the sea consists of stony shingle, or of a sandy beach, such a shingle is frequently torn up during a strong gale, and its pebbles are held in temporary suspension by the waves, and are hurled with great violence against the cliff. When this is the case, as it often is in a hurricane, the action of the breakers upon the cliffs becomes tremendous. The surges dash against the hardest rocks, and, independently of their own force, and of the abrading power of their spray, the stones and pebbles which they contain strike against the cliffs, and destroy them by wearing, scooping, and undermining them. This fact, you remember, is analogous to what, in a former lesson, was represented as the action of rivers and floods when charged with pebbles, wood, or fragments of ice.

On some portions of our western coasts, which are exposed to the perpetual and uncontrolled power of the Atlantic, you may observe how strong westerly gales cause the breakers of the ocean to be hurled with irresistible force against the cliffs. The spray of the sea promotes the decomposition of the rocks, and prepares them for a more easy disintegration by the violence of the breakers. Everywhere you find steep rocks and abrupt cliffs hollowed out into deep caves with lofty arches. Almost every promontory ends in a cluster or series of rocky masses imitating the forms of columns, pinnacles, obelisks, and needles, which have been worn into these shapes by the action of the breakers.

Though some rocks resist this battering agency longer than others, it is evident that they cannot permanently and for ever resist the devastating action of the waves. Geologists find that rocks of every variety of mineral composition, and of indurated compactness, are suffering disintegration. Granite, clay-slate, serpentine, quartz rock, and basalt—all suffer the same fate. Where the coast is much exposed, the hardest rocks are found worn and torn. The sea front of these cliffs are found everywhere drilled into holes, or worn into little caverns, some of which are of considerable length. This perforation or drilling of the cliff results from the force of the waves being driven, by local circumstances, more in one direction than another; or it may result from the inferior hardness of different parts of the same rock.

The Island of Staffa, one of the western isles of Scotland, furnishes one of the most magnificent specimens of a cave thus drilled into the hardest rock. (See fig. 61.) This most beautiful of ocean caverns is formed in a stupendous group of vertical columnar basalt. The cave is altogether the effect of the incessant action of the breakers on the base of the cliff. It is called Fingal's cave.

The Island of Staffa consists of a mass of columnar basaltic rocks. Its cliffs are very steep, and are composed of clusters of angular columns, having from three to six or seven sides, which fit one another closely, as is represented in fig. 61. These cliffs are about seventy feet high. Fingal's cave is in the south-

east part of the island; is forty-two feet wide, and 227 feet in length. The roof is a hundred feet high at the entrance, but gradually diminishes to fifty. This roof consists of the projecting extremities of basaltic columns. The floor is a causeway paved with the truncated ends of similar columns. The sides are formed of perpendicular pillars. The depth of the water within the cave is nine feet, along which a boat can reach the extremity of the cave in calm weather. When boisterous gales drive the sea into the cavern, the breakers dashing against the steep sides of the cave, and their roar echoed with increased power from the rugged roof, present to the eye and the ear a scene of overwhelming grandeur.

This magnificent cave owes its existence to the circumstance that, at this point, the basaltic columns are jointed, while the general character of the rock is to be without divisions in the columns. A thin layer of siliceous cement exists between the joints or articulations, which is called mortar by the inhabitants of the island, who, on this ground, firmly believe that this columnar structure is a real product of human art. It is this cement that is destroyed by the action of the sea, and then the dilapidation of the columns is effected by the force of the breakers.

The destructive processes which I have enumerated, you will find illustrated on every coast in the world. To study, however, the destructive agency of the ocean, you need not quit the shores of our own island. Here you have abundant instances, and in the greatest variety, of the influence of waves and breakers upon promontories, cliffs, bays, and estuaries, and that upon every description of rock, from granite, porphyry, and slate, to limestones, sand-stones, and marls.

In many instances, the sea has formed for itself a passage through rocks of granite and porphyry. The breaches which have been thus effected in cliffs are widened every winter by the impetuous assaults of the waves of the tides, which bring down large masses of rock from both sides of the breach, until the gash or chasm worn in the rock forms a narrow ravine, which becomes lengthened by the perpetual onsets of breakers. In other instances, what were once small islands, have, through the wear and tear of sea action for ages, become mere clusters of rocks, or grotesque shreds of terra firma. These peaks or columns put on the most fantastic shapes, such as the Drongs of Scotland. In the south they are represented by the Needles of the Isle of Wight.

If the destruction be so great when the billows act upon coasts of hard rock, you can easily conjecture that, when the force of the waves is directed against shores that consist of clays and sands, as in estuaries, the effect must be devastating. Many parts of our coast, both eastern and western, show that large tracts of land, on which proud castles and happy villages once stood, have been entirely swept away by the waves of the sea. Were you to examine the shores of Holland, and follow the whole line of coast up towards Denmark, you would find abundant and manifold instances of the destructive influence of the sea upon fluviatile rocks.

To an Englishman, one of the most interesting spots for studying the ravages of sea action upon the land must be the Straits of Dover. There are many physical and geological proofs that the coasts of England and France were once united. Mariners find, in sailing from the German Ocean towards the Straits, that the soundings become more and more shallow. After quitting a depth of 120 fathoms, they come progressively to 58, 38, 18, and eventually even to two fathoms. This shallow part lies between Romney Marsh and Boulogne. As soon as they pass westward of this, the soundings again become deeper and deeper. The inference, therefore, is geologically sound, that once the distance between Romney Marsh and Boulogne formed an isthmus which divided two seas.

Even so early as 1605, old Verstegan endeavoured to prove that France and England had been one land. He showed this from the proximity and identity of the composition of the opposite cliffs; and from the occurrence of a submarine ridge, called "Our Lady's sands," extending from coast to coast at no great depth. To confirm this physical argument, it turns out that the noxious animals in France and England are the same. These are animals that could not have swam across, and would not be voluntarily introduced by man. It is but barely possible that they might have migrated over when the channel was covered with ice.

This isthmus is supposed to have been about six or seven miles in breadth. Its soil or rock was composed entirely of chalk and flint, and, in many places, was not much higher than the sea level. Whether the breach in this isthmus was made by earthquake, by the agency of man for the purposes of commerce or defence, or by encroachments of the sea, science cannot satisfactorily decide. There are some geological appearances about the cliffs both at Dover and at Brighton, which show that there have been risings and falls in the relative level of sea and land at a comparatively modern epoch. These appearances indicate that the chalk itself, originally a marine deposit, has been sunk about sixty feet since its first emergence from the ocean, and that the present cliffs are not the first that have been excavated by the action of waves.

This lesson teaches you that this power of the waves of the sea is the greatest land-abrading force that we know. When the crash of a heavy wave strikes against a cliff, the blow is sometimes so powerful that the rock will seem to tremble beneath your feet. The rocks which are thus attacked are exposed to greater decomposition from being alternately wet and dry, in proportion to the surface so wetted and dried. In this class of studies it is delightful to discover what provision the All-wise Architect of the rocks has contrived for the preservation of our cliffs. It is not by the sand or shingle only that He has issued orders to the sea, "hitherto shalt thou go;" but he has ordained that incrustations by marine animals and sea-weeds should protect the bases of cliffs against the destructive force of the breakers.

LESSONS IN ENGLISH.—No. XXXVIII.

By John R. Beard, D.D.

LATIN STEMS (*concluded*).

Some Latin stems supply us only in part with derivatives, giving for instance the noun and leaving the Saxon to furnish the adjective, or giving the adjective, and leaving the Saxon to furnish the noun. Such a fact illustrates the composite character of our present English tongue. If it is a token of perfection in a language, that it is produced and evolved out of its own elements like a tree with its stem, branches and leaves, the English has little claim to perfection. But a perfection of this kind is only theoretical. That is the best language which most effectually answers the purpose of speech. Thus viewed, the English possesses very high qualities. In virtue of the facts just mentioned, examples of which I am about to append, the English possesses a most desirable variety, which adds not only to the colouring and polish of our style, but also to its capability and force.

Latin Nouns with their derived Adjectives, and corresponding Saxon Nouns.

Latin nouns.	*Derived adjectives.*	*Saxon nouns.*
initium	*initial*	*beginning*
pectus, pectoris	*pectoral*	*breast*
cadaver	*cadaverous*	*carcass*
felis	*feline*	*cat*
vacca	*vaccine*	*cow*
morbus, morbi	*morbid*	*disease*
canis	*canine*	*dog*
auris	*auricular*	*ear*
finis	*final*	*end*
hostis	*hostile*	*enemy*
oculus	*ocular*	*eye*
ager, agri	*agrarian*	*field*
grex, gregis	*gregarious*	*flock*
tutela	*tutelary*	*guardianship*
manus	*manual*	*hand*
caput, capitis	*capital*	*head*
merces	*mercenary*	*wages*
equus, or *eques*	*equestrian*	*horse*
domus	*domestic*	*home*
insula	*insular*	*island*
culina	*culinary*	*kitchen*
lux, lucis	*lucid*	*light*
pulmo	*pulmonary*	*lungs*
mens, mentis	*mental*	*mind*
pecunia	*pecuniary*	*money*
luna	*lunar*	*moon*
os (oris)	*oral*	*mouth*
nasus	*nasal*	*nose*
ocus	*local*	*place*

Latin nouns.	*Derived adjectives.*	*Saxon nouns.*
vulgus	*vulgar*	*rabble*
annulus (annus)	*annular*	*a ring*
æmulus	*emulous*	*a rival*
radix, radicis	*radical*	*root*
regula	*regular*	*rule*
mare, maris	*maritime*	*sea*
pastor	*pastoral*	*shepherd*
humerus	*humeral*	*shoulder*
latus, latĕris	*lateral*	*side*
visus	*visual*	*sight*
miles, militis	*military*	*soldier*
ver	*vernal*	*spring*
sol	*solar*	*sun*
furtum	*furtive*	*theft*
femur, femŏris	*femoral*	*thigh*
dens, dentis	*dental*	*tooth*
fœdus, fœdĕris	*federal*	*treaty*

The similarity which exists between the Latin and the corresponding English affords the student aid either to learn the words which are of Latin extraction found in English, or to become acquainted with the Latin vocabulary itself. Suppose, for instance, that you meet with the word *lateral*, and know, or, not knowing, ascertain that it is a word of Latin origin which signifies *that which pertains to the side*. Having this information, you are enabled to remember that *latus*, the noun whence lateral comes, denotes *the side*. Or if you know that latus means *the side*, then you readily infer that lateral means *that which pertains to the side*. In this way, with an active mind, you may make the Latin roots with which you have become acquainted teach you the import of scores, nay, hundreds, of derivatives.

And observe, too, the specific service which the Latin element renders. We have the noun *side*, but we have no corresponding Saxon adjective. The want is supplied by the Latin.

In meaning, these nouns and adjectives do not always strictly correspond. Thus ager, *field*, and agrarian do not strictly correspond; I mean, you cannot infer the exact meaning of *agrarian* for instance, from the meaning of *ager*. You are thus taught that it is an intelligent, not a slavish study in which you are engaged. Rules are not chains, but guiding-posts.

Some of the words in the last list, and in previous lists, which appear as Latin or Saxon, are not exclusively of Latin or Saxon origin. To *wade*, given as a derivative of vado, is a Saxon root, being common to both the Latin (Celtic) and the Saxon tongues. *Waddle*, a diminutive of *wade*, is also Saxon. *Rule* and *regula* may be considered as the same word in different forms; also oculus and *eye*; so insula and *island*; leo and *lion*; mens and *mind*. Similar facts abound in our language, and show that in order to know one language well you must study several, and that the proper way to study languages is to study them in their mother tongues—in the primitive groups or classes where they are found, and whence they shoot and branch.

I subjoin a list in which the richness of our language is still more exemplified:—

Latin nouns.	*Latin adjectives.*	*Saxon adjectives.*	*Saxon nouns.*
corpus, corpŏris	*corporeal*	*bodily*	*body*
puer, pueri	*puerile*	*boyish*	*boy*
frater	*fraternal*	*brotherly*	*brother*
onus, onĕris	*onerous*	*burdensome*	*burden*
dies	*diurnal*	*daily*	*day*
mors, mortis	*mortal*	*deadly*	*death*
terra	*terrestrial*	*earthly*	*earth*
pater	*paternal*	*fatherly*	*father*
culpa	*culpable*	*faulty*	*fault*
ignis	*igneous*	*fiery*	*fire*
caro, carnis	*carnal*	*fleshly*	*flesh*
capillus	*capillary*	*hairy*	*hair*
odium	*odious*	*hateful*	*hate*
salus, salutis	*salutary*	*healthy*	*health*
cor, cordis	*cordial*	*hearty*	*heart*
cœlum	*celestial*	*heavenly*	*heaven*
auxilium	*auxiliary*	*helpful*	*help*
glacies	*glacial*	*icy*	*ice*
rex, regis	*regal*	*kingly*	*king*
lex, legis	*legal*	*lawful*	*law*
vita	*vital*	*lively*	*life*
amor	*amorous*	*lovely*	*love*
mater	*maternal*	*motherly*	*mother*
nox, noctis	*nocturnal*	*nightly*	*night*
robur	*robust*	*strong*	*strength*

Latin nouns.	*Latin adjectives*	*Saxon adjectives.*	*Saxon nouns.*
mars, martis	*martial*	*warlike*	*war*
aqua	*aqueous*	*watery*	*water*
voluntas	*voluntary*	*willing*	*will*
femina	*feminine*	*womanly*	*woman*
sylva	*sylvan*	*woody*	*wood*
mundus	*mundane*	*worldly*	*world*
annus	*annual*	*yearly*	*year*

The diverse meanings of capillary and *hairy* suffice to prevent you from thinking that these pairs of adjectives—one from the Latin, one from the Saxon—are in each case identical in meaning. Frequently, however, that which is indicated by the one is that which the other signifies. When the two are of the same import, the one may be used for the other. To which of the two you should give the preference depends on circumstances. If you are addressing the people, you will do well to employ words of Saxon origin. Nor fancy that by so doing you lower your style. Rather is it an object of honourable ambition to write a good pure idiomatic Saxon style. And much do I hope that none of my pupils will allow themselves to be seduced by the finery and the foppery of Latinisms, and long, high-sounding words. Simplicity in diction, like simplicity in dress, betokens real respectability. Write, because you have something to say, and if you have nothing to say, do not write; and if you write, write so as to be understood by those for whom you write; the BEST STYLE IS THAT WHICH IS MOST READILY UNDERSTOOD.

COMPOSITION AND PARSING.

Continue to make short sentences out of the lists which I give of

Words with their proper Prepositions.

	F. ll.
Deviate from,	via, *a way*
Devolve on, upon,	volvo, *I roll*
Devote to,	votum, *a vow*
Dictate to,	dico, *I say*
Die of (a disease), by (the sword or famine), for (another)	
Differ with (a person in opinion), from (a person or thing in some quality),	fero, *I bear*
Different from,	fero, *I bear*
Difficulty in,	facilis, *easy*
Diminution of,	minutus, *small*
Disabled from,	
Disagree with,	
Disagreeable to,	
Disappointed of (a thing not obtained), in (a thing obtained),	
Disapprove of,	probus, *good*
Discourage from,	cœur, *heart*
Discouragement to,	
Disengaged from	gage, *a pledge*
Disgusted at, with,	gustus, *taste*
Dislike to,	
Dismissal from	missus, *sent*
Disparagement to,	
Dispense with,	dispenser, *to set free*
Dispose of, to, for,	positus, *placed*
Dispossess of,	possideo, *I possess*
Dispute with,	puto, *I think*

Study carefully, and parse carefully the following admirable remarks by a great master. Having done so, write, as well as you can, on the same subject; and having corrected, preserve what you write. You may now, if you have followed my advice, and kept your compositions, compare your earlier attempts with the essay you produce on the love of knowledge. The comparison can hardly fail to give you both instruction and encouragement.

THE LOVE OF KNOWLEDGE.

But while I am descanting so minutely upon the conduct of the understanding, and the best modes of acquiring knowledge, some men may be disposed to ask, "Why conduct my understanding with such endless care?—and what is the use of so much knowledge?" What is the use of so much knowledge?—what is the use of so much life?—what are we to do with the seventy years of existence allotted to us?—and how are we to live them out to the last? I solemnly declare that, but for the love of knowledge, I should consider the life of the meanest hedger and ditcher, as

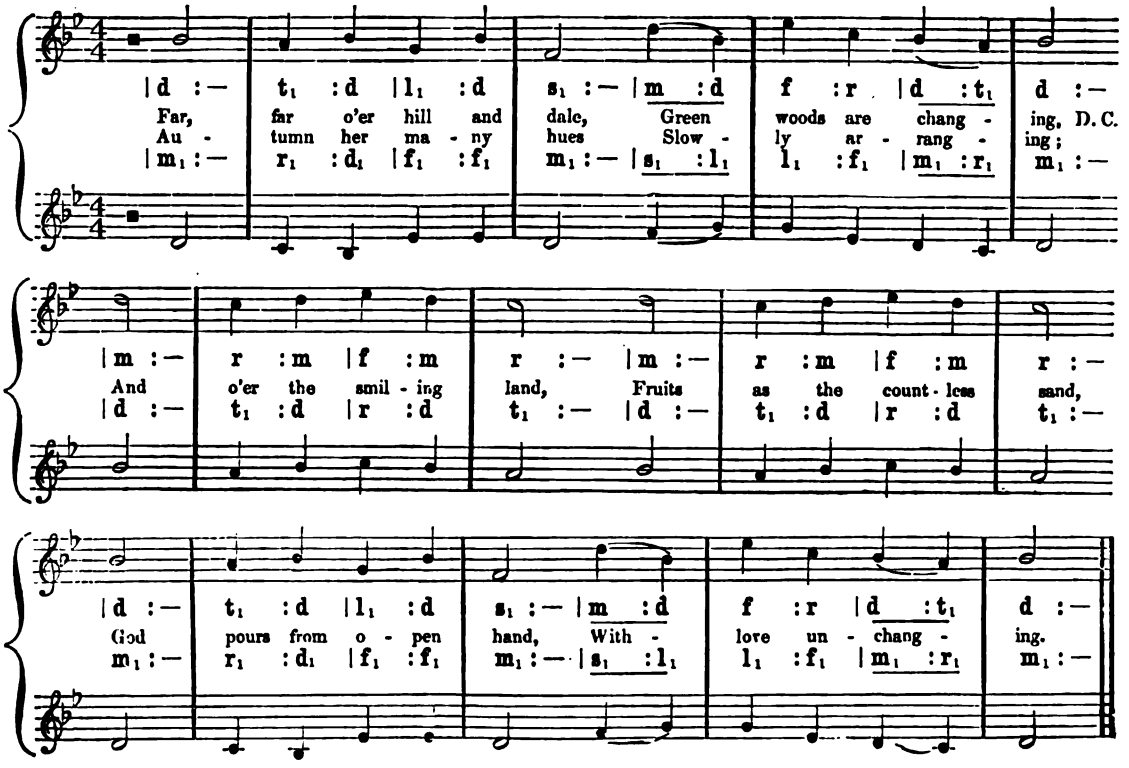
preferable to that of the greatest and richest man here present: for the fire of our minds is like the fire which the Persians burn in the mountains,—it flames night and day, and is immortal and not to be quenched! Upon something it *must* act and feed,—upon the pure spirit of knowledge, or upon the foul dregs of polluting passions. Therefore, when I say, in conducting your understanding, love knowledge with a great love, with a vehement love, with a love coeval with life; what do I say but love innocence—love virtue—love purity of conduct—love that which, if you are rich and great, will sanctify the blind fortune which has made you so, and make men call it justice,—love that which, if you are poor, will render your poverty respectable, and make the proudest feel it unjust to laugh at the meanness of your fortunes,—love that which will comfort you, adorn you, and never quit you; which will open to you the kingdom of thought, and all the boundless regions of conception, as an asylum against the cruelty, the injustice, and the pain that may be your lot in the outer world,—that which will make your motives habitually great and honourable, and light up in an instant a thousand noble disdains at the very thought of meanness and fraud! Therefore, if any young man here have embarked his life in the pursuit of knowledge, let him go on without doubting or fearing the event;—let him not be intimidated by the cheerless beginnings of knowledge, by the darkness from which she springs, by the difficulties which hover around her, by the wretched habitations in which she dwells, by the want and sorrow which sometimes journey in her train; but let him ever follow her as the angel that guards him, and as the genius of his life. She will bring him out at last into the light of day, and exhibit him to the world comprehensive in acquirements, fertile in resources, rich in imagination, strong in reasoning, prudent and powerful above his fellows, in all the relations and in all the offices of life.—*Sydney Smith.*

LESSONS IN MUSIC.—No. XVI.

By JOHN CURWEN.

OUR pupils will diligently study the three following tunes, in order to recognise perfectly and familiarly the mental effects of TE and RAY. It will be encouraging to those who have faithfully followed our course thus far, to know how much of the journey they have yet to travel. The present lesson will be followed by one on the varieties of the human voice, which will be illustrated by four songs arranged for *three* voices. Next will come a lesson on the deeply-interesting subject of transition or "modulation," illustrated by several short pieces arranged for *four* voices. The subject of "minor" tunes and "the minor scale" will follow. And then "notation," with all the mysteries of "signatures" and "clefs" will be easily explained and mastered. The lessons will conclude with as full a treatment of the subject of melody and harmony as our space will allow. A few short glees will illustrate the closing lessons. Take courage, then. You have already trodden the most difficult part of the road.

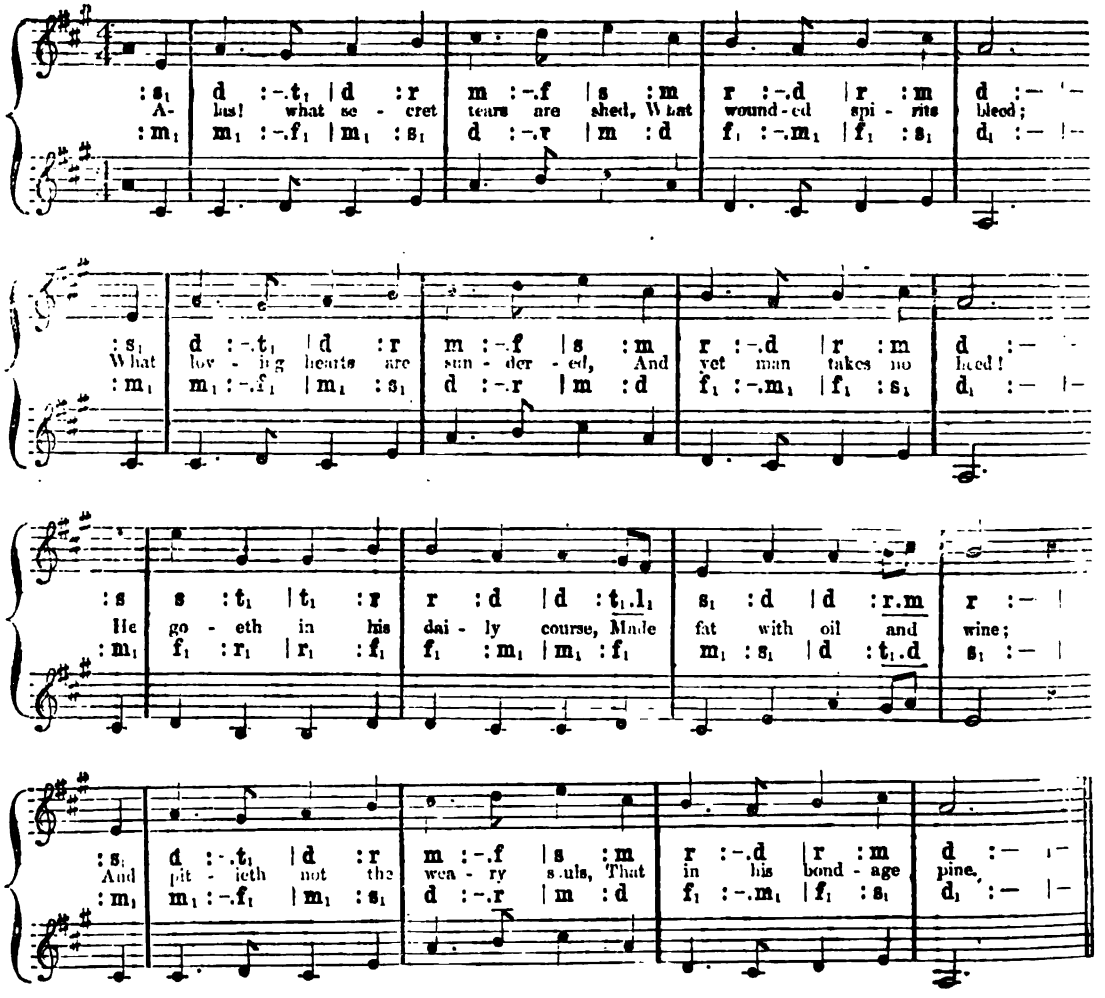
EXERCISE 33. **THE SPANISH CHANT.** KEY B flat. M. 66


| d : — t1 : d | l1 : d s1 : — | m : d f : r | d : t1 d : —
Far, far o'er hill and dale, Green woods are chang - ing, D. C.
Au - tumn her ma - ny hues Slow - ly ar - rang - ing;
| m1 : — r1 : d1 | f1 : f1 m1 : — | s1 : l1 l1 : f1 | m1 : r1 m1 : —
| m : — r : m | f : m r : — | m : — r : m | f : m r : —
And o'er the smil - ing land, Fruits as the count - less sand,
| d : — t1 : d | r : d t1 : — | d : — t1 : d | r : d t1 : —
| d : — t1 : d | l1 : d s1 : — | m : d f : r | d : t1 d : —
God pours from o - pen hand, With - love un - chang - ing.
m1 : — r1 : d1 | f1 : f1 m1 : — | s1 : l1 l1 : f1 | m1 : r1 m1 : —

2 See, to the harvest field
Gleaners have hasted,
Gathering the scattered ears,
None should be wasted.
FREELY WE ALL RECEIVE,
FREELY THEN WE SHOULD GIVE,
On Him "in whom we live"
All our care casting.

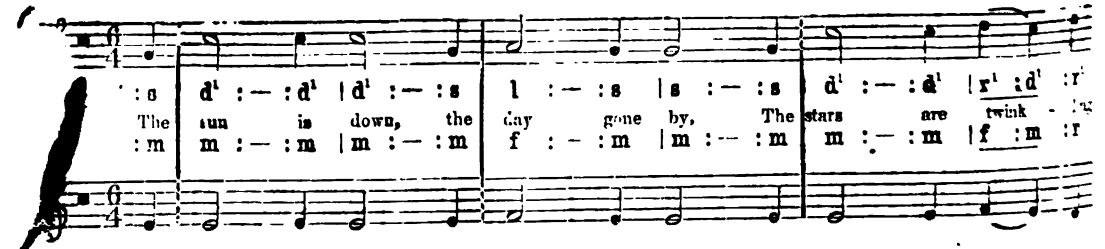
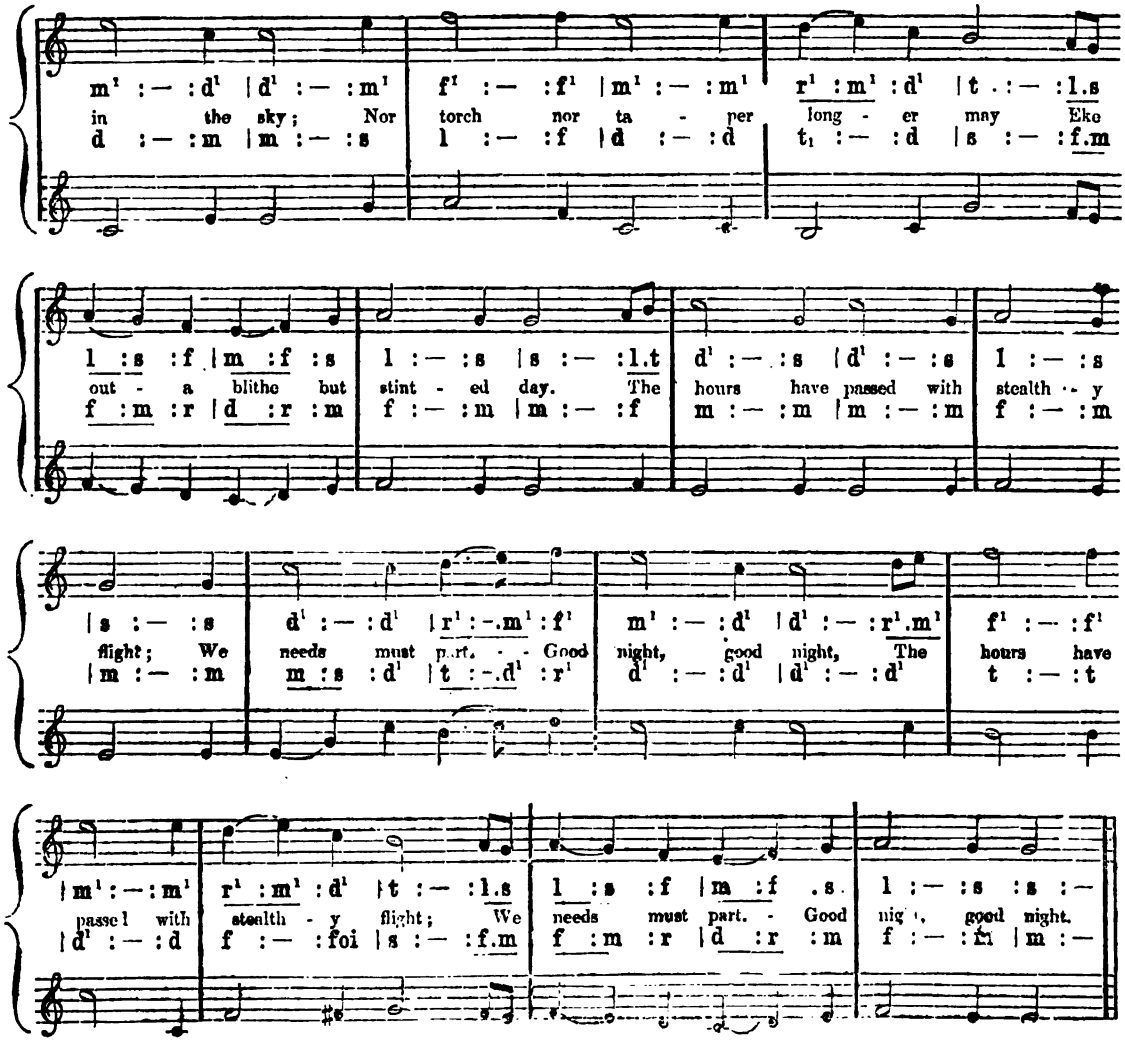
3 Spring came and passed away,
Summer is ending,
Autumn will soon decay
With winter blending.
While time is given us here,
Oh may we prize it dear,
In love and godly fear
Each moment spending.

Exercise 34. **CYPRUS.** Key A. M. 80.

(The words by Mary Howitt.)

: s1 | d : -.t1 | d : r | m : -.f | s : m | r : -.d | r : m | d : —
Ah! what se - cret tears are shed, What wound - ed spi - rits bleed;
: m1 | m1 : -.f1 | m1 : s1 | d : -.r | m : d | f1 : -.m1 | f1 : s1 | d1 : —
: s1 | d : -.t1 | d : r | m : -.f | s : m | r : -.d | r : m | d : —
What lov - ing hearts are sun - der - ed, And yet man takes no heed!
: m1 | m1 : -.f1 | m1 : s1 | d : -.r | m : d | f1 : -.m1 | f1 : s1 | d1 : —
: s | s : t1 | t1 : r | r : d | d : t1.l1 | s1 : d | d : r.m | r : —
He go - eth in his dai - ly course, Made fat with oil and wine;
: m1 | f1 : r1 | r1 : f1 | f1 : m1 | m1 : f1 | m1 : s1 | d : t1.d | s1 : —
: s1 | d : -.t1 | d : r | m : -.f | s : m | r : -.d | r : m | d : —
And pit - ieth not the wea - ry souls, That in his bond - age pine.
: m1 | m1 : -.f1 | m1 : s1 | d : -.r | m : d | f1 : -.m1 | f1 : s1 | d1 : —

2 To him they are but as the stones
Beneath his feet that lie,
It entereth not his thoughts that they
From him claim sympathy;
It entereth not his thoughts that God
Heareth the sufferer's groan,
That, in his righteous eye, their life
Is precious as his own.

Exercise 35. **CLIFTON GROVE.** Key C. M. 100.

(The words by Joanna Baillie.)

CLIFTON GROVE *(Continued).*

in the sky; Nor torch nor ta - per long - er may Eke
out - a blithe but stint - ed day. The hours have passed with stealth - y
flight; We needs must part. - - Good night, good night, The hours have
passe l with stealth - y flight; We needs must part. - Good nig - , good night.

2 The lady in her curtained bed,
The herdsman in his wattled shed,
The clansman in the heathered hall,
Sweet sleep be with you, one and all!
We part in hopes of days as bright
As this gone by; good night, good night.

3 Sweet sleep be with us, one and all!
And if upon its stillness fall
The visions of a busy brain,
We'll have our pleasure o'er again,
To warm the heart! to charm the sight!
Gay dreams to all! good night, good night!

LESSONS IN GERMAN.—No. XXXVIII.

Section LXXIX.

Der Schlag, "the blow, the stroke" (commonly connected with rühren), often denotes palsy, apoplexy. Ex.: Er ist von dem Schlag gerührt worden; he has been struck with the palsy. Er hatte einen Anfall vom Schlage; he had an apoplectic fit.

I. Abgehen = to go away, to leave. Ex.: Der Zug ist schon abgegangen; the train has already left (started). Es geht gut ab = it sells well; as, der Wein geht gut ab; the wine sells well (goes off well).

II. Er läßt sich nichts abgehen = he lets nothing (advantageous) go from him, that is, he stints himself in nothing.

III. Je nachdem = even after, or according as. Ex.: Je nachdem ich Muße habe, werde ich Sie besuchen; as, or according as I have leisure I will visit you, &c.

IV. Einfallen signifies literally, to fall in, or into; hence to fall down, or to ruin, to decay, &c. With the dative it signifies, to come into the mind, to occur. Ex.: Es ist mir nie eingefallen, so etwas zu thun; it never occurred to me to do such a thing.

V. So fern, or in so fern = in so far as, if, in case. Ex. Ich erlaube es dir in so fern es von mir abhängt; I will permit it, so far as it depends upon me. In so fern es die Zeit erlaubt; if, or in case the time permit, &c.

VI. Angehen used intransitively, signifies to begin. Ex: Der

Gottesdienst in Deutschland geht gewöhnlich des Morgens um neun Uhr an; the church-service in Germany generally commences, in the morning, at nine o'clock. Used transitively, it signifies "to concern, to be of consequence." Ex.: Das geht ihn an; that is his concern, or that concerns him. Das geht mich nichts an; that does not concern me (is of no consequence to me.)

Exercise 82.

Abgang, *m.* sale, market, ("*run*");
Ab'kühlen, to cool;
An'gehen, (See VI.);
Debatte, *f.* debate;
Einfall, *m.* idea, thought;
Ein'fallen, to fall in, occur;
Erkälten, to take cold;
Gelaunt', disposed, humoured;
In so fern, (See V)
Kümmern, to concern, trouble;
Leidlich, tolerable, supportable;
Naß, wet;
Rasch, quick, swift;
Schlag, *m.* (See above);
Schnupfen, *m.* cold (in the head);
Sinn, *m.* mind, sense;
Sitzung, *f.* session, sitting;
Un'verträglich, unsociable, intolerant;
Vorsicht, *f.* precaution;
Zu'nehmen, to increase;
Zusam'menfallen, to tumble, to fall together, to fall to ruin.

Der Schlag rührte ihn auf der linken Seite.	The palsy struck him on the left side.
Er stand da wie vom Schlag gerührt.	He stood there as if struck with the palsy.
Wo ging der Streit an?	Where did the contest begin?
Was gehn mich deine Freuden an? (Göthe.)	How do thy pleasures concern me?
Das Dampfschiff geht um vier Uhr ab.	The steam-boat leaves at four o'clock.
Diese Waare geht gut ab.	This ware sells well. (See I)
Diesem Manne geht nichts ab.	This man does not stint himself. (See II.)
Die Unterredung ging ruhig ab.	The conference passed off quietly.
Je nachdem die Unterhaltung ist, ist auch die Stimmung.	According as the entertainment is, so also is the humour.
In so fern mir der Name einfällt, werde ich dir ihn sagen.	In case the name occurs to me I will mention it to you.

1. Mein kleiner Bruder hat den Schnupfen; er hat sich auf dem Eise stark erkältet. 2. Wer erhitzt ist und sich zu rasch abkühlt, kann sich leicht erkälten. 3. Wir sollen uns nicht um Dinge kümmern, welche uns nichts angehen. 4. In so weit mich diese Sache angeht, habe ich die nöthigen Schritte gethan. 5. Dieses geht Euch nichts an. 6. Bei dieser Kunde stand er wie vom Schlag gerührt. 7. Den alten Mann hat der Schlag gerührt. 8. Der Mann ist vom Schlage gerührt worden. 9. Wie vom Schlag gerührt sank sie nieder. 10. Diese Waare geht gut ab. 11. Wann geht das nächste Dampfschiff ab? 12. Ich sehe nicht, daß sich dieser Mann etwas abgehen läßt. 13. Ist die Sitzung ruhig abgegangen? 14. Nein, sie ist nicht ruhig abgegangen,—die Debatte war sehr stürmisch 15. Dieses Buch hatte einen starken Abgang. 16. Der junge Kaufmann erzählte mir, daß der Abgang bedeutend zugenommen habe. 17. Je nachdem es mir in den Sinn kommt, reise ich von hier ab. 18. Je nachdem er gelaunt ist, kann er der leidlichste, aber auch der unverträglichste Mensch sein. 19. Je nachdem er es anfängt, wird der Erfolg sein. 20. In so fern das Wetter schön bleibt, werde ich dich morgen besuchen. 21. In so fern es dir angenehm ist, werde ich meinen Bruder mitbringen. 22. In so fern es meine Eltern zufrieden sind, werde ich dich begleiten. 23. So etwas ist mir nie eingefallen. 24. Das Concert geht um halb sieben an. 25. Mein Freund hatte einen herrlichen Einfall. 26. Es ist bei dem fröhlichen Deutschen ein Einfall schöner als der andere. 27. Auf die Frage was ein Einfall wäre, antwortete Einer: „wenn ein Haus einfällt."

1. My sister has a cold; she took cold one wet evening. 2. That case does not concern me, and therefore I shall not trouble myself about it. 3. Has the train already left? 4. No, it has not left yet. 5. Has the train left for Oxford? 6. It has already left twice this morning. 7. Did the debate pass off quietly? 8. No, it was a very stormy one. 9. English goods sell well in every country. 10. This grammar has a great sale. 11. According as your knowledge is, so will you be rewarded. 12. Since he has been struck with the palsy, he has not been able to attend his business. 13. He was struck with the palsy during our visit to your house. 17. As far as it concerns me, I shall take every precaution. 18. In spite of the poverty of this people they stint themselves in nothing. 19. To mankind nothing is better than a good education. 20. I do not know whether he will grant my request.

Section LXXX.

The obsolete word lei (*sort, kind,*) still remains in combination with the numerals, forming what are called the *variatives;* thus, Einerlei; of one kind, the same; Dreierlei, of three kinds. (§ 48.) Ex.: Dreierlei bringe ich zu dir, erwähle dir eines; three (sorts of) things I bring (to) thee, choose thee one. Es ist ihm einerlei, ob er geht oder bleibt; it is the same to him whether he goes or stays.

I. Gehen, with the preposition über, is often used with the signification "to transcend, to surpass." Ex.: Zufriedenheit geht über Reichthum; contentment surpasses wealth.

Exercise 83.

Begünstigen, benefit;
Bonn, *n.* Bonn;
Einerlei, of one kind, the same;
Erziehung *f* bringing up, education;
Ente, *f.* duck;
Entsagen, to renounce;
Fünkchen, *n* sparklet;
Gang, *m.* direction, course;
Geduldig, patiently;
Gefühl, *n.* touch;
Geschäft, *n.* affair, business;
Gymna'sium, *n.* gymnasium;
Heilsam, beneficial;
Lügner, *m.* liar;
Nachtheil, *m.* disadvantage;
Nutzlos, useless;
Menschengeschlecht, *n.* mankind;
Pfeifchen, *n.* little pipe;
Reh, *n.* venison;
Rindfleisch, *n.* beef;
Schatz, *m.* treasure;
Schlafen, to sleep;
Schul'digkeit, *f.* obligation, duty;
Stück, *n.* piece;
Teich, *m.* pond;
Trägheit, *f.* idleness;
Umge'bung, *f.* environs, neighbourhood;
Un'bekümmert, unconcerned, careless;
Universität', *f.* university;
Verhältniß, *n.* relation, circumstance, situation;
Wohlfahrt, *f.* welfare;
Zubringen, to pass, spend.

Wie es dem Vogel nicht ei'nerlei ist, ob er sich in dem Käfige oder in der freien Luft befin'det, so darf es einem Volke auch nicht eins sein, ob es in Sclaverei', oder in Freiheit ist.	As it is not the same to the bird, whether it is (finds itself) in the cage, or in the open air, so likewise can it not be the same to a nation, whether it is in slavery or in freedom.
Dies geht bei mir über Alles.	This with me excels everything.
Dem Aufrichtigen geht nichts über die Wahrheit.	To the upright nothing is better than the truth.
Manchen Menschen geht nichts über Bequemlichkeit und Ruhe.	With many persons, nothing goes beyond convenience and repose.
Wir gingen über Moskau nach Petersburg.	We went by way of Moscow to Petersburgh.
Der Feind ging bei Wien über die Donau.	The enemy went over the Danube, at Vienna.
Es ist unrecht, die Zeit seines Lebens in Abgeschiedenheit von den ü'brigen Menschen zu zubringen.	It is wrong to pass one's life in seclusion from the rest of mankind.

1. Er bringt seine Zeit mit Nichtsthun zu. (§ 93. 2.) 2. Er brachte den größten Theil seiner Jugend auf den Gymnasien (§ 19.) und Universitäten seines Landes zu. 3. Die meiste Zeit bringt er mit nutzlosen Beschäftigungen zu. 4. Viele Menschen bringen ihre Zeit mit Essen, Trinken und Schlafen zu. 5. Einem jeden Menschen, der nur ein Fünkchen Gefühl hat, geht nichts über sein Vaterland und über die Wohlfahrt desselben. 6. Es geht nichts über die Ruhe der Seele, und das Bewußtsein, seine Schuldigkeit gethan zu haben. 6. Er sagte, seine größte Freude und sein größter Schatz seien seine Kinder, und nichts gehe ihm über dieselben. 8. Ein Matrose sagte, es gehe ihm nichts über ein Pfeifchen. 9. Dem Gleichgültigen ist zwar Vieles einerlei, wer aber sagt es sei ihm Alles einerlei, ist ein Lügner. 10. Was man versprochen hat, soll man halten, einerlei, ob Nachtheil oder Vortheil daraus entsteht. 11. Dem Soldaten muß im Kriege Alles eins sein. 12. Ein rechter Mann schickt sich geduldig in alle Verhältnisse; es ist ihm Alles eins was er thut, nicht aber wie er es thut. 13. Seit dem Tode seiner Kinder ist ihm Alles eins; er ist gleichgültig gegen seine Umgebung, und unbekümmert um den Gang

seiner Geschäfte. 14 Ein jeder Mensch hat seinen freien Willen; deßhalb geht es mich nichts an, wie er seine Zeit verwendet. 15. Ich reiste über Rotterdam und London nach Amerika. 16. Der Freund ging soeben über die Straße. 11. Der arme Knabe dauerte ihn, deßhalb nahm er ihn zu sich in sein Haus und ließ ihm eine ordentliche Erziehung geben. 18. Wen das Vieh nicht dauert und wer unbarmherzig gegen dasselbe ist den dauert auch ein Mensch nicht.

1. Many people pass their time in idleness. 2. He spent the greatest part of his life in foreign countries 3. Any man who has a touch of honour, renounces no duties which will benefit mankind. 4. He says, his greatest treasure was God, and the whole world is as nothing compared to Him. 5. This man said, it were all the same to him, whether his undertakings were successful or not. 6. How many sorts of wine have you? 7. I have three sorts, you may choose which you like. 8. I go every day twice over London-bridge. 9. Many go to Germany by way of Ostend. 10. I shall probably spend one month in Bonn. 11. My neighbour has three different kinds of ducks in his pond; they are very beautiful. 12. We have three sorts of roses growing in our garden. 13 When I am hungry, it is the same to me whether I have venison or a piece of beef before me. 14. He bought ribbons of three sorts of colours.

LESSONS IN FRENCH.—No. XLVIII.

By Professor Louis Fasquelle, LL.D.

§ 17. Formation of the Plural of Adjectives.

(1.) *General Rule.*—The plural of adjectives is formed by the addition of *s* to the masculine, or to the feminine termination:—

Masculine.		*Feminine.*	
Singular.	*Plural.*	*Singular.*	*Plural.*
grand, *great*	grands	grande	grandes
petit, *small*	petits	petite	petites.

(2.) This rule has no exceptions with regard to the feminine termination.

(3.) With regard to the masculine termination, it is subject to the three following exceptions:—

First Exception.—Adjectives ending in the singular with *s* or *x*, do not change their form in the plural:—

Singular.	*Plural.*
heureux, *happy*	heureux
doux, *sweet, soft*	doux.

Second Exception.—Adjectives having in the singular the termination *eau*, form their plural masculine by the addition of *x*:—

Singular.	*Plural.*
beau, *handsome, beautiful*	beaux
jumeau, *twin*	jumeaux
nouveau, *new*	nouveaux

Third Exception.—Adjectives ending in *al*, form their plural masculine by changing *al* into *aux*:—

Singular.	*Plural.*
libéral, *liberal*	libéraux
national, *national*	nationaux
rural, *rural*	ruraux.

We quote from Bescherelle's "Grammaire Nationale," the adjectives which form their plural in *als*:—

Singular.	*Plural.*
amical, *friendly*	amicals
bancal, *bandy-legged*	bancals
fatal, *fatal*	fatals
final, *final*	finals
frugal, *frugal*	frugals
filial, *filial*	filials
glacial, *frozen, icy*	glacials
initial, *initial*	initials
labial, *labial*	labials
matinal, *early*	matinals
médial, *medial*	médials
naval, *naval*	navals
pascal, *paschal*	pascals
pénal, *penal*	pénals
théatral, *theatrical*	théatrals.

§ 18.—Agreement of Adjectives with Nouns.

(1.) The adjective must agree, in gender and number, with the noun or pronoun which it qualifies:—

Masculine.		*Feminine.*	
Singular.	*Plural.*	*Singular.*	*Plural.*
le *beau* jardin,	les *beaux* jardins;	la *belle* maison	les *belles* maisons
the fine garden	*the fine gardens*;	*the fine house*	*the fine houses*
le *grand* livre	les *grands* livres;	la *grande* carte	les *grandes* cartes
the large book	*the large books*;	*the large map*	*the large maps.*

(2.) This agreement must take place, not only when the adjective immediately precedes or follows the noun or pronoun, but also when it is separated by other words:—

Masculine.	*Feminine.*
Singular.—Plaise à Dieu de te rendre assez *bon* pour mériter la vie heureuse! FENELON.	*Singular.*—L'honneur de passer pour *bonne* l'empêchait de se montrer *mauvaise* MARIVAUX
May God render thee sufficiently good to deserve the blessed life.	*The honour of passing for good prevented her showing herself bad.*
Plural.—Jamais, en quoi que ce puisse être les méchants ne sont *bons* à rien de bon. J. J. ROUSSEAU.	*Plural.*—Loin de nous raidir contre les inclinations qui sont *bonnes*, il faut les suivre pour servir Dieu. MME. DE MAINTENON.
The wicked are never, in any circumstances, fitted (good) to perform anything good.	*Far from resisting our good inclinations, we should follow them in order to serve God.*

(3.) When an adjective relates to two or more substantives, whether in the singular or the plural, and all of the same gender, it must agree with the nouns in gender, and be put in the plural:—

Le riche et l'indigent, l'imprudent et le sage, *sujets* à même loi, subissent même sort. J. B. ROUSSEAU.	*The rich and the poor, the imprudent and the wise, being subject to the same law, experience the same fate.*

(4.) When the words which the adjective qualifies are of different genders, the adjective must be put in the masculine plural:—

Je tâche de rendre *heureux*, ma femme, mon enfant, et même mon chat et mon chien. BERNARDIN DE ST. PIERRE.	*I try to render happy my wife, my child, and even my cat and my dog.*
L'ordre et l'utilité *publics* ne peuvent être le fruit du crime. MASSILLON.	*Public order and utility cannot be the fruits of crime.*

For special rules on this point, see § 83

§ 19.—Determining or Determinative Adjectives.

There are four sorts of determining adjectives—the demonstrative, the possessive, the numeral, and the indefinite.

§ 20.—Demonstrative Adjectives.

(1.) The demonstrative adjectives are used when an object is to be particularly specified or pointed out. They are never, in French, used substantively, that is, without the nouns which they determine:—

Singular.

Masculine.—Ce, *this* or *that*, placed *before a word commencing with a consonant.*

Cet, *this* or *that*, placed *before a word commencing with a vowel or an h mute.*

Feminine.—Cette, *this* or *that*, placed *before all sorts of nouns.*

Plural.

Ces, *these* or *those*, *for both genders.*

EXAMPLES.

Masculine singular.		*Feminine singular.*	
cet soldat,	*this* or *that soldier*	cette femme,	*this* or *that woman*
cet ami,	*that* or *this friend*	cette épée,	*that* or *this sword*
cet homme,	*this* or *that man*	cette harpe,	*this* or *that harp.*

Plural.

ces hommes, *these* or *those men*; ces femmes, *these* or *those women.*

Voyez ce papillon échappé du tombeau; Sa mort fut un sommeil, et sa tombe un berceau. DELILLE.	*See that butterfly escaped from the tomb; his death was a slumber, and his tomb a cradle.*
. . . . . Cet admirable don, L'instinct, sans doute est loin de l'auguste raison. (THE SAME)	*That admirable gift, instinct, is doubtless far beneath majestic reason*

Là, *cette* jeune plante en vase, disposée,	*There that young plant prepared as a vase, receives the dew in its elegant cup.*
Dans sa coupe élégante accueille la rasée. (THE SAME.)	
Ces honneurs que le vulgaire admire,	*Do these honours admired by the vulgar awake the dead from their sepulchres?*
Réveillent-ils les morts au sein de monuments? SOUIEL.	

(2.) When it is necessary to make, in French, a difference similar to that existing between the English words *this* and *that*, the adverbs *ci* and *là* must be placed after the nouns:—

ce livre-ci, *this book* (here)	ce livre-là *that book* (there).
ces livres-ci, *these books*	ces livres-là, *those books.*

§ 21.—POSSESSIVE ADJECTIVES.

(1.) The possessive adjectives, which are always joined to a noun, relate to possession or property; they are:—

Singular.		*Plural.*	
Masculine.	*Feminine.*	*Both genders.*	
mon,	ma,	mes,	*my.*
ton,	ta,	tes,	*thy.*
son,	sa,	ses,	*his, her, its.*
notre,	notre,	nos,	*our*
votre,	votre,	vos,	*your.*
leur,	leur,	leurs,	*their.*

(2.) In French these adjectives take the gender and number of the object possessed, and not, as in English, those of the possessor:—

Masc. sing.	*Fem. sing.*	*Pl. both genders.*
mon frère, *my brother*,	ma sœur, *my sister*,	mes cousins, *my cousins.*
ton livre, *thy book*,	ta plume, *thy pen*,	tes maisons, *thy houses.*
son papier, *his* or *her paper.*	sa table, *his* or *her table*,	ses habits, *his* or *her clothes.*
notre cheval, *our horse*	notre vache, *our cow*,	nos prairies, *our meadows*
votre lit, *your bed*,	votre chaise, *your chair*	vos crayons, *your pencils.*
leur foin, *their hay*,	leur paille, *their straw*,	leurs fermes, *their farms.*

Sobriété dans toute chose,	*Sobriety in all things, is, my friend, the true enjoyment.*
Mon ami, c'est l'art de jouir. DU TREMBLAY.	
Ma main de quelque fleur esquisse la peinture. CASTEL.	*My hand sketches the picture of some flower.*
Mes sens sont glacés d'effroi. J. B. ROUSSEAU.	*My senses are frozen with fear.*
De *son* propre artifice on est souvent victime. COLIN D'HARLEVILLE.	*One is often the victim of his own artifice.*
A *sa* vocation chaque être doit répondre. FR. DE NEUFCHATEAU.	*Every being should fulfil his vocation.*
Il faut de *ses* amis endurer quelque chose. MOLIERE.	*We must bear something from our friends.*
Notre vie est une maison, Y mettre le feu c'est folie. NIVERNAIS.	*Our life is a house; to set it on fire is folly.*
Vos mailles se rompront tous la charge pesante. CASTEL.	*Your meshes will break under the heavy burden.*
Leurs fleurs suivront mes pas, en récréant ma vue. (THE SAME).	*Their flowers will follow my steps, and please my sight.*

(3.) The adjectives mon, *my*; ton, *thy*; son, *his* or *her*, are used instead of ma, ta, sa, before feminine words commencing with a vowel, or an *h* mute, in order to prevent the meeting of two vowels, or of a vowel and an *h* mute; thus we say:—

mon épée, *my sword, and never* ma épée.
ton épouse, *thy wife, instead of* ta épouse.
son armée, *his army, but never* sa armée.

C'en est fait, *mon* heure est venue. BOILEAU.	*All is over, my hour is come.*

(4.) The possessive adjectives must be repeated before every noun:—

Mon frère, ma sœur, et mes cousins sont à Paris.	*My brother, sister, and cousins are at Paris.*

Il n'est pas d'état dans la société qui n'ait son esclavage.—*J. J. Rousseau.*

La flatterie est une fausse monnaie qui n'a cours que par notre [illegible]. *Rochefoucauld.*

[illegible] à la colère: Venge-toi; à la passion; Jouis; à la [illegible] au soupçon: Crois tout.—*Plutarque.*

A KEY TO THE EXERCISES IN THE LATIN LESSONS.

(*Continued from page 299, Vol. II.*)

By JOHN R. BEARD, D.D.

Page 38, col. 1, vol. II.—LATIN-ENGLISH.

The safety of men depends not only on truth, but also on reputation; the citizens, having made a treaty with the enemies, enjoyed peace; by reflection, we comprehend God and the divine mind; we live on milk, flesh, and many other things; take care that you do not avenge yourselves on your enemies; the Romans promised this to the Numidians; the Numidians continued to harass the Carthaginians by war; the Romans are about to strive; the Romans say that they will strive; the Romans returned the favour with increase; the Romans promised the Numidians, if they would continue to harass the Carthaginians by war, that they would strive to return the favour with increase; no one has lived too short a time who has performed a work of perfect virtue; wise men despise the appearances in a dream; as soon as we have arisen, we despise the appearances in a dream; Aristotle, Zeno, and innumerable others, having gone out of their country, never returned home; there is no plague so detestable, which is not produced by man against man; I am not born for a corner; this whole world is my country; the seeds of virtue are inborn in our nature; Hannibal fought with the Romans in Italy; Hannibal, having fought with the Romans, always came off conqueror; Hannibal, as often as he fought with the Romans in Italy, came off conqueror.

Page 38, col. 1, vol. II.—LATIN-ENGLISH.

The mind of every most excellent man chiefly strives after immortal glory; the enemies were wearied by the length of the conflict; the enemies, wearied by the length of the conflict, left the (field of) battle; he acquired virtue; in whatever part of the world a good man is, he will be loved by friends; he who has acquired virtue, in whatever part of the world he is, will be loved by us; courage is eager for danger; courage does not reflect on what it may be about to suffer; courage (virtus) is eager for danger, and whither it turns, does not think of what it will suffer; Augustus did not suffer himself to be called a lord; some animals are destitute of reason, others use reason; the soul having escaped, the body is worth nothing; the memory of illustrious men, even when dead, has influence with us; it is worthy of a king to aid the fallen; it is peculiar to folly to perceive the faults of others and to forget its own; we ought to do our best to benefit very many persons; to be angry with those whom we ought to love is wickedness; friendships, acquaintances, and neighbourhoods, contain some pleasure (something of pleasure); we understand our advantages better by being without them, than by enjoying them; what pleasure friendships, acquaintances, and neighbourhoods contain, we understand better by being without them, than by enjoying them; fresh men always succeeded wearied ones.

Page 38, col. 1, vol. II.—ENGLISH-LATIN.

Felicitas virtute nititur; nititur ne hominibus felicitas? non, felicitas Deo nititur; excolere virtutem eniti debemus; pater filium complexus est; filius patris mortem ultus est; rex praemium pollicitus est; sorori tuae regina pollicita est ne praemium? milites cumulatam gloriam adipisci nitentur; mane experrecti sunt, et discessēre; bene vitae officiis functi sunt; Aristoteles et Zeno praeceptorum officiis functi sunt; quando amici tui domum revertent? heri domum reverterunt; e patriâ profecti sunt, et nunquam revertent; pestis haec hominum in animis nata est (born); ubi est patria? patria mea est mundus; in animis mortalibus sunt semina innata vitiorum; dux cum hostibus congressus est; quotiescunque duces Anglici cum hostibus congressi sunt, semper discessēre superiores; optimi cujusque pueri animus maxime parentes suos amat; boni in salutem animae nituntur; lacte pueri et puellae vescuntur; discipuli officiis suis functi sunt; O Deus, miserēre lapsorum; succurite pauperibus; proprium est stultitiae nulli prodesse.

Page 39, col. 1, vol. II.—LATIN-ENGLISH.

Caesar feared to oppose his army to a river of such magnitude; Caesar is of opinion that it should be attempted, and a trial made; Caesar, although he feared to oppose his army to a stream of such magnitude, yet is of opinion that it should be attempted and a trial made; nor did they fear that they should be surrounded; they said that they feared not the enemy; they said that they feared the narrow road; they said that they feared that corn was not supplied conveniently enough; they said that they feared not the enemy, but the narrow road, and that they were afraid that provisions could not be supplied conveniently enough; he not

afraid, the ship is safe; I fear greatly on account of the republic; he had no fear on account of his own peril and the peril of the legion; you are not afraid you will lose the place; he feared he should not succeed.

Page 89, col. 1, vol. II.—ENGLISH-LATIN.

Timeo ne operam perdideris; timeo ne domus cadat; timeo ut frumentum in urbem supportetur dux; metuebat ut exercitus ejus veniret; de suâ puellâ pulchrâ metuunt; de fortunâ tuâ nihil timeo; rex ducesque timent ne circumveniantur; Cicero experiendum judicat; timeo ut experiri possit.

Page 54, col. 2, vol. II.—LATIN-ENGLISH.

The forehead, the eyes, and the countenance often lie, but the speech lies very often; whatever arises has its origin from nature; the sun bestows the same light and the same warmth on all; how many are unworthy of light! and yet the day arises; whence, at length, do you appear to us so suddenly? O soldiers, if we break out in fierce assault upon the enemy, the victory is in our hands; while we attempted to assault the city, the enemies attacked us from behind; each one measures dangers by his own fear; the wise man both remembers past things with pleasure, and so possesses present things, as to perceive how great and how pleasant they are; take care you do not obtain honours by flattery; orators, before they begin, premise certain things; in all matters, before we begin, we should employ careful preparation; all the citizens had adorned and clothed their houses with flowers and wreaths, because they were waiting for the king; while the hostile army was demolishing the private and public buildings of the city, the citizens were filled with the greatest grief; while the enemies were dividing the spoil amongst themselves, we charged them with the greatest impetuosity; the general exhorted the soldiers, that they should try all methods by which they might relieve the city from the blockade; because a fierce tempest arose, great fear seized upon all the sailors.

Page 55, col. 1, vol. II.—ENGLISH-LATIN.

Saeva tempestas coorta est; saeva tempestas coorietur; saeva tempestas cooritur; saevae tempestates cooriebantur; saeva tempestas cooriebatur; nautae multos labores experti sunt; hostes domum tuam demolientur; meam sororem opperiar; mater mea heri me opperiebatur; illi eblanditi sunt honores; honores eblandieris ne? nolo honores eblandiri; prius quam ordiaris, adhibenda tibi est industria; tellure potitur; omni urbe potitus est; libris patris mei potiar; mi puer, cave ne mentiaris; solum mali mentiuntur; malum est mentiri; O pater, nunquam mentiar; illi mentiti et puniti sunt; turpe est mentiri; sol et bonis et malis oritur, tanta bonitas Deo est; rex fortibus militibus honores largitur; inter duo filios bona partitus est; quicquid a tellure oritur, venit a manu divinâ.

Page 55, col. 1, vol. II.—LATIN-ENGLISH.

Those are to be laughed at, who teach others that which they themselves have not tried; every animal loves itself, and as soon as it appears, aims at preserving itself; nature has bestowed so great a productive power on the conveniencies and necessaries of men, in order that those things which are begotten may seem to have been given to us advisedly (consulto), and not to have arisen by chance; Herodotus passed through many lands, and certainly (quidem) related many marvellous things, but these he himself invented not, but others (invented them) from whom he heard them; now, for three months we had been waiting for a friend, when his death was announced to us; Sulla suddenly appeared to the Romans, and began a most frightful civil war; a wise man will never flatter bad men, never invent any false thing, never occasion injury to others; if we attack the enemy quickly, there is no doubt that in a short time we shall get possession of the city; as soon as the sun has risen, we shall set out; take care that you do not flatter bad men; the enemies hastened to get possession of the city; an even number is easy to divide; the sun rising, we set out; a fierce tempest having arisen, great fear seized all the sailors; with the greatest pleasure we behold the sun when about to rise (oriturum).

Page 55, col. 1, vol. II.—ENGLISH-LATIN.

Sole oriente, tenebrae diffugiunt; solem orturum magnâ cum voluptate specto; coortâ tempestate, naves nostrae sparsae sunt; nulli calamitatem moliar, non etiam malis; ortusne est sol? horâ octavâ sol orietur; repente hostem adortus est; meam ordiar orationem; orator orationem ordiebatur, quum judex intrabat; non est dubium quin tuis potituri sitis; simulatque nati sumus, movemus; omnes homines se ipsos diligunt, ac simulatque facultatibus potiti sunt, inter se eas partiri debent; inter egentes facultates partitus est; multi Britanniam emensi, ignorant quam sit felix potensque; spero te nunquam mentiturum esse; tempestas orietur; omnes existimant, tempestatem cooriturum esse.

Page 55, col. 2, vol. II.—LATIN-ENGLISH.

The arts support themselves; we shall always pity wretched men; when you are sick, you ought to comply with the instructions of the physician; foolish men perceive the faults of others, (but) forget their own; the principal charm of youth springs from modesty; O boys, reverence old age; O boy, I confess the truth; take pity on the destitute; let the scholars reverence their teachers; I doubt not that you will promise me your protection; we behold (intuemur) with great pleasure the noble examples of virtue which have been recorded in history; who knows not how many abuse eloquence? we have enjoyed peace during many years; all the citizens fear that the enemies will attack the city; as soon as we have arisen, we proceed to our business; the citizens, having obtained liberty, will enjoy the greatest pleasure; aid the fallen; converse as boldly with your friend as with yourself; be not angry with those whom you ought to love; if we always pursue the path of virtue, access to heaven will sometimes lie open to us; perform your part well; by concord small things increase, by discord the greatest things fall to pieces: glory, like a shadow, follows virtue; do not flatter bad men; we measure great men by their worth, not by their fortune; pleasure flatters our senses; I fear that my friend is dying.

Page 55, col. 2, vol. II.—ENGLISH-LATIN.

Heri amicus meus mortuus est; metuo ne amicus tuus moriturus sit; ne largitor malis pueris; Deus pils largietur; aditus in coelum semper bonis patet; metuo ut aditus in coelum Alexandro pateat; quamdiu patria tua pace fruebatur? quamdiu regis exercitus in patriâ nostrâ erit, pace fruémur; esne munere functus? ne abutere patris gratiâ; loquar tecum, sed non tibi blandiar; regi blanditus, laudem adeptus est; filius ne laudem adipiscétur? filius meus gloriam maximam adeptus est; gloria virtutem eximiam sequitur; se rediturum esse, mihi pollicitus est; ille rediit; non, eras redibit; pueri se ipsi tuentur; pueri se ipsi tueri debent; misereor et miserebor miserorum; ne obliviscere vitiorum tuorum; intra paucos dies proficiscar; quando revertes? veremini senes, O pueri, veremini patrem; veremini Deum; peccatum suum fassus est; tempestate coortâ, pavor animos nostros occupavit.

CORRESPONDENCE.

THE LEAN HORSE.

SIR,—Permit me to lay before your readers an answer to the question about the horse, proposed in No. 42, p. 240 of the POPULAR EDUCATOR.

The gentleman who bought the horse,
Which was so poor and lean;
Had spared no cost in keeping him,
'Tis plainly to be seen.
The feeding of the animal,
Till he got sound and well,
Cost eighteen pound and one bob more,
And then he did him sell.
The half of which if added to
One fourth of the prime cost,
Is just exactly what the gent.
By the transaction lost.

A. THOMSON.

Wood Hall Colliery, 1st February, 1853.

The same answer was given, with correct solutions, by W. GIBBONS (Pimlico): G. WILD (Dalton-on-Tees): G. ARCHBOLD (St. Peters): DAWSON (Knaresborough): PHILO (Berwick-on-Tweed): F. H. (Brightwell): B. B. (Yorkshire): G. W. C.; JAMES WILKINSON (Low Moor): and others.

CONSTRUCTION OF THE VIOLIN.

SIR,—In answer to one of your correspondents, who signs his name "John Stocking," I quote the following passage from "Ottó on the Violin."

The violin consists of 58 different pieces; the wood is generally of three sorts; the back, neck, sides, and circles, are of sycamore; the belly, bass-bar, sound-post, and six blocks, of deal; and the finger board and tail piece, of ebony. Six cremona violins (namely those made by Amati or Straduarius) that came into my possession, were made after the following proportions. The belly was thickest where the bridge rests; then it diminished about a third at that part where the holes are cut, and where the belly rests on the sides it was half as thick as in the middle. The same proportion is observed in the length. The thickness is equally maintained all along that part in which the bass-bar is fixed;

thence to the upper and under end blocks, the thickness decreases to one half, so that the cheeks are three-fourths the thickness of the breast, and the edges all round only one half.

These proportions are best for imparting a full, powerful, and sonorous sound. The back is worked out much in the same proportion as the belly.

If you feel desirous of more information on this subject, I advise you to purchase "Otto's Treatise on the Violin." Published by R. Cocks and Co., New Burlington-street, London. The price, I believe, is 3s. Yours, &c. H. M. S.

ANSWERS TO CORRESPONDENTS.

ELSWICK: Right in the lean horse query.—A STUDENT IN ENGLISH, and his friends in Sheffield, are strongly advised to commit the lists of *prefixes* and *affixes* with their meanings to memory; this will give them such a hold, as it were, of the most important part of the language, as will enable them to speak and write with the greatest accuracy.—WALLASEY BIDSTON (Liverpool): We hope that Mr. Cassell's Latin Dictionary, edited by Dr. Beard, will be *the best and cheapest*. when it is ready.—W. BUSH (Yarmouth) wishes to know where he can obtain *designs for wood-carving*.—S. HEATH (Barnetby) should read Virgil before Horace. As an introduction to the Horatian metres and style, he would do well to read George Buchanan's Latin translation of the Psalms of David, a most elegant book, and written in the purest Latin, that of the Augustan age: good copies of it may be had at any old book-stall in London for sixpence.—H. EAVES (Preston) wishes to know of some work on the art of grinding glasses for telescopes: can any of our readers assist him?

A SUBSCRIBER (in Buckingham) will have some lessons on Mapping, &c. in the P. E.—J. Y. (Preston) will find his wants supplied in the Lessons on Chemistry, when they appear.—AMICUS (*Stepney*): The *subjects* for Examination in Natural Philosophy, and Chemistry, in the University of London, are always the same, but the *particular* questions vary every year. The *classical subjects* for the Pass Examination in 1851 are stated in No. 41, p. 215, col. 2, line 34.—W. ASH (Holborn): His penmanship is really not so bad as he thinks; we advise him to buy two or three copy-books for *large-hand*, ready ruled, at a stationer's shop, and imitate our large copies by writing them from A to Z two or three times. Then, do the same with the *half-text hand*; and, lastly, do the same with the *small or court-hand*, and he may rest assured that by slow and careful perseverance he must improve. He ought, of course, to read *most carefully* our instructions as to the mode of holding the pen and sitting at the table.—W. BUTLER (Southwark): The sentence "I had known the deceased some years *previous* to his death," is the most correct.—A SUBSCRIBER (Isle of Man) should buy the latest edition of Smart's Walker's Dictionary. Encyclopædias very soon get out of date; we cannot recommend any one in particular, as you might be disappointed in the first article you turned up. The P. E. will be better than any encyclopædia.

Incola, the sentence beginning Regibus is quite right:—*Agricola* ought to have known that littera in the singular is a letter of the alphabet, and that a letter in the sense of an epistle is in Latin litteræ, being in the plural.—F. T. An adjective pronoun is a pronoun which, like an adjective, stands with a noun, as si qui (for si aliqui) homines, *if any persons*; the genitive case of the personal pronoun ego, that is mei, *of me*, or mine, denoting possession, and so is the same as mei of what is called the possession pronoun meus; they are indeed the same word; similar tenses are such as denoting corresponding times, may go together; dissimilar tenses are the reverse. Corresponding times are such as in the nature of things stand in the same relation as the presents, and the presents hold the same position in time or in regard to eternity; in the same way are the past and the past related, the future and the future; the supine differs from the infinitive chiefly in form and in construction; the supines are really nouns, the one in the accusative case, the other in the ablative; the infinitive also has sometimes the force of a noun, as Amo *legere* libros, I love *to read* books, is the same as Amo *lectionem* librorum, I love *the reading* of books.

HENRICUS (Taunton): Should write to Mr. Bagster for what he wants; Simeon's *Horæ Homileticæ* is the book he means, but we *don't know any thing about prices*. Your suggestion about publishing the figures of Euclid by themselves is good for many purposes; it will be taken into consideration.—JOHN MCCULLOCH (Edinburgh): Thanks for his answers to Cassell's Arithmetic.—B. B. (Yorkshire): must really buy and read the Spectator for himself. Gregory's letters we doubt not are good, and recommendable to a student.—T. MORLEY (Bromley): Thanks for his answers to the questions in Cassell's Arithmetic.—E. SMITH (Little Cookham, Surrey) shall have the first copy of the answers to Cassell's Arithmetic.—GERMANICUS, received and under consideration.—PHILO (Dundee): Right; *nous verrons*.

GERMAN.—EDWARD EVES should study more the rules of declension. In exercises 3, 4, and 10 you have made mistakes. The other sentences are very correct; every syllable beginning with an s must be written with a long ſ.—A SUBSCRIBER: Etcetera, *&c. &c.*, is written in German generally u. ſ. w., but also like the English etcetera.—T. S. W. R. B. F. will find it in this week's lesson.—T. V.: Do not know; have never seen it.

S. DAVIES (Cayo): We believe Matthiæ's Greek Grammar to be the most complete.—PHILOMATH (Bath): Received.—A STUDENT (Halifax): In the German, as in the French Lessons, there are references to the SECOND PART yet to come.—J. COLQUHOUN (Tolcross): Practice does wonders.—W. H. (Apsley-bridge) should write to the bookseller he mentions for his catalogue; he will be only too happy to send it to him.—A CONSTANT READER, &c. (Leeds), is informed that the two editions of the P. E. are exactly the same; the only difference is in the paper, and the heading of the first page.

ERRATA.

Vol. I. p. 411, Col. I. Exercises 2, line 2, *for* divitissime, *read* divitissimi, for dissimilim *read* dissimiles; Line 17, *for* modestur *read* modestior; line 18, *for* similissima *read* simillima; line 1, *for* contamus *read* cantamus.

LITERARY NOTICES.

GIN AND WATER; a pair of pictorial designs by Kenny Meadows, portraying the effects arising from the indulgence of those potent liquids. In the first, GIN, we have the interior of the drunkard's home, with a glimpse of the horrors which belong peculiarly to such homes; in the second, WATER, we see how comfort, cleanliness, and peace attend the steps of the temperate man. The contrast is well sustained, and the pictures—which measure 24 inches by 16 inches—cannot but be popular. We have had too many songs and pictures in praise of the drinking customs of our country, and we are glad to perceive that our poets and artists are beginning to discover that they may get inspiration even out of water—

"Wine, wine, thy power and praise
Have ever been echoed in minstrel lays;
But water, I deem, hath a mightier claim
To fill up a niche in the Temple of Fame!"

These pictures, which should be framed and hung over every cottage chimney-piece, and on the walls of every factory, and workshop, and ragged school throughout all the land, can be obtained of every bookseller for one shilling. They are exquisitely engraved on wood, by Messrs. Henry Linton and William Measom.

THE AUTOGRAPHS FOR FREEDOM; containing, in addition to a New Story by Mrs. STOWE, authoress of "Uncle Tom's Cabin," entitled "The Two Altars; or, Two Pictures in One;—The Altar of Liberty, or 1776; The Altar of ——, or 1850," a thrilling Narrative by FREDERICK DOUGLASS, entitled "The Heroic Slave;" "Passages in the Life of a Slave Woman," by Annie Parker; "Placido, the Cuban Slave," by Professor W. G. Allen; "The Heroic Slave Woman," by the Rev. J. S. May, &c.; also, Contributions from the leading Writers in America on the Question of Negro Emancipation; and, on this side of the Atlantic, from the Earl of Carlisle, the Bishop of Oxford, Wilson Armistead, Joseph Sturge, &c.; with fac-similes of the Autographs of all the Contributors. Price 1s., in boards; or bound in cloth, with Eight beautiful Engravings from designs by Gilbert and Willis, price 1s. 6d.

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Printed and Published by JOHN CASSELL, 9, La Belle Sauvage-yard, Ludgate-hill.—March 5, 1853.

LESSONS IN DRAWING.—No. VII.

PERSPECTIVE.—Section I.

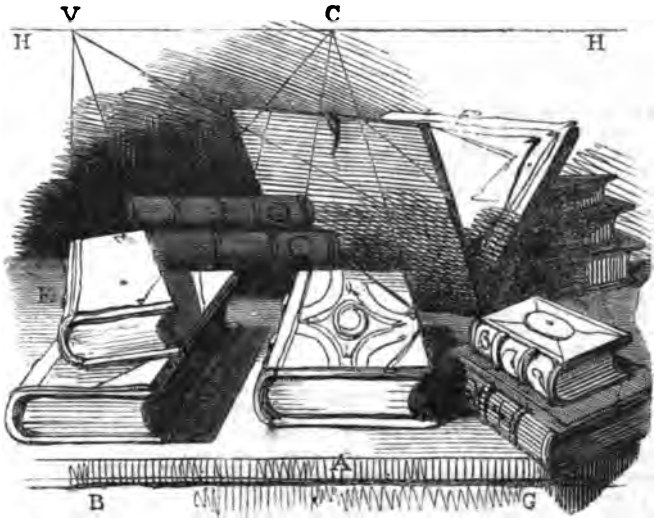
Previously to entering on the details of Perspective, we shall show, by a few easy lessons and experiments, that a certain knowledge of the principles of this department of the art of drawing may be readily acquired.

Take your seat at a table, having a wall opposite to it, at the distance, say, of five feet from the eye, and having the edge of the table parallel to (that is, in every part equally distant from) the wall. Make a mark on the edge, in order to determine your position exactly, and to enable you to replace yourself in the same spot at pleasure. Now, using one eye only, make a mark on the wall directly opposite to the eye—suppose this point to be C, in fig. 71, your own position being at A. Next, lay a book near A, at right angles to the edge of the table, and the sides will appear to your eye to take such directions that, if they were sufficiently prolonged, they would meet in the point C. Take another book near B, also at right angles to the edge of the table, and consequently parallel to the first book near A, and you will find that its sides will in like manner appear to meet in the point C, if sufficiently prolonged. Lines which meet in one point in this manner, are said to *converge* to the point; and you will find, on laying another book beyond B, that its sides will also converge to C, if only it shall be parallel to the book A.

Points to which parallel lines appear to converge are called, in perspective, *vanishing points*; and you will perceive from the preceding observations, that for *parallel lines* at right angles to the wall, or, which is the same thing, at right angles to the edge of the table (these *parallel lines* being also in horizontal planes), the *vanishing point* is directly opposite the eye.

In the next place, take a book E, and place it on the book near B, so as to make an angle of 60°, with the edge of the table. Place yourself as before, with the eye opposite to C, and you will find that at this angle of 60°, the vanishing point is no longer opposite to the eye, but that it lies in a horizontal line drawn through C, namely H H; and, supposing, as before, that the eye is about five feet from C, the new vanishing point V will be about three feet from C, in this horizontal line. Again, a book near G, placed parallel to E, will have the same vanishing point V. By a similar process, you will find that a book lying at an angle of 45° with the edge of the table, will have its vanishing point on the horizontal line H H, at the distance of about five feet from C. With these instructions you may continue similar observations on the convergency of the parallel lines of books placed at other angles. All the preceding examples are but particular instances of a general law about to be explained; it will, therefore, be sufficient to have indicated here a method by which the student may practically verify much of our observations, which will immediately follow, relating to vanishing points and vanishing lines.

Fig. 71.

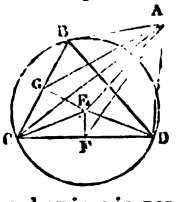


[1.] If you look through a pane of glass at any object on the other side of it, and with a diamond, or any other suitable instrument, you trace upon the glass the apparent outline of the object, as it appears to the eye, it will be correctly drawn; and, if the colouring and shading were added, you would have upon the glass an exact image of the original. Perspective is generally divided into *Linear* and *Aerial*. *Aerial Perspective* relates to such changes as take place in the colour and the depth of shadow, according to the distance of any object from the eye, and other modifying circumstances. This branch of perspective will be treated of when considering Colour and Chiaro-scuro, or Light and Shade. *Linear Perspective* explains the laws which modify such an outline as we have just supposed to be drawn upon a pane of glass. The end contemplated in this kind of perspective is to produce such an *outline* as shall convey to the mind a just idea of the original. Linear Perspective, then, is *the art by which upon a plane (such as the surface of a sheet of paper) an outline (or linear) representation may be drawn so as to produce the same image in the eye as the object itself would do, under certain given conditions.*

[2.] Rays of light proceed from one point to another in straight lines. Upon this fact, and upon another, which the treatises on Optics explain, namely, that the rays from all objects to which we direct the eye converge to a point in the interior and at the back of that organ, the principles of perspective are founded. The following remarks will illustrate this subject:—

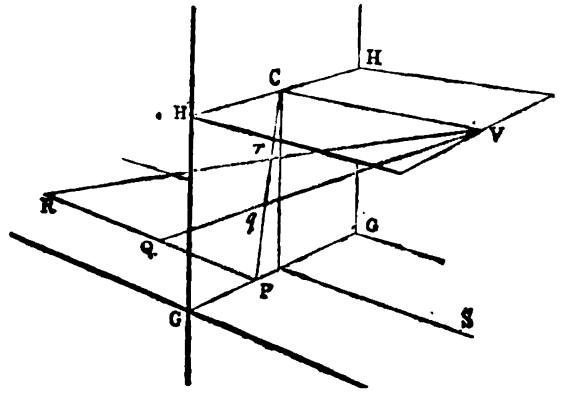
In fig. 72, the triangle B C D is the object, and the lines B A, C A, D A, represent luminous rays proceeding to the eye at A. Rays of light proceed in all directions from any object whatever, but, on directing the eye to an object, we perceive it only by means of those rays which arrive at the eye, and are there converged. This being premised, the lesson conveyed by fig. 73, will be understood by the following explanations, and, as these contain the elements of the practical methods now in use for producing drawings in perspective, the student is requested to study them with attention.

Fig. 72.



R G S G is the *ground plane*, or original plane. In this plane, the *plan* of all original lines is to be found.

Fig. 73.



H H G G is the *plane of the picture*, and is generally taken in a position vertical to that of the ground plane.

V H H is the *vanishing plane*; it always passes through V, the place of the eye, and is always taken parallel to an *original plane*. The line in which the *vanishing plane* cuts the *plane of the picture* (or, as it is sometimes called, *the plane of projection*) is the *vanishing line* of an original plane.

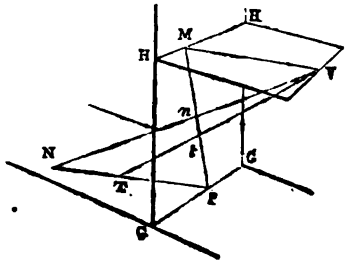
The line H H is consequently the *vanishing line* of the ground plane, and of all planes parallel to the ground plane. It is commonly called the *horizontal line;* and in it are found the vanishing *points* of lines in the ground plane, making any angle whatever with G G, which we shall call the *ground line*. This line G G is evidently the intersection of the plane of the picture with the ground plane. H H being the vanishing line of planes parallel to the ground plane, the vanishing points of all lines lying in such parallel planes will also be found in H H.

[3.] The vanishing point of any original line, that is, a line lying in any original plane, as, for example, the line Q R is found by supposing a plane to pass through the line, and through the point V, the place of the eye; this plane evidently cuts the vanishing plane in a line parallel to the original line; for example, V C is evidently parallel to Q R, and the point C, where this line V C meets the vanishing line of the plane in which Q R lies, is the vanishing point of Q R, and of all lines in the same plane which are parallel to Q R. As H H is the vanishing *line* of all planes parallel to R G S G, it follows that the point C is the vanishing *point* for all the lines in those planes which are parallel to Q R. The image, or projection of the line Q R, is at once ascertained when the vanishing point and the original line are given. Produce Q R to the ground line, and join P, the point where it cuts this line, with C, the vanishing point; draw R V and Q V, to the point V; then *q r* is the projection or perspective representation of Q R.

[4.] When the three planes are brought into one, in a manner to be explained in the next section, these constructions are very easy, and if the reader familiarises himself with the figure referred to in [3.], all the practical methods in use will be understood without difficulty. Indeed, fig. 73, with the explanations now given, contains, in as concise a form as possible, the constructions on which all modern treatises on Perspective are founded; and forms the key to all that is to follow in this series of lessons. It is, therefore, recommended to the best attention of the student, with the assurance that a clear conception of its construction is in itself the substance of all theoretical perspective; for, by looking at any object through a pane of glass, and supposing it to represent H H G G, the plane of projection (confining, in the first place, his observations to lines at right angles to the ground line), he will see how consistent this construction is with the natural appearances.

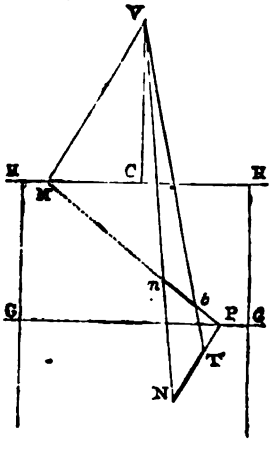
[5.] In fig. 73, the vanishing point for Q R at right angles to the ground line G G, was shown to be at C, the point where V C cuts H H at right angles. In fig. 74, if T N is at an angle of 60° with the ground line, its vanishing point M will be found by drawing V M at an angle of 60° with H H, bringing T N up to the ground line (that is, producing it to meet G G in P), and joining M P; V N and V T determining, as before, the length of

Fig. 74.



n t the representation of T N. Now suppose the plane G G N to be turned round upon the line G G as on a hinge, until it is in the same plane with H H G G; and suppose also the plane H V N to be turned in like manner on H H until it also is in the plane H H G G—the three planes are brought into one, and the lines V M, P N, retain their direction mutually parallel as before, the intersections also at P and M with the horizontal and the ground line have suffered no change. In fig. 75 is shown an arrangement very commonly adopted in perspective drawing founded upon this.

Fig. 75.



G G is the ground line; the line H H is determined by taking H G equal to the height of the eye above the ground line, thus corresponding strictly with the lines H G in the two preceding figures; the line V C is the *distance* of the eye from the plane of the picture, and in this arrangement, as in the two preceding figures, the vanishing point of any line as T N making a given angle with the ground line, is found by drawing a parallel through V, the place of the eye, to cut the horizontal line in M, bringing T N up to the ground line to cut it in P, joining P and M, and then determining the length of *t n* by lines drawn to V from T and N.

H H G G is the picture, and the spaces above and below this are used for the necessary constructions effected by the parallel ruler, the set square, the T square, compasses, and other instruments described, with explanations of their uses, in the lessons on Practical Geometry in vol. I. of this work.

Lines at right angles to the ground line have their vanishing point in C, where a line from V the place of the eye, meets the horizontal line at right angles; this point is called the *point of sight* or the *centre of the picture*.

Lines parallel to the ground line or horizontal line, that is parallel to the plane of the picture, have no vanishing point, because a parallel drawn through V, as is at once evident, can never meet the horizontal line. Such lines in perspective will be parallel to their originals.

Vertical lines, for a like reason, have no vanishing point, and are parallel, in their representation, to the originals. All lines, therefore, which are either parallel or perpendicular to the horizontal line will exhibit no change of direction, but will be represented by lines of less length as they are more distant; this is shown in the lines of trees in fig. 4, page 149, the equal perpendicular heights of the trees being represented by shorter lines as they recede, and if the pathway were crossed by horizontal lines, it is evident that they would diminish as their distance from the ground line increased, and that this would be all the change they would undergo.

A distinction is sometimes made of Parallel Perspective and Angular Perspective—the first being where objects are represented having one line or side parallel to the picture, and the second where neither side is parallel. This distinction is mentioned here because it is not uncommon, but it seems unnecessary.

In our next lesson an example will be given of the method usually followed in putting a square into perspective, serving to exemplify what are described above as Angular and Parallel Perspective.

The following are some important definitions which must be kept in mind:—

The *horizontal plane* is that which is parallel to the horizon, or not inclined to it; in perspective it is a plane parallel to the horizon, passing through the eye, and cutting the perspective plane at right angles.

The *horizontal line* is a straight line drawn through the principal point parallel to the horizon; or it is the intersection of the horizontal and perspective planes. If the objects are to be represented as being *below* the eye, the horizontal line must be above them; and if they are to be represented as being *above* the eye, the horizontal line must be below them.

The *measures* of all base lines in the plane of the perspective are the same—that is, they are measured by the same scale, whether that be the natural size, or greater or less; and objects behind them are diminished in proportion to their distances.

The *natural size* depends on the distance of the point of sight from the centre of the picture; if that is small, the natural size of the objects will be greater than if it is large, as the nearer any object is to the eye, the larger is the *visual angle*.

The *size* of an object will be reduced to half of what it would have been, if on a base line or on the plane of the perspective, when it is as far behind that plane as the distance of the eye. Linear perspective has reference to the position, form, magnitude, &c., of the several lines.

The *line of distance* is a straight line drawn from the eye to the principal point of the plane.

The *point of view or of sight* is the place of the eye whence the object is viewed, and is always in the horizontal line.

The *vanishing point* is that to which all parallel lines in the same plane tend in the representation.

The *point of distance* is the distance of the picture, transferred upon the vanishing line from the centre, or from the point where the principal ray meets it, whence it is generally understood to be on the vanishing line of the horizon.

The outlines of such objects as buildings, machinery, and most works of human labour which consist of geometrical forms, or which can be reduced to them, may be most accurately obtained by the rules of *linear perspective*, since the intersection with an interposed plane of the rays of light proceeding from every point of such objects may be obtained by the principles of geometry. Linear perspective includes various kinds of projections. *Aerial perspective* teaches how to give due diminution to the strength of light, shade, and colours of objects, according to their distances and the quantity of light falling upon them, and to the medium through which they are seen.

A *perspective plane* is the surface on which the object or picture is delineated, or it is the transparent surface or plane through which we suppose objects to be viewed; it is also termed the *plane of projection* and the *plane of the picture*.

The perspective of a plane surface parallel to the plane of the picture changes neither its form nor direction. The perspective of a straight line remains straight. Straight lines parallel to the plane of the picture remain parallel to themselves in perspective.

The appearance of a vertical line is a line greatly vertical. Lines perpendicular to the plane of the picture all meet on the point of sight situated on the horizon, for these lines are in planes perpendicular to that of the picture; the point of sight in the picture is the intersection of all these planes, and consequently of all these lines with the horizontal line. All these lines being perpendicular to the same plane are parallel to one another.

LESSONS IN LATIN.—No. XLIV.

By JOHN R. BEARD, D. D.

SYNTAX.

SYNTAX teaches how to put words together so as to form sentences. Latin syntax teaches how to put words together so as to form sentences after the model of the ancient Latin authors. These have left us a model of writing in the works of Cicero, Cæsar, Tacitus, and others. Latin syntax, therefore, teaches the art of combining words into sentences according to the manner observed by the best Latin writers.

Already has there been put before the student much that relates to syntax. My duty is now to give a systematic view of Latin syntax considered as a whole. The entire subject may be comprised under these heads:—

I. AGREEMENT.
II. QUALIFICATION.
III. GOVERNMENT.
IV. IDIOM.

I. *Agreement* is said to exist between two or more words when they are in the same gender, number, and case; or when they are in the same person, e. g.,

Erat Italia plena.
Lit. Trans.:—*Was Italy full.*
Idiom. Trans.:—*Italy was full.*

Here there is an agreement between the noun Italia, and the adjective plena, both being in the nominative case, singular number, and feminine gender. There is also an agreement between Italia and erat; for Italia is in the third person of the singular number, and erat is in the third person singular number.

II. *Qualification* takes place when one word qualifies another word, or when more words than one qualify another word. Qualification differs from agreement in this, that while agreement takes place between adjectives and nouns, or between nouns and verbs, qualification takes place between verbs, adverbs, and conjunctions, or between verbs and adverbial phrases, e. g.,

Erat Italia *tunc* plena,
Italy was *then* full.

In this instance of qualification, the adverb tunc is the qualifying word, and the verb erat is the word qualified. Instead of a simple adverb, there may be an adverbial phrase, e. g.,

Erat Italia *tunc temporis* plena,
Italy was *at that time* full.

III. *Government* arises between two or more words when one of the words depends on the other in sense, and is affected by it in case, in tense, or in mood. In these preliminary explanations, I confine myself to the simplest instance, namely, that of case, e. g.,

Erat Italia tunc *plena artium.*
Italy was then *full of arts.*

In plena and artium, you see an instance of government. Artium is said to be governed by plena, and, being governed by plena, it is in the genitive case. If you look at the construction, you will see that artium depends in sense as well as form on plena, as in the English *full of arts.*

IV. *Idiom* denotes the peculiarities of the Latin language, and specially those peculiarities which appear when the Latin is compared with the English. The differences between our methods of expression and the old Roman method of expression, when the facts or ideas are similar, constitute the Latin idiom. Idiom is a Greek term, denoting *that which is one's own, that which is peculiar.* We find a case of idiom, if we compare together the Latin and the English arrangement of the sentence under consideration, e. g.,

1 2 3
Erat Italia plena,
2 1 3
Italy was full.

With this idiom, the student has already some acquaintance under the name of inversion.

I proceed to give the sentence in full, marking the several

points by means of the initial letters, thus: A. stands for *agreement*; Q. for *qualification*; G. for *government*; and I. for *idiom*.

A. A. Q. A. G. A. A.

Erat Italia tunc plena Graecarum artium.

The instances stand separately thus:—

I. Agreement:—(*a*) Italia plena; (*b*.) Graecarum artium; (*c*.) erat Italia.
II. Qualification:—Erat tunc.
III. Government:—Plena Graecarum artium.
IV. Idiom:—Erat Italia tunc plena.

I subjoin another sentence marked as before, and marked, also, in relation to its constituent parts:—

PREDICATE. SUBJECT.

Ad fines Scytharum cito pervenit Alexander magnus.

G. G. Q. A. A.

To the borders of the Scythians, quickly came Alexander the Great.

The idiom is here again in the arrangement. This the student will recognise as a simple sentence. Another simple sentence follows:

Unus ex Scytharum legatis multa verba ei fecit,
One of the Scythians' ambassadors made (spoke) many words to him.

If I arrange this sentence logically according to our English order, it will stand thus:—

SUBJECT PREDICATE.

Verb. Object.

Unus ex legatis Scytharum fecit multa verba ei.
One of the ambassadors of the Scythians spoke many words to him.

Looking at the sentence in relation to syntax, I find no instance of qualification. But, if I insert statim *immediately* before fecit, I obtain a qualifying word, e. g., unus ex legatis Scytharum *statim* fecit multa verba ei. I may arrange the several parts under the syntactical heads, thus:—

1. Agreement:—(*a*.) Unus fecit; (*b*.) multa verba.
2. Qualification:—Statim fecit.
3. Government:—(*a*.) Ex legatis; (*b*.) Scytharum legatis; (*c*.) fecit multa verba; (*d*.) fecit ei.
4. Idiom:—The idiom may here be said to consist in the use of the verb fecit, *made*, whereas we in English in such a case would employ the term *said* or *addressed*.

Let me now present the sentence exactly as it occurs in the Latin original:—

Ubi ad fines Scytharum pervenit Alexander, unus ex
When to the borders of the Scythians came Alexander, one of
eorum legatis haec inter alia multa dixit,
their ambassadors these among other many things said.

The union of the two simple sentences has formed a compound sentence. This compound sentence is composed of two members. Each of these members has its own subject and its own predicate. The student ought to have no difficulty in pointing out these subjects and these predicates. Let him do so; let him, also, write down the several syntactical elements. Before I pass on to illustrate these heads into which syntax is divided, I will, for the sake of thorough elucidation, add a few words respecting the constituent parts of a sentence.

A sentence, then, is a thought expressed, a statement made, a proposition laid down, e. g.,

Rosa floret.
The rose flourishes.

The essential or constituent parts of a sentence are—

1. The *subject*, or that of which something is said or declared; as in the foregoing sentence, Rosa, *the rose*.

2. The *predicate*, or that which is said or declared of the subject, as floret; of the rose it is affirmed that it *flourishes*.

3. The *attribute*, which, forming a part of the predicate, describes the quality or thing which is affirmed of the predicate. Floret, *it flourishes* or *flowers*, may be resolved into est florifera, the rose is *flower-bearing*; where *flower-bearing* is the *attribute*, so called because it describes that which is attributed to the subject.

4. The *copula*, or a part of the verb esse which *joins* the predicate with the subject, e. g., Rosa EST florifera, the rose IS flowering.

5. The *object*, which, forming part of the predicate, denotes the person or thing on which the action of the verb falls, e. g. Rosa fert FLORES, *the rose bears* FLOWERS; where flores is the *object*, and is in the accusative case, because it receives the action indicated in the verb fert.

The *subject* is a substantative, as rosa, *a rose*; or another word used as or for a substantive; as a pronoun, e. g., ILLE floret, HE *flourishes*; or an adjective used substantively, e. g., MULTI florent, MANY (that is, *many persons*) *flourish*.

The *predicate* is a verb, as rosa *floret*; or, an adjective with a part of the verb esse, *to be*, as, rosa *pulchra est*, the rose *is beautiful*; or, again, simply a part of the verb esse, *to be*, employed as denoting *existence*, e. g., rosa EST, the rose IS, that is, *the rose exists*.

In Latin, the *predicate* and the *subject* may be expressed by one word; as, amo, *I love*; amabunt, *they will love*. The reason of this is, that the endings of the verbs denote the person, and thereby supply the place of pronouns.

A *subject* may consist of more than one word, e. g.:—1, it may consist of an adjective and a noun, *rosa pulchra* floret, *the beautiful rose* flourishes, or is in flower; 2, it may consist of a noun in the genitive case governed by a noun in the nominative case, e. g., *hortus regis* floret, *the garden of the king* flourishes; or 3, again it may consist of one noun explaining another noun, e. g., *Alexander, rex Macedŏnum*, magnus appellatur, *Alexander, the king of the Macedonians*, is called Great. The first example is an instance of what we have above termed *agreement*; so also is the third example; this, moreover, is an instance of what is called *apposition*, a word which will be shortly explained. The second example is an instance of what has previously been described as *government*.

The *predicate* may take different forms; e. g.:—1, virtutem amo, *I love virtue*; here, the predicate consists of a verb with an object, that is a noun in the *objective* or *accusative* case; 2, the predicate may consist of a verb with a noun and a preposition, or a prepositional clause, e. g., pro patriâ pugnamus, *we fight for (on behalf of) our country*; 3, the predicate may be formed by two verbs, e. g., scribere cupio, *I desire to write*, where scribere is the object; and 4, the predicate may be found in an adverb joined to a verb, e. g., bene scribis, *thou writest well*. Of these examples, number *one*, *two*, and *three*, are instances of government; number *four* is an instance of qualification.

The *subject* is found in the nominative case; e. g., ALEXANDER vicit Darium, ALEXANDER *conquered Darius*. It may also appear in the accusative case; e. g., Fertur ALEXANDRUM vicisse Darium, *it is said that* ALEXANDER *conquered Darius*. But we have here an instance of difference of idiom; for in English we employ the *nominative* with the *conjunction that*, in order to express what, in Latin, is expressed by the *accusative* case with the *infinitive mood*, generally called *the accusative before the infinitive*. Observe, however, that in the Latin the accusative Alexandrum is the subject to the verb vicisse. In the last example there are three instances of government; that is, 1, Alexandrum is required to be in the accusative case by the verb fertur; 2, by the same verb fertur, the verb vicisse is required to be in the infinitive mood; and 3, Darium is governed in the accusative case by the infinitive vicisse.

I may present the chief parts which enter into the construction of a sentence thus:—

Subject.	*Predicate.*
Rosa	floret.

Subject.	*Predicate.*	
	copula	*attribute*
Rosa	est	florifera.

Subject.	*Predicate.*	
	verb	*object*
Rosa	fert	flores.

To the several parts may be added qualifying words; e.g.

1. *To the subject:* Pulchra rosa fert flores.
2. *To the object:* Rosa fert pulchros flores.
3. *To the verb:* Rosa *in vere* fert flores.

This is a simple sentence, inasmuch as it has one subject and one predicate. Two or more simple sentences make a compound sentence; e. g.,

Rosa floret et bene olet.
The rose flourishes and smells well.

This sentence is equivalent to two sentences, namely, rosa floret, *the rose flourishes*; and rosa bene olet, *the rose smells well.*

Compound sentences are of various kinds. That which has been just given may be called conjunctive, since it is made compound by the conjunction et, *and*. Another kind of compound sentence is the relative, so called because it is formed by the introduction of a relative clause, that is, one which begins with the relative pronoun qui, quae, quod, *who* or *which*; e. g.,

Rosa, QUAE FLORET, olet bene.
The rose, WHICH FLOURISHES, *smells well.*

Sentences may also be made compound by the introduction of adverbs of time, e. g.,

Rosa, QUUM floret, olet bene.
The rose, WHEN *it flowers, smells well.*

Or causal conjunctions, e. g.

Rosa, QUONIAM floret, olet bene.
The rose, SINCE *it flowers, smells well.*

Other forms ensue:—

Rosa, SI floret, olet bene.
If the rose flourishes, it smells well.

Rosa, QUAMDIU floret, olet bene.
The rose smells well, AS LONG AS *it is in flower.*

Rosa SIC floret UT oleat bene.
The rose flowers SO THAT *it smells well.*

Olet NE bene rosa, QUIA floret?
Does the rose smell well BECAUSE *it is in flower?*

HAUD bene olet rosa QUUM non floreat.
The rose does NOT *smell well* SINCE *it does not flourish*

VOCABULARY.

Circumequito 1, *I ride round* (circum, *around*, and equus, *a horse*); indico 3, *I declare*; Sulla primus, *Sylla was the first to*; cubo 1, *I recline, lie*; permeo, 1, *I go through, traverse, survey*: peragro 1, *I wander over* or *through*: Scoti, orum, m. *the Scotch*; Pythagoras, (genitive *ae*, dat. *ae*, acc. *am*, voc. *a*, abl. *a*), *Pythagoras, (a Greek philosopher*).

EXERCISES.—LATIN-ENGLISH.

Pythagoras Aegyptum permeavit, Persarum Sacerdotes invisit, et pedibus multas barbarorum terras peragravit; quum exercitus concursuri essent, imperator aciem circumequitavit, et milites adhortatus est; postquam flumen transitum erat, vehementissima pugna est coepta; fugit mortem qui contemnit; multa verba et vultûs genera sunt, quae histrionem decent non oratorem; amicus verus is est qui nos nihil celat; nullus poeta videtur Homerum potuisse imitari; Tarquinienses devastaverant eam partem agri Romani, quae Etruriam adjăcet; quapropter Romani iis bellum indixerunt; Sulla primus urbem Romam armatus introiit; intelligimus lucem quâ fruimur, et spiritum quem ducimus, a Deo nobis dari; Cicero narrat duos equites Romanos fuisse, qui Catilinae promiserint se eum noctu interfecturos esse; ambitio certe vitium est; videmus tamen eandem saepe virtutum matrem esse; credula spes vitam nostram alit, et semper cras fore melius dicit; Viriathus quatuordecim annos contra Romanos bellum gessit; Pythagoras primus se esse philosophum dixit, hoc est amatorem sapientiae; mons Olympus erat altissimus; omne animal mortale est; pater me vituperavit; anseres non volant; diligentes homines labórant; probi homines amant parentes et cognatos suos; agricolae vere semina serunt; habesne libros necessarios? alti montes coercent vim ventorum; sol et luna totum orbem terrarum implent lumine suo; folia hujus arbŏris virebant in aestate; nos sedemus in conviviis, sed veteres Graeci et Romani cubabant in lectis; mundus a Deo expletus est variis bonis; qui a multis timetur, is multos timet; aer semper movetur, sed si violenter movetur, ventus fit; homo bonus peccata sua fatetur non dissimulat; non possumus intueri solem apertis oculis.

ENGLISH-LATIN.

The queen visited the Scotch; dost thou understand that all good things are given to men by God? Cicero relates that he made a speech against Catiline; Cicero was called the father of his country? does Cicero say that he was called the father of his country; to be called the father of (one's) country is honourable; he who wishes to be called the father of his country should be very wise and very noble; after we have supped we will go to bed; when the Tarquinians had devastated a part of the Roman territory, the Romans declared war on them; what poet has ever imitated Homer? Homer was the first to (say, Homer first wrote) write a long poem; God has filled the world with good things; do those things become a good man? the priests of the Persians were visited by Pythagoras, who travelled through many lands; the commander will ride round the army and address the soldiers; hast thou a true friend? it is difficult to find a true friend; bad men say that it is very difficult to find a true friend; good men are loved by good men; the whole world is filled with the light of the sun and the moon.

LESSONS IN FRENCH.—No. XLIX.

By Professor LOUIS FASQUELLE, LL.D.

§ 22.—NUMERAL ADJECTIVES.

(1.) There are two kinds of numeral adjectives: the cardinal and the ordinal.

(2.) The cardinal numbers indicate simply the number or quantity, without any reference to order: as, un, *one*; deux, *two*, &c.

(3.) The ordinal numbers mark the order or rank which persons and things occupy: as, premier, *first*, second, *second*, &c.

We shall, for the purpose of comparison, place the cardinal and ordinal numbers in parallel columns:—

(4.) *Cardinal Numbers.*		(5.) *Ordinal Numbers.*	
un, *feminine* une,	1	premier, *feminine* première,	1st.
deux,	2	deuxième or secd., *f.* seconde,	2d.
trois,	3	troisième,	3d.
quatre,	4	quatrième,	4th.
cinq,	5	cinquième,	5th.
six,	6	sixième,	6th.
sept,	7	septième,	7th.
huit,	8	huitième,	8th.
neuf,	9	neuvième,	9th.
dix,	10	dixième,	10th.
onze,	11	onzième,	11th.
douze,	12	douzième,	12th.
treize,	13	treizième,	13th.
quatorze,	14	quatorzième,	14th.
quinze,	15	quinzième,	15th.
seize,	16	seizième,	16th.
dix-sept,	17	dix-septième	17th.
dix-huit,	18	dix-huitième,	18th.
dix-neuf	19	dix-neuvième,	19th.
vingt,	20	vingtième,	20th.
vingt-et-un,	21	vingt-et-unième,	21st.
vingt-deux, &c.,	22	vingt-deuxième, &c.,	22d.
trente,	30	trentième,	30th.
trente-et-un,	31	trente-et-unième,	31st.
trente deux, &c.,	32	trente-deuxième, &c.,	32d.
quarante,	40	quarantième,	40th.
quarante-et un,	41	quarante-et-unième,	41st.
quarante deux, &c.,	42	quarante-deuxième, &c.,	42d.
cinquante,	50	cinquantième,	50th.
cinquante-et-un,	51	cinquante-et-unième,	51st.
cinquante-deux, &c.,	52	cinquante-deuxième, &c.,	52d.
soixante,	60	soixantième,	60th.
soixante-et-un,	61	soixante-et-unième,	61st.
soixante-deux, &c.,	62	soixante-deuxième, &c,	62d.
soixante-dix,	70	soixante-dixième,	70th.
soixante-onze,	71	soixante-onzième,	71st.
soixante-douze,	72	soixante-douzième,	72d.
soixante-treize,	73	soixante-treizième,	73d.
soixante-quatorze,	74	soixante-quatorzième,	74th
soixante-quinze,	75	soixante-quinzième,	75th.
soixante-seize,	76	soixante-seizième,	76th.
soixante-dix-sept,	77	soixante-dix-septième,	77th.
soixante-dix huit,	78	soixante-dix-huitième,	78th.
soixante-dix-neuf,	79	soixante-dix-neuvième,	79th.
quatre-vingts,	80	quatre-vingtième,	80th.
quatre-vingt-un,	81	quatre-vingt-unième,	81st.
quatre-vingt-deux, &c.,	82	quatre-vingt-deuxième, &c.	82d.
quatre-vingt-dix,	90	quatre-vingt-dixième,	90th.
quatre-vingt-onze,	91	quatre-vingt-onzième,	91st.

(4.) *Cardinal Numbers.*		(5.) *Ordinal Numbers.*	
quatre-vingt-douze, &c.,	92	quatre-vingt-douzième, &c.	92d.
cent,	100	centième,	100th.
cent-un,	101	cent-unième,	101st.
deux-cents,	200	deux-centième,	200th
deux-cent un,	201	deux-cent-unième,	201st.
trois-cents,	300	trois-centième,	300th.
trois-cent-un, &c.	301	trois cent-unième, &c.	301st.
mille,	1000	millième,	1000th.
deux-mille,	2000	deux-millième,	2000th.
deux-mille-cinquante,	2050	deux-mille-cinquantième	2050th.
un million,	1,000,000	millionième,	1,000,000th.

§ 23.—Variations of the Cardinal Numbers.

(1.) The following cardinal numbers vary:—

(2.) Un, *one*, *a* or *an*, takes the gender of the noun to which it is prefixed:—

un livre, *a book*; *une* feuille, *a leaf*.

When used substantively, *un* takes, at times, the form of the plural:—

Masc. Les uns et les autres,	*These and those.*
Fem. Les unes et les autres,	(*The ones and the others*).

(3.) *Vingt* and *cent*, when multiplied by one number, and not followed by another, take the form of the plural:—

quatre-*vingts*, *eighty*;	six *cents*, *six hundred*.
L'homme vit *quatre-vingts* ans, le chien n'en vit que dix. Buffon.	*Man lives eighty years, the dog only ten.*
On m'apporta chez moi, douze *cents* francs. J. J. Rousseau.	*They brought me, at my house, twelve hundred francs.*

(4.) *Vingt* and *cent*, however, when multiplied by one number, and followed by another, or, if not followed by a number, used to indicate a particular epoch, do not take the form of the plural:—

quatre *vingt*-cinq hommes; cinq-*cent*-deux hommes,	*eighty-five men. five hundred and two men.*
Charlemagne fut proclamé empereur d'Occident, le jour de Noël, en huit *cent*. Voltaire.	*Charlemagne was proclaimed emperor of the West, Christmas-day, in the year eight hundred.*

(5.) Mille—(*thousand*.) For the date of the year, reckoned from the commencement of the Christian era to the year two thousand of the same, we use the abbreviated form, *mil*:—

L'an *mil* huit cent cinquante,	*The year one thousand eight hundred and fifty.*

(6.) With regard to the years which have *preceded* our era, and those which will *follow* our present *thousand*, we write the full form, *mille*.

La première irruption des Gaulois, eut lieu sous le règne de Tarquin, environ l'an du monde trois *mille* quatre cent seize. Verteot.	*The first irruption of the Gauls took place under the reign of Tarquin, about the year of the world* 3416.

(7.) Million, billion, take the plural form.

§ 24.—Miscellaneous Observations on the Cardinal Numbers.

(1.) In French, in computing from twenty to thirty, thirty to forty, &c., the larger number must always precede the smaller. We may not say, as often in English, *one* and *twenty*, but always *vingt-et-un*, *vingt-deux*, &c.

(2.) The conjunction *et*, after vingt, trente, &c., is only used before *un*: thus, we say vingt-et-un, *twenty* (and) *one*, and simply vingt-deux, *twenty-two*, &c.

(3.) The word *one* frequently precedes in English the words *hundred* and *thousand*; it must not be rendered in French. We say:—

mille hommes,	*one thousand men.*
cent francs,	*one hundred francs.*

(4.) When the words *cent* and *mille* are used substantively before the name of objects generally reckoned or sold by the hundred or thousand, in number or in weight, the word *un* may be placed before them; the name of the object being preceded by the proposition *de*:—

Un cent, un mille (millier) de briques,
One hundred, one thousand (of) bricks.
Un cent (un quintal) de sucre,
One hundred (weight) of sugar.

(5.) The words septante, *seventy*; octante, *eighty*; and nonante, *ninety*, are now nearly obsolete, being used only in a few provinces of France. They are, as may be seen in the preceding table, replaced by awkward expressions: *soixante-dix*, sixty-ten; *quatre-vingts*, four-twenties (four score); *quatre-vingt-dix*, four-score-ten, &c.

(6.) Before the words onze, *eleven*, and onzième, *eleventh*, the article is not elided. We say *le onze*, *le onzième*, *la onzième*. In pronunciation, the *s* of the plural article *les* is silent when this article precedes *onze* or *onzième*.

§ 25.—Observations on the Ordinal Numbers.

(1.) It will be seen that the ordinal numbers, with the exception of *premier* and *second*, are formed from the cardinal—

1. By the change of *f* into *vième* in *neuf*;
2. By the change of *e* into *vième* in those ending with that vowel;
3. By the addition of *vième* in those ending with a consonant:
4. Cinq requires *uième* to make *cinquième*, fifth.

(2.) All ordinal adjectives may take the form of the plural.

(3.) *Premier* and *second* alone vary for the feminine, and make *première*, *seconde*, &c.

(4.) *Unième (first)* is only used in composition with *vingt*, *trente*, &c.

(5.) *Second*, *deuxième (second)*—*Dunzième* supposes a series, a continuation; *second* merely indicates the order:

1st. We may say of a work which has four or more volumes:

J'ai le *deuxième* (or *le second*) volume de cet ouvrage.	*I have the second volume of this work.*

2d. In speaking of a work which has only two volumes, we should say:

J'ai le *second* (not *le deuxième*) volume du dictionnaire de Bescherelle.	*I have the second volume of Bescherelle's dictionary.*

3d. Under the ordinal numbers may be placed the following words, which are often used substantively:—

Trentenaire,	*thirty*,	*of thirty years' duration.*
Quarantenaire,	*forty*,	*of forty* " "
Cinquantenaire,	*fifty years old*,	*of fifty* " "
Sexagénaire,	*sexagenarian*,	*of sixty* " "
Septuagénaire,	*septuagenarian*,	*of seventy* " "
Octogénaire,	*octogenarian*,	*of eighty* " "
Nonagénaire,	*nonagenarian*,	*of ninety* " "
Centenaire,	*centenarian*,	*of one hundred* "

4th. Trentenaire and quarantenaire are law terms:

Possession trentenaire, quarantenaire.	*Thirty, forty years' possession.*

5th. Of the others, sexagénaire, septuagénaire, and octogénaire only, are in frequent use:

Un octogénaire plantait, &c. La Fontaine.	*A man eighty years old was planting trees.*

§ 26.—Rules.

(1.) In speaking of the days of the month, the French use the cardinal, not the ordinal number:—

le *deux* mars,	*the second of March.*
le *dix-sept* avril,	*the seventeenth of April.*
L'overture des Etats-généraux eut lieu le *cinq* mai, 1789. Thiers.	*The opening of the States-general took place on the fifth of May*, 1789.

(2.) We must, however, say:—

le *premier* (not l'un) juin,	*the first of June.*

(3.) The cardinal numbers are also employed in speaking of sovereigns and princes:—

Charles *dix*,	*Charles the Tenth.*
Louis *dix-huit*,	*Lewis the Eighteenth.*
Louis *onze* avait trente-huit ans, quand il monta sur le trône. Anquetil.	*Lewis the Eleventh was thirty-eight years old when he ascended the throne.*
La mort de Grégoire *sept* n'éteignait pas le feu qu'il avait allumé. Voltaire.	*The death of Gregory the Seventh did not extinguish the fire which he had kindled.*

(4.) We must say, however:—

Henri *premier*,	*Henry the First.*

(5.) *Deux* and *second* are, in this case, used indifferently:—

Charles *deux*, Charles *second*, *Charles the Second.*

(6.) In speaking of Charles the Fifth, of Germany, and of the Pope Sixtus the Fifth, the obsolete word *quint* (fifth) is used:—

Charles-*quint*, *Charles the Fifth.*
Sixte-*quint*, *Sixtus the Fifth.*

LESSONS IN ENGLISH.—No. XXXIX.

By JOHN R. BEARD, D.D.

FRENCH STEMS.

The words which the English owes to the Romance languages are very numerous. Of this number, by far the largest portion comes from the French. This portion is too large to be here enumerated, though a few specimens may be given. Before, however, I proceed to set down instances, let it be observed that I shall prefer those which retain some marked resemblance to their originals, or still appear in their native form.

ENGLISH WORDS FROM THE FRENCH.

From CHEVAL, *a horse* (Lat. Caballus), come
Chevalier, *a knight.*
Chivalry, *knighthood.*
Cavalier, *a knight*, or *horseman.*
Cavalry, *horse-troops.*

From CHARTRE or CHARTE, *a charter* (Lat. charta), come
Chart, *a sea-map.*
Charter, *a writing bestowing privileges.*
Chartist, *a person desirous of a new charter.*
Cartel, *a writing containing stipulations, &c.*
Cartoon, *a drawing on large paper, a painting.*
Cartouch, *a case for balls or cartridges.*
Cartrage or Cartridge, *a case for gunpowder.*
Cartulary, *a register*; *a monastic record.*

From BARRE, *a bar* (the same word), come to bar, *to hinder.*
Barricade, *a fence or temporary fortification.*
Barrier, *a boundary, or obstacle.*
Barring-out, *a boyish game.*

The following are a few separate instances—bottle; brilliant; escape; engagement; flask; forage; flank; guarantee; guard; garnish; grimace; hash; haranguе; hardy; lodge; marquis; mason; packet; robe; wardrobe; saloon; supper; dinner; (breakfast is Saxon); tirade; troubadour. The words which denote the various officers in civil government are mostly Norman French, as might be expected from the conquest of England by William the Norman: e. g., king and earl are Saxon, but prince, duke, marquis, baron, count, mayor, &c., are of French origin, at least so far as the English is concerned.

The ignorance of older philologists may be exemplified in the derivation which they gave of parliament. *Parliament* is a word of French extraction, from the word parler, *to speak*; the *ment*, as the student now knows, is merely the terminational suffix. But the wisdom of our forefathers made *ment* into *mind*, and stated that the parliament was so called because men there freely spoke their mind! The history of this derivation is no better than the philology, for in the French parliament liberty of speech was not predominant.

Another instance of philological ignorance is presented in these facts. *Curmudgeon*, which Bailey, in his "Universal Etymological Dictionary" (1731), describes as meaning *a covetous hunks, a pitiful, niggardly, close-fisted fellow*, Dr. Johnson derived from the French cœur-mechant *(bad-heart)*, appending the words *Unknown Correspondent* as the authority. Dr. Ash, taking the English appendage as the meaning of the French words, gives the etymology thus: *curmudgeon* from cœur *unknown*, and mechant *correspondent!!*

French words have been a medium by which Latin words have come into the English, the extent of our obligation to both those languages can be known only when we have seen specimens of this transference.

FRENCH WORDS AS A MEDIUM FROM THE LATIN TO THE ENGLISH.

Latin.	*French.*	*English.*
ala, *a wing*	aile (of old aisle)	*aisle*
auctor, *originator*	auteur	*author*
bonitas, *goodness*	bonté	*bounty*
bos, *an ox*	boeuf	*beef*
brevis, *short*	brief	*brief*
califacere, *to warm*	echauffer	*chafe*
canalis, *a pipe*	chenal	*channel*
canna, *a reed*	canne	*cane*
caput, *the head*	chef	*chief*
carmen, *a song*,	charme	*charm*
catena, *a chain*,	chaine	*chain*
computare, *to reckon*	compter	*count*
cooperire, *to cover*	couvrir	*cover*
cultellus, *a knife*	coutelas	*cutlass*
diabolus, *Satan*	diable	*devil*
dignari, *to think worthy*	deigner	*deign*
ebur, *ivory*	ivoire	*ivory*
extraneus, *outward*	etranger	*strange*
feretrum, *a bier*	biere	*bier*
ferox, *fierce*	féroce	*fierce*
fidelitas, *fidelity*	feodalité / feauté	*fealty*
gigas, *a giant*	géant	*giant*
gubernari, *to govern*	gouverner	*to govern*
gula, *the throat*	goulet	*gullet*
incantare, *to enchant*	enchantor	*enchant*
inimicitia, *enmity*	inimité	*enmity*
lectarium, *a bed*	litière	*litter*
levare, *to lift*	lever	*to lift*
lex, *a law*	loi	*loyal*
macer, *lean*	maigre	*meagre*
magister, *master*	maître	*master*
magnus, *great*	magne	*main*
medietas, *the middle*	moitie	*moety*
mirabile, *wonderful*	merveille	*marvel*
nomen, *a name*,	nom	*noun*
numerus, *a number*	nombre	*number*
nutrix, *a nurse*	nourrice	*nurse*
oleum, *oil*	hulle	*oil*
paganus, *a villager*	paysan	*peasant*
panarium, *a basket*	panier	*pannier*
passus, *a step*	pas	*pace*
pauper, *needy*	pauvre	*poor*
peregrinus, *a stranger*	pelerin	*pilgrim*
populus, *the people*	peuple	*people*
prepositus, *placed over*	prévost	*provost*
presbyter, *an elder*	prêtre	*priest*
probare, *to make good*	prouver	*prove*
pullus, *a chicken*	poulet	*poultry*
puppis, *the stern*	poupe	*poop*
ratio, *reason*	raison	*reason*
recipere, *to receive*	recevoir	*receive*
regnare, *to rule*	regner	*reign*
rotundus, *round*	rond	*round*
sapor, *taste*,	saveur	*savour*
supernus, *supreme*	souverain	*sovereign*
tegula, *a tile*	tuile	*tile*
traditor, *a traitor*	traitre	*traitor*
visus, *sight*	vue	*view*

A careful survey of a French dictionary on the part of one who is skilled in derivation, would bring to light an extent of obligation owing by the English to the French language, of which ordinary students have no idea. I subjoin a few words by way of specimen, taken under several letters of the alphabet

FRENCH WORDS IN THE ENGLISH LANGUAGE.

French.	*English.*	*Latin.*
adage	adage	adagium
aigle	eagle	aquila
aile	aisle	ala
amour	amour	amor
angle	angle	angulus
antre (Shakspeare)	antre	antrum
arc	arc	arcus
bâton	batoon	baculus
baume	balm	balsamum
bile	bile	bilis
bourg	burgh	purgos (Greek)
boutique	booth	apothēkē (Greek)
bulle	bull	bulla

French.	*English.*	*Latin.*
cage	cage	
caisse	case	capsa
campagne	champagne	campánia
cap	cape	caput
coche	coach	
cendre	cinders	cinis
cerise	cherry	cerásus
chaire	chair	
chaloupe	sloop	
char	chariot	carrus
cheminée	chimney	camínus
cle or clef	clef	clavis
coin	coigne	cuneus
comté	county	comitatus
corps	corpse	corpus
couple	couple	copula
duel	duel	duellum
empire	empire	imperium
epouse	spouse	sponsa
etain	tin	stannum
fable	fable	fabula
face	face	facies
faim	famine	fames
fardel	fardeau	phortos (Greek)
fibre	fibre	fibra
figue	fig	ficus
flûte	flute	
foi	faith	fides
front	front	frons
fruit	fruit	fructus
gai	gay	gaudium
geai	jay	
gingembre	ginger	zingiber
golfe	gulf	kolpos (Greek)
goût	gout	gustus

Many French terms are employed in English either in their native form or slightly altered, and of these some even in France are of modern origin. We have *dragoon* from the name of the soldiers with whom Louis XIV. carried on the war, which received the name of his *dragonades*, against his French Protestant subjects in order to compel them to become Catholics. From the noun *dragoon* we have the verb to *dragoon into*. A roué, in slang language, *a black-leg*, is literally a wretch who deserves to be broken on *the wheel*—metaphorically one who has the same manners, as the courtiers of the profligate Duke of Orleans, Regent of France, who is said to have given the name to his abandoned associates. Guillotine, a term which we derive from France, is the name of an instrument for decapitating political offenders; it received its name from the inventor, and was first used amidst the early horrors of the first revolution in that country. Translations from the French have led to the in-coming amongst us of many French terms and phrases, greatly to the corruption of our mother English. Formerly, translations were said to be "done into English." The phrase is not inappropriate, for many translations from the French are miserably done, a large portion of every page consisting of French words, and idioms in an English dress; resembling a Frenchman aiming to speak English by putting on an English costume. Common-place novels, too, have brought into vogue many Gallicisms. Most blame-worthy is this defacement and corruption of our language, when they are perpetrated by historians of whom better things might be expected. "This practice has been well taken off by the "Spectator" in No. 185 of that work, which is strongly recommended to the perusal of those who possess it or can readily borrow it.

Having read the remarks in the "Spectator," and read also what I have written in this lesson, let the student proceed to write an essay on

THE FRENCH ELEMENT IN THE ENGLISH LANGUAGE.

Words with their proper Prepositions.

	F. R.
Disqualify for,	qualis, *of what kind*
Dissatisfied with,	satis, *enough*
Dissent from,	sentio, *I feel*
Distinct from	tinctus, *dyed, coloured*
Distinguish from, between	tinguo, *I dye, colour*
Distrustful of,	trauen, *to trust*
Divested of,	vestis, *a garment*
Divide between (two), among (many)	divido, *I divide*
Dote on,	
Doubt of,	dubito, *I doubt*
Dwell in, at, on,	
Eager in,	begierig, *desirous of*
Embark in, on board of, for,	embarquer, *to go into a barque*
Embellished with,	bellus, *beautiful*
Emerge from,	mergo *I dip*
Employ in, on, about,	employer, *to put to use*
Emulous of,	emulus, *a rival*
Enamoured of,	amor, *love*

COMPOSITION.

Report the following extract:—

ON THE CHOICE OF AUTHORS.

If we are to read, it is a very important rule in the conduct of the understanding, that we should accustom the mind to keep the best company, by introducing it only to the best books. But there is a sort of vanity some men have, of talking of, and reading, obscure, half-forgotten authors, because it passes as a matter of course that he who quotes authors which are so little read, must be completely and thoroughly acquainted with those authors which are in every man's mouth. For instance, it is very common to quote Shakespeare; but it makes a sort of stare to quote Massinger. I have very little credit for being well acquainted with Virgil; but if I quote Silius Italicus, I may stand some chance of being reckoned a great scholar. In short, whoever wishes to strike out of the great road, and to make a short cut to fame, let him neglect Homer, and Virgil, and Horace, and Ariosto, and Milton, and, instead of these, read and talk of Fracastorius, Sannazarius, Lorenzini, Pastorini, and the thirty-six primary sonnetteers of Bettinelli; let him neglect everything which the suffrage of ages has made venerable and grand, and dig out of their graves a set of decayed scribblers, whom the silent verdict of the public has fairly condemned to everlasting oblivion. If he complains of the injustice with which they have been treated, and call for a new trial with loud and importunate clamour, though I am afraid he will not make much progress in the estimation of men of sense, he will be sure to make some noise in the crowd, and to be dubbed a man of very curious and extraordinary erudition.—*Sydney Smith.*

LESSONS IN GERMAN.—No. XXXIX.

SECTION LXXXI.

Verlaſſen, when used reflexively, signifies, "to depend upon• to rely upon." Ex.: Ich verlaſſe mich auf ihr Wort; I depend upon your word (I leave myself upon your word.)

I. Abhängen, likewise, signifies to depend upon, to be dependent upon. Ex.: Es hängt von Umſtänden ab; it depends upon circumstances. Thence is derived the adjective abhängig, dependent. Ex.: Er führt ein abhängiges Leben; he leads a dependent life. Die Vereinigten Staaten erklärten ſich als ein unabhängiges Volk; the United States declared themselves (as) an independent people.

EXERCISE 84.

Ab'hängen, (See above);	Frucht, *f.* fruit;	Kanarienvogel, *m.* canary-bird;
Ab'hängig, dependent;	Geber'den, to behave;	Deffnen, to open;
Bedin'gung, *f.* condition, stipulation;	Gemäch'lich, comfortable, easy;	Umſtand, *m.* circumstance;
Darein'willigen, to consent;	Gena'u, exactly;	Un'abhängig, independent;
Entzwei'en, to disunite, fall out, quarrel;	Gera'then, to turn out, prove;	Verſchmä'hen, to disdain, despise;
Fä'higkeit, *f.* ability;	Hinaus', out, out there;	Wohl'meinen, to mean well, wish well;
Folge, *f.* sequel, consequence;	Hinaus'eilen, to hasten out;	Zu'dringlich, obtrusive.
	Hinaus'werfen, to throw out;	

Ich kann nicht darein'willigen.	I cannot agree to it.
Er wil'ligte unverzüg'lich darein'.	He agreed (consented) to it unhesitatingly.
Dieſe Leute ſtellen ſich als ob ſie von Sinnen wären.	These people act (place themselves) as if they were out of their senses.

Es wiederfährt' uns in unserm Leben (§ 15. 2. *d.*) manches Glück und manches Unglück.	There happens to us in our lives (many a) much happiness and many a misfortune.
Es wiederfährt' Manchem mehr Ehre, als er verdient'.	There happens to many a one more honour than he deserves.
Der Vogel ist zum Fenster hinaus'geflo'gen.	The bird has flown out of the window.
Die Freunde entzwei'ten sich.	The friends quarrelled (separated themselves.)
Die Pflaume ist ein Steinobst.	(The) plums are a stone-fruit.
Sie verlie'ßen sich darauf', daß er sein Versprech'en halten würde.	They relied upon his keeping his promise.
Man soll nie eher in eine Sache ein'willigen als bis man tiefel'be wohl überlegt' hat.	One should never assent to a thing, before he has well considered it (the same.)
Ist es nicht, als ob dieses Volk mich zum Gotte mache? (Schiller.)	Is it not, as though this people would make me a God?

1. Dieses Jahr ist das Obst, sowie alle Früchte, wohl gerathen. 2. Dieser Baum trägt jedes Jahr sehr vieles Obst. 3. Ist alle Frucht Obst? 4. Nein, nicht alle, sondern nur solche, die (§ 65. 2.) an Bäumen wächst. 5. Dieser junge Mann verläßt sich zu viel auf seine Verwandten und zu wenig auf seine eigenen Fähigkeiten. 6. Er verläßt sich darauf, daß wir ihn die nächsten Woche besuchen. 7. Er verließ sich darauf, daß ihm Gott helfen werde. 8. Wer sich zu viel auf Andere verläßt, kann leicht getäuscht werden. 9. Ich halte (Sect. 69. II.) viel auf meine Freunde. 10. Er hält viel auf ein gemächliches Leben. 11. Dieser Mann hält zu viel auf sich und seine Klugheit, weßhalb er den Rath wohlmeinender Freunde verschmäht. 12. Nur unter dieser Bedingung kann ich darein willigen. 13. Ich willige darein, in so fern (Sect. 79. V.) es keine üblen Folgen hat. 14. Er willigte darein, ohne mit allen Schwierigkeiten bekannt zu sein. 15. Dieses Kind thut gerade, als ob es hier zu Hause wäre. 16. Der Matrose stellte sich, als ob er von Sinnen wäre. 17. Er geberdet sich, als ob ihm das größte Unrecht widerfahren sei. 18. Dieser Mann stellt sich, als ob er beleidigt wäre. 19. Er stellt sich wie ein Kind von fünf Jahren. 20. Der Nachbar warf den Zudringlichen zur Thüre hinaus. 21 Der Knabe eilte zur Thüre hinaus, als ich dieselbe öffnete. 22. Zur Thüre hinaus, wer sich entzweit! (Göthe.) 23. Es hängt ganz von Umständen ab, ob ich schon nächstes Jahr nach Amerika reise oder nicht. 24. Es hängt sehr von Umständen ab, was er thun wird. 25. Ein so abhängiges Leben die Bauern in Deutschland führen, ein eben so unabhängiges führen sie in Amerika. 26. Ganz unabhängig vermag kein Mensch auf Erden zu werden.

1. Last year the fruit did not turn out well. 2. This tree yields fruit but seldom. 3. This young gentleman relies too much upon his abilities. 4. No, he does not rely too much upon his abilities, but he knows it is not well to be dependent upon those of others. 5. I rely upon you that you will visit me next week. 6. Do exactly as if you were at home. 7. The criminal acted as if he were out of his senses. 8. This man acts exactly as a child. 9. Where is your canary-bird? It is flown out of the window. 10. How can I assent to a thing which is against my inclination? 11. Whoever quarrels shall be expelled the house. 12. It depends upon circumstances, whether I shall go to my friends. 13. Every man strives to be independent. 14. Depend upon it that I shall not help you again.

Section LXXXII

Nichts or, nicht dafür können, signifies "not to be in fault, or to blame," &c.; as, ich kann nichts dafür; it is not my fault, or I cannot help it; literally, I cannot, or can nothing therefore. Er kann nichts dafür, daß er so arm ist; he cannot help it, i. e. he is not to blame that he is so poor. So also interrogatively; as, kann die Welt etwas dafür, daß sich ein großer Geist in ein schlechtes Kleid versteckt? (Rabener.) Is the world t blame, that a great soul conceals itself in a plain dress? That is, Die Welt kann nichts dafür.

Exercise 85.

An'geben, to give, specify;	Kern, *m.* kernel;	Un'würdigkeit, *f.* unworthiness, indignity;
An'strengung, *f.* exertion, effort, labour;	Kutscher, *m.* coachman;	Teller, *m.* plate;
Bereit, ready;	Ordnung, *f.* order, regulation;	Verder'ben, to spoil, corrupt, destroy;
Beruf', *m.* calling, vocation;	Schale, *f.* shell;	Verzich'ten, (auf Etwas), to resign, i. e. as a privilege or a claim on anything;
Beruhigen, to quiet;	Schwächling, *m.* weakling, weakly person;	Vor'gehen, to go before, go too fast;
Bestim'men, to fix, determine;	Umschlie'ßen, to inclose, surround;	Wagen, *m.* carriage;
Dafür, therefore, for it;	Umwerfen, to upset;	Weisheit, *f.* wisdom;
Dank, *m.* thanks, acknowledgment;	Un'ordentlich, disorderly, irregular, confused;	Wesen, *n.* being, existence:
Erret'ten, to save, rescue, deliver;	Unterlass'en, to leave off, omit, fail;	Zerbre'chen, to break (in pieces).
Furcht, *f.* fear, dread;		

Ich kann nichts dafür, daß ich mein Geld verlo'ren habe.	It is not my fault, that I have lost my money.
Diese Uhr geht vor (or, zu schnell), und jene geht nach, (or, zu langsam).	This watch goes too fast and that (one) goes too slow.
Hat man mein Zimmer in Ordnung gebracht'?	Has my room been put in order?
In der Reihe seiner Schmeichler hat er keinen wahren Freund.	In the ranks of his flatterers he has not a true friend.
Es giebt Viele, die glauben, daß in den meisten Fällen das Glück oder Unglück eines Menschen vom Zufall ab'hänge.	There are many who believe, that in (the) most cases, the fortune or misfortune of a man depends on chance.
Leben Sie wohl, mein Herr, und empfeh'len Sie mich gütigst Ihrer Frau Gemah'lin.	Farewell, sir, and please remember me kindly to your lady.

1. Sie können nichts dafür, daß Sie so unglücklich sind. 2. Er konnte nichts dafür, dieses Glas zerbrochen zu haben. 3. Ich kann nichts dafür geben, als meinen Dank. 4. Die Gründe dafür werde ich angeben, wenn es verlangt werden sollte. 5. Können Sie mir sagen, (Sect. 83. I.) wie viel Uhr (Sect. 25. IX.) es ist? 6. Nein, denn meine Uhr ist stehen geblieben. 7. Steht Ihre Uhr schon lange? 8. Ja, beinahe eine Stunde. 9. Meine Uhr geht zu schnell, sie geht beinahe eine halbe Stunde vor. 10. Die Uhr meines Freundes geht fünf Minuten vor. 11. Leben Sie wohl, und vergessen Sie nicht, mich bald wieder zu besuchen. 12. Leben Sie wohl, mein Herr! 13. Wann wollen wir zusammen Herrn N. besuchen? 14. Es hängt ganz von Ihnen ab (Sect. 81. I.), welche Zeit Sie dazu bestimmen wollen, ich bin zu jeder Zeit bereit, mitzugehen. 15. Es hängt von Ihnen ab, diese Familie zu erretten oder zu verderben. 16. Der Nachbar arbeitet in seinem Garten und sucht denselben in Ordnung zu bringen. 17. Bei Aller Anstrengung bringt er diese Sache nicht in Ordnung. 18. Er suchte mich in die Reihe seiner Kameraden zu bringen. 19. Es hält schwer (Sect. 46. II.), einen unordentlichen Menschen an Ordnung zu gewöhnen. 20. Nach vieler Mühe hat er die Rechnung in Ordnung gebracht. 21. Wer an dem Fuße eines steilen Berges stehen bleibt und aus Furcht vor Anstrengung denselben zu erklimmen unterläßt und lieber auf die schöne Aussicht verzichtet, der zeigt damit an, daß er ein Schwächling und eines solchen Genusses unwerth ist,—und wer aus eigner Schuld in der Mitte seiner geistigen Ausbildung stehen bleibt, und den süßen Kern der Weisheit entbehren will, weil eine rauhe und harte Schale denselben umschließt, der zeigt ebenfalls nicht nur seine Unwürdigkeit, denselben zu genießen, an, sondern auch, wie wenig er den Beruf und die Pflicht des Menschen, als eines geistigen Wesens, erkannt hat.

1. It is not my fault that you have had the mishap. 2. You are not to blame that the servant has broken the plate. 3. He could not give me anything for it, except his thanks. 4. He could not help it, he only spoke the truth. 5. Is the coachman to blame, that the carriage was upset? 6. No, he is not to be blamed, for the horses could not be quieted. 7. Can you

tell me what time it is? 8. No, my watch goes too slow. 9. To fix the hour of my departure depends upon my parents 10. Farewell, Madam; please do not forget, to remember me to your parents 11 It depends upon you, what time you will fix to visit your friend; I shall always be ready to accompany you. 12. Fortune and misfortune, life and death, poverty and riches, all depend on the will of God.

Section LXXXIII.

Sich verſtehen, (to understand one's self, with *auf* signifies to be a judge of, to be skilled in. Ex: Er verſteht ſich auf Alles he is skilled in everything.

Es verſteht ſich, (literally, it understands itself, i. e. it is understood, is self-evident,) answers to our phrase, "of course," or, "as a matter of course." Ex: Es verſteht ſich or es verſteht ſich von ſelbſt, daß ich meinen Eltern gehorchen muß: of course, or as a matter of course, I must obey my parents. The word „natürlich" naturally, is often used in the same manner; as, natürlich muß es ſo ſein, of course, it must be so.

I. Sagen answers to the English say or tell: to tell or narrate, however, is often expressed in German by erzählen Ex.: Was ſagte er? What did he say? Was hat er Ihnen geſagt? What has he told, or said to you? Der alte Matroſe erzählte eine rührende Geſchichte; the old sailor told, or related a moving (affecting) story.

II. Fort is often answered in English by "gone, off," &c. Ex.: Iſt er ſchon lange fort? Has he already been *gone* long?

III. Es ſei denn, daß = unless, except, &c, Ex.: Der Menſch kann nicht wahrhaft glücklich ſein, es ſei denn, daß er tugendhaft ſei; man can not be truly happy, unless he be virtuous. Wahrlich, wahrlich, ich ſage dir: Es ſei denn, daß Jemand von Neuem geboren werde, kann er das Reich Gottes nicht ſehen;

Exercise 86

Anwalt, *m.* attorney, defender;	Hin'kommen, to come, get to;	Scherz, *m.* jest, sport;
Bahnen, to open, (as a path), facilitate;	Park, *m.* park;	Stören, to trouble, disturb;
Ende, *n.* end;	Pflanze, *f.* plant, vegetable;	Türkiſch, Turkish;
Fort'gehen, to go away;	Schein, *m.* shine, light;	Verſchwen'deriſch, prodigal, lavish, profuse.

Wiſſen Sie, wie weit Sie in der Sache zu gehen haben?	Do you know how far you have to go in the matter? (how far you are at liberty to go)
Einen wie langen (§ 120. 4.) Spazier'ritt haben Sie gemacht?	How long a (pleasure) ride have you taken?
Es verſteht ſich von ſelbſt, daß ein fauler Schüler keine Fort'ſchritte machen kann.	It is self-evident that a lazy scholar can make no advancement.
Dieſer Italie'ner verſteht' ſich auf Muſik.	This Italian is a judge of music
Herr M iſt heute Morgen fort nach Nord-Ame'rika	Mr. M. left (is off) this morning for North America.
So weit er auch von hier wohnt und ſo lange ich auch zu gehen habe, ſo beſu'che ich ihn dennoch alle Tage.	As far as he resides from here, and so great a distance as I have to walk, I, nevertheless, visit him every day.
Wohin' eilen Sie ſo ſchnell?	Whither are you hastening so rapidly?
Ich gehe zu dem Zahn'arzte	I am going to the dentist.
Die Sache ſei nun wie ſie wolle, ich werde ihm nicht verzeihen, es ſei denn, daß er mich um Entſchuld'igung bitte	Well, be it (the thing) as it may I shall not forgive him, unless he ask my pardon.

1. Der Dieb iſt ſeines Verbrechens überführt worden und es verſteht ſich von ſelbſt, daß er beſtraft werden wird. 2 Der Vater iſt ſeit dieſem Morgen fort und bis jetzt noch nicht wieder zurückgekehrt 3. Das Buch iſt fort und keiner dieſer Schüler will (§ 83 8. Rem.) wiſſen, wo es hingekommen iſt. 4. Meine Neffen ſind fortgegangen, ohne zu ſagen wohin ſie gehen würden. 5. Unſer Obſt iſt alle. (Sect. 41. III.) 6. Auch noch ſo vieles Geld wird all, wenn man verſchwenderiſch iſt. 7. Der türkiſche Kaiſer Soliman II ſagte kurz vor ſeinem Tode: „meine Kräfte ſind alle nicht aber mein Muth." 8 Wie weit gehen Sie heute? 9 Ich gehe bis daß ich müde werde, gewöhnlich bis an (Sect 38 Note 1) Park. 10. Mein Freund weiß nicht gut, wie weit er in dieſer Sache zu gehen hat. 11. Man muß ſelbſt im Scherz wiſſen, wie weit man zu gehen hat; denn auch im Scherze kann man beleidigen. 12. Wo gehen Sie hin? 13. Ich gehe nach meinem Anwalt. 14 Wie weit haben Sie zu gehen? 15 Bis an das Ende der Stadt. 16 Wie lange haben Sie zu gehen? 17. Ueber eine Stunde 18 Einen wie weiten Spaziergang haben Sie gemacht? 19. Ich bin ſie in der Nähe des Fürſten geweſen. 20. Einen wie langen Spaziergang haben Sie gemacht? 21. Ich bin über eine halbe Stunde ſpazieren gegangen. 22 Wie lange ſind Sie auf dem Hauſe geweſen? 23. Ich war drei viertel Stunden von demſelben entfernt 24. Wieviel Sie weit von demſelben entfernt? 25. Ich bin beinahe eine halbe Stunde weit von demſelben entfernt geweſen 26 Ich hörte euch niederſpringen, ich es nun auf dieſer, oder ſei es in jener Welt. 27. Der Gefangene meinte es ſei nun lange genug daß er den warmen Schein der Sonne und die friſche Luft habe entbehren müſſen. 28 Ich kann morgen nicht zu Ihr kommen es ſei denn, daß mein Bruder bei mir bleiben wolle; gerne würde. 29 Ich kann heute unmöglich meine Pferd beſorgen, es ſei denn, daß ich dieſen Nachmittag weniger geritten werde 30. Es mir Niemand in die Stadt eingelaſſen, es ſei denn, daß er einen Paß habe

I. Tell me if that is your own horse? 2. That farmer told me many things about agriculture. 3. I shall not go out today unless necessity compels me. 4 You will not enter the kingdom of heaven, unless you acknowledge the blessings of God. 5. My brother went off yesterday and we have heard nothing of him. 6. It is self-evident that without nourishment man, animals, and plants cannot exist. 7. My knife is gone, and none of the children know where. 8. Our money is all gone. 9. I know very well how far I have to go in this matter. 10. Where do you go to? 11. I am going to my brother. 12 How far have you to go? 13. Just to the park. 14. What distance have you to go? 15. About three quarters of a mile 16. He believed the time had now arrived to open his own path through life.

LESSONS IN ALGEBRA.—No. I

SECTION I.

INTRODUCTION.

Art. 1.—Algebra *is a general method of solving problems, and of investigating the relations of quantities by means of letters and signs.*

ILLUSTRATION.

Prob. 1.—Suppose that a man divided 72 pounds among his three sons in the following manner:—To A he gave a certain number of pounds; to B he gave three times as many as to A; and to C he gave the remainder, which was half as many pounds as A and B received. How many pounds did he give to each?

1. To solve this problem *arithmetically*, the pupil would reason thus: A had a *certain part*, i. e., *one share*; B received *three* times as much, or *three shares*; but C had *half* as much as A and B; hence he must have received *two shares*. By adding their respective shares, the sum is *six shares*, which, by the conditions of the question, is equal to 72 pounds. If, then, 6 shares are equal to 72 pounds, 1 share is equal to $\frac{1}{6}$ of 72, viz., 12 pounds, which is A's share. B had *three* times as many, viz., 36 pounds, and C *half* as many pounds as both, viz., 24 pounds.

2. Now, to solve the same problem by *algebra*, he would use *letters* and *signs*, thus:

Let x represent A's share; then by the conditions,

$x \times 3$ will represent B's share; and

$4x \div 2$ will represent C's share.

Add together the *several shares*, or x's; thus, $x + 3x + 2x = 6x$. Then $6x = 72$, for the whole is equal to all its parts; and $1x = 12$ pounds A's share; $3x = 36$ pounds B's share; and $2x = 24$ pounds C's share.

Proof.—Add together the number of pounds received by each, and the sum will be equal to 72 pounds, the amount divided.

In this *algebraic solution* it will be observed: *First*, that we *represent* the *number of pounds* which A received by x. *Second*, to obtain B's share, we must *multiply* A's share by 3. This multipli-

cation is represented by *two lines crossing each other like a capital* X. *Third*, to find C's share, we must take *half* the sum of A's and B's share. This *division* is denoted by a *line between two dots*. *Fourth*, the *addition* of their respective shares is denoted by *another cross formed by a horizontal* and *perpendicular line*. Take another example:—

PROB. 2.—A boy wishes to lay out 96 pence for peaches and oranges, and wants to get an equal number of each. He finds that he must give 2 pence for a peach, and 4 pence for an orange. How many can he buy of each?

Let x denote the number of each. Now, since the price of one peach is 2 pence, the price of x peaches will be $x \times 2$ pence, or $2x$ pence. For the same reason, $x \times 4$, or $4x$ pence, will denote the price of x oranges. Then will $2x + 4x$, that is, $6x$, be equal to 96 pence by the conditions of that question, and $1x$ is equal to $\frac{1}{6}$ of 96 pence, viz., 16 pence, which is the number he bought of each.

2. QUANTITIES in algebra are generally expressed by *letters*, as in the preceding problems. Thus b may be put for 2 or 15, or any other number which we may wish to express. It must not be inferred, however, that the letter used has *no determinate* value. Its value is *fixed* for the *occasion* or *problem* on which it is employed; and remains *unaltered* throughout the solution of that problem. But on a *different* occasion, or in *another* problem, the same letter may be put for any other number. Thus, in prob. 1, x was put for A's share of the money. Its value was 12 pounds, and remained fixed through the operation. In prob. 2, x was put for the number of each kind of fruit. Its value was 16, and it remained so through the calculation.

3. By the term *quantity*, we mean anything that can be *multiplied*, *divided*, or *measured*. Thus, a *line*, *weight*, *time*, *number*, &c., are called quantities.

4. The *first* letters of the alphabet, a, b, c, &c., are used to express *known* quantities; and the *last*, z, y, x, &c. letters, those which are *unknown*.

5. *Known* quantities are those whose values are given, or may be easily inferred from the conditions of the problem under consideration.

6. *Unknown* quantities are those whose values are not given but required.

7. *Sometimes*, however, the given quantities, instead of being expressed by letters, are given in *figures*.

8. Besides letters and figures, it will also be seen that we use *certain signs* or *characters* in algebra to indicate the *relations* of the quantities, or the *operations* which are to be performed with them, instead of writing out these relations and operations in words. Among these is the sign of addition ($+$), subtraction ($-$), equality ($=$), &c.

9. *Addition* is represented by two lines ($+$), one horizontal, the other perpendicular, forming a cross, which is called *plus*. It signifies "more," or "added to." Thus $a + b$ signifies that b is to be added to a. It is read a plus b, or a added to b, or a and b.

10. *Subtraction* is represented by a short horizontal line ($-$) which is called *minus*. Thus, $a - b$ signifies that b is to be "subtracted" from a; and is read a minus b, or a less b.

11. The sign $+$ is prefixed to quantities which are considered as *positive* or *affirmative*; and the sign $-$, to those which are supposed to be *negative*. For the nature of this distinction, see Arts. 36 and 37.

12. The sign is generally omitted before the *first* or *leading* quantity, unless it is *negative*; then it must *always be written*. When *no sign* is prefixed to a quantity, $+$ is *always* understood. Thus $a + b$ is the same as $+a + b$.

13. Sometimes *both* $+$ and $-$ (the latter being put under the former, $\mp$) are prefixed to the *same* letter. The sign is then said to be *ambiguous*. Thus $a \mp b$ signifies, that in certain cases, comprehended in a general solution, b is to be added to a, and in other cases subtracted from it.

Observe.—When *all* the signs are *plus*, or *all minus*, they are said to be *alike*; when *some* are plus and *others* minus, they are called *unlike*.

14. The *equality* of two quantities, or sets of quantities, is expressed by two parallel lines $=$. Thus $a + b = d$, signifies that a and b together are equal to d. So $8 + 4 = 16 - 4 = 10 + 2 = 7 + 2 + 3$.

15. When the first of the two quantities compared is *greater* than the other, the character $>$ is placed between them. Thus $a > b$ signifies that a is greater than b.

If the first is *less* than the other, the character $<$ is used; as $a < b$, i. e., a is less than b. In both cases, the quantity towards which the character *opens*, is greater than the other.

16. A numeral figure is often prefixed to a letter. This is called a *co-efficient*. It shows how often the quantity expressed by the letter is to be taken. Thus $2b$ signifies twice b; and $9b$, 9 times b, or 9 multiplied into b.

The co-efficient may be either a whole number or a fraction. Thus $\frac{2}{3}b$ is two-thirds of b. When the co-efficient is not expressed, 1 is always to be understood. Thus a is the same as $1a$, i. e., once a, or one times.

17. The co-efficient may also be a *letter*, as well as a figure. In the quantity mb, m may be considered the co-efficient of b; because b is to be taken as many times as there are units in m. If m stands for 6, then mb is six times b. In $3abc$, 3 may be considered as the co-efficient of abc; $3a$ the co-efficient of bc; or $3ab$ the co-efficient of c.

18. A *simple* quantity is either a single letter or number, or several letters connected together *without* the signs $+$ and $-$. Thus a, ab, abd, and $8b$, are each of them simple quantities.

19. A *compound* quantity consists of a number of simple quantities connected by the sign $+$ or $-$. Thus $a + b$, $d - y$, $b - d + 3x$, are each compound quantities. The members of which each is composed are called *terms*.

20. If there are *two* terms in a compound quantity, it is called a *binomial*. Thus $a + b$ and $a - b$ are binomials. The latter is also called a *residual* quantity, because it expresses the *difference* of two quantities, or the remainder, after one is taken from the other. A compound quantity consisting of *three* terms, is sometimes called a *trinomial*; one of four terms, a *quadrinomial*, &c.

21. When the several members of a compound quantity are to be subjected to the *same operation*, they must be connected by a line (——) called a *vinculum*, or by a *parenthesis* ( ). Thus $a - \overline{b + c}$, or $a - (b + c)$, shows that the *sum* of b and c is to be subtracted from a. But $a - b + c$ signifies that b and c is to be subtracted from a, while c is to be added.

22. A single letter, or a number of letters, representing any quantities with their relations, is called an algebraic *expression*, or *formula*. Thus $a + b + 3d$ is an algebraic expression.

23. *Multiplication* is usually denoted by two oblique lines crossing each other, thus $\times$. Thus $a \times b$ is a multiplied into b; and 6×3 is 6 times 3, or 6 into 3. Sometimes a *point* is used to indicate multiplication. Thus $a \,.\, b$ is the same as $a \times b$. But the sign of multiplication is more commonly omitted, between simple quantities; and the letters are connected together in the form of a word or syllable. Thus ab is the same as $a \,.\, b$ or $a \times b$. And $bcde$ is the same as $b \times c \times d \times e$. When a compound quantity is to be multiplied, a *vinculum* or *parenthesis* is used, as in the case of subtraction. Thus the sum of a and b multiplied into the sum of c and d, is $\overline{a + b} \times \overline{c + d}$, or $(a + b) \times (c + d)$. And $(6 + 2) \times 5$ is 8×5, or 40. But $6 + 2 \times 5$ is $6 + 10$, or 16. When the marks of parenthesis are used, the sign of multiplication is frequently omitted. Thus $(x + y)\,(x - y)$ is $(x + y) \times (x - y)$.

24. When two or more quantities are multiplied together, each of them is called a *factor*. In the product ab, a is a factor, and so is b. In the product $x \times (a + m)$, x is one of the factors, and $a + m$ the other. Hence every *co-efficient* may be considered as a factor. (Art. 17.) In the product $3y$, 3 is a factor as well as y.

25. A quantity is said to be *resolved into factors*, when any factors are taken, which, being multiplied together, will produce the given quantity. Thus $3ab$ may be resolved into the two factors $3a$ and b, because $3a \times b$ is $3ab$. And $5amn$ may be resolved into the three factors $5a$, and m, and n. And 48 may be resolved into the two factors 2×24, or 3×16, or 4×12, or 6×8: or into the three factors $2 \times 3 \times 8$, or $4 \times 6 \times 2$, &c.

26. *Division* is expressed in two ways: 1st. By a horizontal line between two dots $\div$, which shows that the quantity *preceding* it is to be divided by that which *follows*. Thus, $a \div c$, is a divided by c.

2nd. Division is more commonly expressed in the form of a *fraction*, putting the dividend in the place of the numerator, and the divisor in that of the denominator. Thus $\frac{a}{b}$ is a divided by b.

27. When four quantities are *proportional*, the proportion is expressed by points, in the same manner as in the Rule of Proportion in arithmetic. Thus $a : b :: c : d$ signifies that a has to b, the

same ratio which c has to d. And $ab : cd :: a+m : b+n$, means that ab is to cd, as the sum of a and m, to the sum of b and n.

28. Algebraic quantities are said to be *alike*, when they are expressed by the same *letters*, and are of the same *power*; and *unlike*, when the letters are different, or when the same letter is raised to different powers. Thus ab, $3ab$, $-ab$, and $-6ab$, are like quantities, because the letters are the same in each, although the signs and co-efficients are different. But $3a$, $3y$, $3bx$, are unlike quantities, because the letters are unlike, although there is no difference in the signs and co-efficients. So x, xx, and xxx, are *unlike quantities*, because they are different powers of the same quantity. (They are usually written x, x^2 and x^3.) And universally if *any quantity is repeated as a factor* a number of times in one instance, and a *different* number of times in another, the products will be *unlike quantities*; thus, cc, $cccc$, and c, are unlike quantities. But if the same quantity is repeated as a factor the *same number* of times in *each instance*, the products are *like quantities*. Thus, aaa, aaa, aaa and aaa, are *like* quantities.

29. One quantity is said to be a *multiple* of another, when the former *contains* the latter a certain number of times without a remainder. Thus $10a$ is a multiple of $2a$; and 24 is a multiple of 6.

30. One quantity is said to be a *measure* of another, when the former is *contained* in the latter any number of times, without a remainder. Thus $3b$ is a measure of $15b$; and 7 is a measure of 35.

31. The *value* of an expression, is the number or quantity for which the expression stands. Thus the value of $3+4$ is 7; of 3×4 is 12: of $\frac{1}{2}^6$ is 2.

32 *The* RECIPROCAL *of a quantity, is the quotient arising from dividing* A UNIT *by that quantity.* The reciprocal of a is $\frac{1}{a}$; the reciprocal of $a+b$ is $\frac{1}{a+b}$; the reciprocal of 4 is $\frac{1}{4}$.

33. What is the algebraic expression for the following statement, in which the letters a, b, c, &c., may be supposed to represent any given quantities?

EXAMPLE.—The product of a, b, and c, divided by the difference of c and d, is equal to the sum of b and c added to 15 times h.

Ans. $\frac{abc}{c-d}=b+c+15h$.

EXERCISES.

2. The product of the difference of a and h into the sum of b, c and d, is equal to 37 times m, added to the quotient of b divided by the sum of h and b.

3. The sum of a and b, is to the quotient of b divided by c, as the product of a into e, is to 12 times h.

4. The sum of a, b and c, divided by six times their product, is equal to four times their sum diminished by d.

5. The quotient of 6 divided by the sum of a and b, is equal to 7 times d, diminished by the quotient of b, divided by 36.

34. What will the following expressions become, when words are substituted for the signs?

6. $\frac{a+b}{h}=abc-6m+\frac{a}{a+c}$.

Ans. The sum of a and b divided by h, is equal to the product of a, b and c diminished by 6 times m, and increased by the quotient of a divided by the sum of a and c.

EXERCISES.

7. $ab+\frac{3h-c}{x+y}=d\times a+b+c-\frac{h}{6+b}$.

8. $a+7(h+x)-\frac{c-6d}{2a+4}=(a+h)\ (b-c.)$

9. $a-b : a\ c :: \frac{d-4}{m} : 3\times(h+d+y)$.

10. $\frac{a-h}{3+(b-c)}+\frac{d+ab}{2m}=\frac{b\,a\times(d+h)}{a\,m}-\frac{cd}{h+d\,m}$.

35. At the close of an algebraic process it is often necessary to restore the numbers for which letters have been substituted at the beginning. In doing this the sign $\times$ must *not be omitted* between the numbers, as it generally is between factors expressed by letters. Thus if a stands for 3, and b for 4, the product ab is not 34, but 3×4, i. e. 12. Suppose $a=3$; $b=4$; $c=2$; $d=6$; $m=8$; and $n=10$.

Find the values of the following *algebraic expressions.*

EXAMPLE.—11. $\frac{ad}{c}+a+mn=\frac{3\times6}{2}+3+8\times10=9+3+80=92$. Ans.

EXAMPLE.—12. $\frac{b+mn}{cd}+\frac{bc+n}{3d}=\frac{4+80}{2\times6}+\frac{4\times2+10}{3\times6}=8$. Ans.

EXERCISES.

13. $\frac{b+ad}{c}+bcm-\frac{d\times4cn}{5a}$. 14. $bm+\frac{ab+3d}{d}-\frac{3bn-dc}{3cd}$

15. $abm+\frac{2b}{m-b}+2n$. 16. $(a+c)\times(n-m)+\frac{m-b}{m-d}-a$.

17. $\frac{a\times(d+c)}{n-d}+abc-\frac{(c+b)\times(m-d)}{n-bc}$.

18. $\frac{ac+5m}{2n+3}+m-cb+\frac{(4d-b)\times(a-c)}{n}$.

POSITIVE AND NEGATIVE QUANTITIES.

36. A POSITIVE OR AFFIRMATIVE *quantity is one which is to be added, and has the sign* $+$ *prefixed to it.* (Art. 11.)

37. A NEGATIVE *quantity is one which is required to be* SUBTRACTED, *and has the sign* $-$ *prefixed to it.*

When several quantities enter into a calculation, it is frequently necessary that some of them should be *added* together, while others are *subtracted.*

If, for instance, the profits of trade are the subject of calculation, and the *gain* is considered positive, the *loss* will be negative; because the latter must be *subtracted* from the former, to determine the clear profit. If the sums of a book account are brought into an algebraic process, the debit and the credit are distinguished by opposite signs.

38. The terms positive and negative, as used in the mathematics, are merely *relative.* They imply that there is, either in the nature of the quantities, or in their circumstances, or in the purposes which they are to answer in calculation, some such *opposition* as requires that one should be *subtracted* from the other. But this *opposition* is not that of *existence* and *non-existence*, nor of *one thing greater* than *nothing*, and *another less* than *nothing.* For in many cases either of the signs may be, indifferently and at pleasure, applied to the very same quantity; that is, the two characters may change places. In determining the progress of a ship, for instance, her easting may be marked $+$, and her westing $-$; or the westing may be $+$, and the easting $-$. All that is necessary is, that the two signs be prefixed to the quantities, in such a manner as to show which are to be added, and which subtracted. In different processes they may be differently applied. On one occasion, a downward motion may be called positive, and on another occasion negative.

39. In every algebraic calculation, some one of the quantities must be fixed upon to be considered positive. All other quantities which will *increase* this must be positive also. But those which will tend to *diminish* it, must be negative. In a mercantile concern, if the *stock* is supposed to be positive, the *profits* will be positive; for they *increase* the stock; they are to be *added* to it. But the *losses* will be negative; for they *diminish* the stock; they are to be *subtracted* from it.

40. A negative quantity is frequently *greater* than the positive one with which it is connected. But how, it may be asked, can the former be *subtracted* from the latter? The greater is certainly not *contained* in the less: how then can it be taken out of it? The answer to this is, that the greater may be supposed first to *exhaust* the less, and then to leave a remainder equal to the difference between the two. If a man has in his possession 1,000 pounds and has contracted a debt of 1,500; the latter subtracted from the former, not only exhausts the whole of it, but leaves a balance of 500 against him. In common language, he is 500 pounds worse than nothing.

41. In this way, it frequently happens, in the course of an

algebraic process, that a negative quantity is brought to *stand alone*. It has the sign of subtraction, without being connected with any other quantity, from which it is to be subtracted. This denotes that a previous subtraction has left a remainder, which is a part of the quantity subtracted. If the latitude of a ship which is 20 degrees north of the equator, is considered positive, and if she sails south 25 degrees: her motion first *diminishes* her latitude, then reduces it to *nothing*, and finally gives her 5 degrees of *south* latitude. The sign − prefixed to the 25 degrees, is retained before the 5, to show that this is what remains of the *southward* motion, after balancing the 20 degrees of north latitude.

42. A quantity is sometimes said to be *subtracted from* 0. By this is meant, that it belongs to the negative side of 0. But a quantity is said to be *added* to 0, when it belongs to the positive side. Thus, in speaking of the degrees of a thermometer, 0 + 6 means 6 degrees *above* 0; and 0 − 6, 6 degrees *below* 0.

AXIOMS.

43. An AXIOM is a *self-evident proposition*.

1. If the same quantity or equal quantities be *added* to equal quantities, their *sums* will be equal.
2. If the same quantity or equal quantities be *subtracted* from equal quantities, the *remainders* will be equal.
3. If equal quantities be *multiplied* into the same, or equal quantities, the *products* will be equal.
4. If equal quantities be *divided* by the same or equal quantities, the *quotients* will be equal.
5. If the same quantity be both *added to* and *subtracted from* another, the value of the latter will not be altered.
6. If a quantity be both *multiplied* and *divided* by another, the value of the former will not be altered.
7. Quantities which are respectively equal to any other quantity, are equal to each other.
8. The whole of a quantity is greater than a part.
9. The *whole* of a quantity is equal to *all its parts*.

LESSONS IN ARITHMETIC.—No. XXIII.

VULGAR FRACTIONS.

Answers to the Exercises in our last Lesson follow in order:—

EXERCISES TO PROB. III.

Answers.—9, $9\frac{1}{7}$, $70\frac{7}{10}$, 1, 2, 30, $42\frac{5}{12}$, and $20\frac{15}{476}$.

EXERCISES TO PROB. IV.

Answers, First.—$\frac{24}{1}$, $\frac{48}{1}$, $\frac{201}{1}$, $\frac{4000}{1}$, and $\frac{4827004}{1}$.

Second.—$\frac{300}{12}$, $\frac{288}{6}$, $\frac{1505}{5}$, $\frac{18000}{4}$, and $\frac{1174812004}{2}$.

Third.—$\frac{21}{6}$, $\frac{71}{4}$, $\frac{77}{3}$, $\frac{348}{7}$, $\frac{1852}{53}$, and $\frac{1833600}{8853}$.

EXERCISES TO PROB. V.

Answers.—(1.) $\frac{5}{18}$, (2.) $\frac{1}{8}$; (3.) $\frac{3}{5}$; (4.) $\frac{4}{5}$; (5.) $\frac{10}{135}$; and (6.) $\frac{13}{952}$.

EXERCISES TO PROB. VI.

Answers,—(1.) $5\frac{3}{4}$; (2.) $3\frac{643}{728}$; (3.) $1\frac{333}{1334}$; (4.) $40\frac{197}{324}$; (5.) $50\frac{67}{1250}$; and (6.) $2689\frac{1}{18}$.

SUBTRACTION OF FRACTIONS.

PROBLEM VII.

To subtract one fraction or one mixed number from another, or from a whole number.

RULE 1.—When the given fractions have a common denominator, subtract the less numerator from the greater, and under it place the common denominator, for the difference or remainder required. The difference should be reduced to its lowest terms, and if it be an improper fraction, it may be reduced to a whole or mixed number, by Problem III.

EXAMPLE.—Find the difference of the two fractions, $\frac{13}{17}$ and $\frac{7}{17}$.

Here, $\frac{13}{17} - \frac{7}{17} = \frac{6}{17}$, the difference required.

RULE. 2—If the given fractions have different denominators, reduce them by Problem II, p. 267, to fractions of equal value having a common denominator, and apply the preceding rule to these fractions, the difference will be the answer required. The reason of these rules is explained at p. 168, vol. II.

EXAMPLE.—Find the difference of the following fractions: $\frac{3}{5}$ and $\frac{9}{15}$.

Here, by Problem II., p. 267, we have

	Numerators.
$\frac{3}{5} = \frac{45}{75}$	57
$\frac{9}{15} = \frac{50}{75}$	50
difference	7

Whence $\frac{7}{75}$ is the answer required. Or, $\frac{57}{75} - \frac{50}{75} = \frac{7}{75}$, the difference of the fractions.

RULE 3.—When a whole number and a proper fraction are given to find their difference, take a unit of the given whole number and reduce it to a fraction having the same denominator as the given fraction, by Rule 2, Prob. IV., p. 328, vol. II. Then find the difference between this fraction and the given fraction by Rule 1 above; this difference added or appended to the difference between the given number and unity (viz., the unit borrowed), will be the answer required. The reason of this rule is explained at p. 133, def. 2., and at p. 168, vol. II.

EXAMPLE.—Find the difference between 20 and $\frac{1}{20}$.

Here, taking 1 from 20 leaves 19; and $1 = \frac{1}{1} = \frac{20}{20}$, by Rule 2, Prob. IV. Now, $\frac{20}{20} - \frac{1}{20} = \frac{19}{20}$, by Rule 1 above; whence $19\frac{19}{20}$ is the difference required.

RULE 4.—When a mixed number and a fraction or two mixed numbers are given to find their difference; reduce the given fractions to fractions of equal value having a common denominator, by Prob. II. Then, appending these fractions to the integers to which they belong, subtract that mixed number which has the smallest integer from the other; in subtracting the fractional part of the one from the fractional part of the other, if the numerator of the subtrahend be less than that of the minuend, apply Rule 1 above, and then the Rule of Subtraction, p. 66, vol. I.; but if the numerator of the fractional part of the subtrahend be greater than that of the minuend, apply Rule 3 above; add the difference thus obtained to the fractional part of the minuend, and then take the difference between the remaining integral parts as before. This difference, prefixed to the difference of the fractional parts thus obtained, will give the difference required.

The reason of this rule is obvious from the reasons assigned for the preceding rules.

EXAMPLE 1.—Find the difference between $31\frac{7}{8}$ and $22\frac{3}{5}$.

Here, $\frac{7}{8} = \frac{35}{40}$, $\frac{3}{5} = \frac{24}{40}$ } by Prob. II.

Whence, $31\frac{7}{8} = 31\frac{35}{40}$

$22\frac{3}{5} = 22\frac{24}{40}$

Required difference $9\frac{11}{40}$;

by the rules to which reference has been made above.

EXAMPLE 2.—Find the difference between $43\frac{1}{12}$ and $27\frac{3}{5}$.

Here, as before, $43\frac{1}{12} = 43\frac{5}{60}$

$27\frac{3}{5} = 27\frac{36}{60}$

Now, taking 1 from 43, leaves 42; and $1 = \frac{1}{1} = \frac{60}{60}$ by Rule 2, Prob. 4;

then, $\frac{60}{60} - \frac{36}{60} = \frac{24}{60}$; and

$\frac{24}{60} + \frac{5}{60} = \frac{29}{60}$; by the rule.

But $42 - 27 = 15$, by the Rule of Subtraction, p. 66, vol. I. Therefore, $15\frac{29}{60}$, is the difference required.

EXAMPLE 3.—Find the difference between $7\frac{3}{10}$ and $\frac{1}{7}$.

Here, as before, $7\frac{3}{10} = 7\frac{11}{70}$

$\frac{1}{7} = \frac{10}{70}$

Required difference $6\frac{1}{70}$, Ans.

In working this example, as above, we have first to take 1 from 7 which leaves 6; then $1 = \frac{1}{1} = \frac{70}{70}$; next, $\frac{70}{70} - \frac{10}{70} = \frac{30}{70}$; and $\frac{30}{70} + \frac{11}{70} = \frac{41}{70}$; whence $6\frac{1}{70}$ is the answer required.

EXERCISES.

Find the difference of the following fractions and mixed numbers:—

1.—Between $\frac{1}{2}\frac{7}{3}$ and $\frac{9}{10}$.
2.—Between $\frac{3}{17}$ and $\frac{5}{9}$.
3.—Between 1 and $\frac{19}{20}$.
4.—Between $4\frac{3}{4}$ and $2\frac{6}{17}$.
5.—Between $1306\frac{1}{2}$ and $708\frac{3}{5}$.
6.—Between $49\frac{3}{13}$ and $24\frac{14}{17}$.

MULTIPLICATION OF FRACTIONS.

PROBLEM VIII.

To multiply fractional quantities and mixed numbers by each other.

RULE 1.—When the given fractions to be multiplied are proper fractions, multiply all their numerators together for the numerator of the product, and all their denominators for the denominator of the product; the result placed in a fractional form will be the product required.

The reason of this rule may be thus explained; take, for example, two proper fractions $\frac{3}{4}$ and $\frac{5}{7}$, and let it be required to find their product. You will recollect that the fraction $\frac{5}{7}$ may be considered as $\frac{1}{7}$ of 5 (see No. 7, p. 133, vol. ii.); you will also remember that to multiply the fraction $\frac{3}{4}$ by 5, we must multiply the numerator only, and that this product will be $\frac{15}{4}$ (see No. 11, Principle 2, p. 134); now we wish to have the product of $\frac{3}{4}$ by $\frac{1}{7}$ of 5; we must therefore take $\frac{1}{7}$ of the product of this fraction by 5, that is, we must take $\frac{1}{7}$ of $\frac{15}{4}$; but, by No. 8, Def. 3, p. 133, this becomes $\frac{1}{7}\frac{5}{4}$, the proper answer to the question. The process, then, is plainly this; in order to multiply one fraction by another, you first multiply the multiplicand by the numerator of the multiplier, and then divide the product by its denominator (see No. 12, Principle 3, p. 134); but this process is equivalent to that expressed in the words of the rule; for multiplying the numerator of a fraction by a whole number increases its value, and multiplying the denominator by the same diminishes its value; and the numerator and denominator of the multiplier are considered as whole numbers when taken by themselves.

Another view of the reason of this rule may be taken perhaps with more simplicity and propriety as follows: When we multiply a fraction by any number we repeat or take it as many times as that number denotes; when we multiply it by *unity or one* we take it *one time*; and when we multiply it by a *proper fraction* we take it a *part of a time*; therefore, in the latter case, we must take such a part of the multiplicand as that part denotes; but to take such a part of a fraction as another fraction denotes is to *take a fraction of a fraction*, which, according to No. 8, Def. 3, p. 133, is to form a *compound fraction*; and this requires the operation described in the rule; see the place to which we have just referred.

From the preceding observations we draw the following important observations, viz.: That whatever be the nature of the multiplicand, 1, if it be multiplied by a *whole number* greater than unity, it is *increased*; 2, if it be multiplied by *unity itself* it is *neither increased nor diminished*; 3, and, if it be multiplied by a *proper fraction* it is *diminished*, that is, the product is always *less than* the multiplicand.

When the product of several fractions is required, the preceding rule is applicable to any two of them; it is then applicable to the product of these two, and another of them; then to the product of these three and another of them; and so on, whatever be their number; so that the rule for reducing compound fractions to simple ones, and for multiplying any number of fractions together is the same. This rule is, therefore, capable of the same abridgment, by the method of *cancelling factors*, explained at No. 15, p. 328, col. 2, where the rule for this process is given.

N.B.—The answer obtained by the rule above must be reduced to its lowest terms.

EXAMPLE.—Multiply together the following fractions:—(1.) $\frac{4}{9}\times\frac{3}{8}$; (2.) $\frac{5}{11}\times\frac{5}{9}\times\frac{33}{70}$; and (3.) $\frac{1}{2}\times\frac{2}{3}\times\frac{3}{4}\times\frac{4}{5}\times\frac{5}{6}\times\frac{6}{7}$.

Here, the operations are indicated as follows:—

(1.) $\frac{4}{9}\times\frac{3}{8}=\frac{4\times3}{9\times8}=\frac{12}{72}=\frac{1}{6}$, by the rule.

Or, $\frac{4}{9}\times\frac{3}{8}=\frac{4\times3\times1}{3\times3\times2\times4}=\frac{1}{3\times2}=\frac{1}{6}$, by cancelling factors.

(2.) $\frac{4}{11}\times\frac{5}{9}\times\frac{33}{70}=\frac{4\times5\times33}{11\times9\times70}=\frac{660}{6930}=\frac{2}{21}$, by the rule.

Or, $\frac{4}{11}\times\frac{5}{9}\times\frac{33}{70}=\frac{2\times2\times5\times3\times11}{11\times3\times3\times2\times5\times7}=\frac{2}{21}$, by cancel. factors.

(3.) $\frac{1}{2}\times\frac{2}{3}\times\frac{3}{4}\times\frac{4}{5}\times\frac{5}{6}\times\frac{6}{7}=\frac{720}{5040}=\frac{1}{7}$, by the rule.

Or, $\frac{1}{2}\times\frac{2}{3}\times\frac{3}{4}\times\frac{4}{5}\times\frac{5}{6}\times\frac{6}{7}=\frac{1}{7}$, by cancelling the factors.

In these examples, the process of cancelling the factors appears strikingly useful; for, in (1.) the factors common to both numerator and denominator are 4 and 3, which being left out, gives the result $\frac{1}{6}$, without the trouble of reducing the product to its lowest terms; in (2.) the common factors are 2, 5, 3 and 11, and the result $\frac{2}{21}$; in (3.) the common factors are 2, 3, 4, 5, and 6, and the result is $\frac{1}{7}$.

EXERCISES.

Find the products of the following fractions:—

(1.) $\frac{7}{12}\times\frac{5}{14}\times\frac{2}{9}\times\frac{3}{8}$.

(2.) $\frac{325}{729}\times\frac{142857}{428571}$.

(3.) $\frac{111}{1332}\times\frac{49}{70}\times\frac{63}{343}$.

(4.) $\frac{7}{9}\times\frac{12}{19}\times\frac{51}{91}\times\frac{32}{145}\times\frac{38}{630}$.

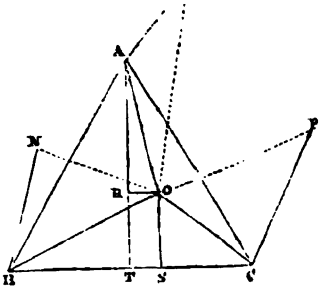
(5.) $\frac{3}{4}\times\frac{4}{5}\times\frac{5}{6}\times\frac{6}{7}\times\frac{7}{8}\times\frac{8}{9}$.

(6.) $\frac{1}{2}$ of $\frac{3}{4}$ of $\frac{5}{6}\times\frac{7}{9}$ of $\frac{4}{5}$ of $\frac{9}{10}$.

SOLUTIONS OF PROBLEMS AND QUERIES.

1. THE THREE TOWERS, p. 223.

LET A B C be the equilateral triangle, on whose angular points the three towers A M, B N, and C P are placed; let the base or side of the triangle A B C be denoted by d, and the heights of the three



towers A M, B N, and C P by a, b, and c, respectively. Let z denote the length of the ladder, which is either M O, N O, or P O, if we suppose O to be the point where the ladder must be placed, in order to reach the tops of the towers, at M, N, and P, respectively. It is plain that as the heights of the towers are of different lengths, if we suppose the lengths a, b, and c to be written in the order of their magnitude, a being the smallest, and c the tallest, that the point O will be nearest to C and nearer to B than to A. From the point A, draw A T perpendicular to B C; from the point O, draw O S perpendicular to B C, and O R to A T; then R O S T is a right angled parallelogram, and A R O a right angled triangle. Since by hypothesis, the angles M A O, N B O, and P C O are right angles, we have, by the 47th of Euclid's Book I., the following equations:—(1.) $AO^2=z^2-a^2$, (2.) $BO^2=z^2-b^2$, and (3.) $CO^2=z^2-c^2$, and denoting T S by x, and O S or R T by y, we have also, $BS^2+SO^2=BO^2$, and $CS^2+SO^2=CO^2$, or, by substitution, from the preceding, (4.) $\left\{\frac{1}{2}d+x\right\}^2+y^2=z^2-b^2$, and (5.) $\left\{\frac{1}{2}d-x\right\}^2+y^2=z^2-c^2$; whence, by subtracting equation (5.) from equation (4.),

we have $2dx = c^2 - b^2$, and consequently (6.) $x = \frac{c^2-b^2}{2d} = e$, which is known.

But by the 47th of Euclid, Book I., $AT^2 = AB^2 - BT^2$, or by substitution, $AT^2 = d^2 - \frac{1}{4}d^2 = \frac{3}{4}d^2$; whence (7.) $AT = \frac{1}{2}d\sqrt{3}$. Again, we have $AB^2 + BO^2 = AO^2$, or, by substitution, (8.) $\left\{\frac{1}{2}d\sqrt{3} - y\right\}^2 + e^2 = x^2 - a^2$, and (9.) $\left\{\frac{1}{2}d + e\right\}^2 + y^2 = x^2 - b^2$; whence, by subtracting equation (9.) from equation (8.), we have $\frac{1}{2}d^2 - e\,d - y\,d\sqrt{3} = b^2 - a^2$, and consequently (9.) $y = \frac{\frac{1}{2}d^2 + a^2 - b^2 - e\,d}{d\sqrt{3}} = f$, which is known. Now, from equation (9.) we have by transposition, substitution, &c., (10.) $x = \sqrt{\left(\left\{\frac{1}{2}d + e\right\}^2 + f^2 + b^2\right)}$.

Assuming the values as given in the question, we have $a = 28$, $b = 30$, $c = 34$, and $d = 50$. By substituting these numbers in equation (6.), we find $x = 2{\cdot}56 = e$. By substituting the same numbers, with the value of e just obtained, we find $y^2 = 134{\cdot}9381 = f^2$; and by substituting the values of e and f thus found, in equation (10.) we find $x = 42{\cdot}361$ feet, which is the length of the ladder required. From this value of x, the three distances AO, BO, and CO are found, by substitution in equations (1.), (2.), and (3.), to be respectively, 31·789 feet, 29·908 feet, and 25·268 feet. This question was solved by J. SOWDEN; DOUGLAS; A. SKERRITT (Holbrook); CAROLUS (Padiham); and many others.

SOLUTION OF QUERY 2, P. 240, COL. 2.

Let x and y be the two numbers. Then, by the question $xy = x + y$; Whence, we have, $xy - x = y$, by transposition; or, $x(y-1) = y$; whence, $x = \frac{y}{y-1}$.

Now, by assuming the value of y, we can from this expression, find the value of x which will answer the conditions of the question. This formula may be put into the words of the following rule; *From any number greater than unity, subtract unity, and divide the number by the remainder, the quotient and the number assumed will be the two numbers required.*

EXAMPLE.—Take any number 7 for the value of y, one of the numbers; then $7 - 1 = 6$, and $7 \div 6 = 1\frac{1}{6}$; whence 7 and $1\frac{1}{6}$ are the numbers required. Proof: $7 + 1\frac{1}{6} = 8\frac{1}{6}$; and $7 \times 1\frac{1}{6} = 8\frac{1}{6}$.

This question was solved by G. WILD (Dalton-on-Tees): PHILO (Berwick-on-Tweed): G. W. C.; and others.

FRENCH EXTRACTS.

PENSEES MORALES ET MAXIMES.

FAUTE.

Ne dites jamais: Cette faute est légère, je puis me la permettre sans danger. Ne dites jamais: Cet acte de vertu est peu considérable, il m'est bien permis de l'omettre.—*Sénèque.*

Il n'y a pour l'homme qu'un vrai malheur, qui est de se trouver en faute et d'avoir quelque chose à se reprocher.—*La Bruyère.*

FIERTE.

La fierté du cœur est l'attribut des honnêtes gens; la fierté des manières est celle des sots.—*Duclos.*

FINESSE.

La finesse n'a guère plus de peine à tromper l'esprit qu'à duper la bêtise.—*Livis.*

La finesse est l'occasion prochaine de la fourberie: de l'une à l'autre le pas est glissant: le mensonge seul en fait la différence: si on l'ajoute à la finesse, c'est fourberie.—*La Bruyère.*

Le vrai moyen d'être trompé, c'est de se croire plus fin que les autres.—*La Rochefoucauld.*

Il y a des gens niais que se connaissent et qui emploient habilement leur niaiserie.—*Idem.*

On peut être plus fin qu'un autre, mais non pas plus fin que tous les autres.—*Idem.*

FORTUNE.

L'on voit des hommes tomber d'une haute fortune par les mêmes défauts qui les y avaient fait monter.—*La Bruyère.*

Il faut de plus grandes vertus pour soutenir la bonne fortune que la mauvaise.—*La Rochefoucauld.*

Ceux qui se plaignent de la fortune n'ont souvent à se plaindre que d'eux-mêmes.—*Voltaire.*

On se plaint de l'issue de tel événement: *La fortune a trihi nos efforts*, dit-on; c'est dire en d'autres termes: *Il est arrivé un résultat sans cause.* Pourquoi ces plaintes d'enfant? Ce qui est arrivé devait arriver. Votre maison s'est écroulée; c'est qu'elle était mal étayée. Le peuple a couvert d'acclamations ses oppresseurs: c'est parce que le peuple n'est pas assez avancé pour comprendre ses véritables intérêts. La fortune n'a rien à faire là-dedans: au lieu de l'accuser, travaillez les causes, l'effet suivra. Tel est le rôle qui convient à des créatures raisonnables.—*J.-B. Say.*

FRERE.

Une coutume très-imprudente des pères et des mères, des instituteurs et des domestiques, c'est de faire naître et d'entretenir entre les frères une certaine émulation qui dégénère en discorde lorsqu'ils sont d'un âge plus avancé, et trouble la paix des familles.—*Bacon.*

GLOIRE.

La gloire des grands hommes se doit toujours mesurer aux moyens dont ils se sont servis pour l'acquérir.—*La Rochefoucauld.*

GOUT.

Il y a dans l'art un point de perfection, comme de bonté ou de maturité dans la nature: celui qui le sent et qui l'aime a le goût parfait; celui qui ne le sent pas et qui aime en deçà ou au delà a le goût défectueux. Il y a donc un bon et un mauvais goût, et l'on dispute des goûts avec fondement.—*La Bruyère.*

GRANDEUR.

La fausse grandeur est farouche et inaccessible: comme elle sent son faible, elle se cache, ou du moins ne se montre pas de front, et ne se fait voir qu'autant qu'il faut pour imposer et ne paraître point ce qu'elle est, je veux dire une vraie petitesse. La véritable grandeur est libre, douce, familière, populaire. Elle se laisse toucher et manier; elle ne perd rien à être vue de près; plus on la connaît, plus on l'admire. Elle se courbe par bonté vers ses inférieurs, et revient sans effort dans son naturel.—*La Bruyère.*

Les grandeurs sont comme les parfums; ceux que les portent ne les sentent quasi pas.—*Christine.*

GRAVITE.

Une gravité trop étudiée devient comique; ce sont comme des extrémités qui se touchent, et dont le milieu est dignité: cela ne s'appelle pas être grave, mais en jouer le personnage; celui qui songe à le devenir ne le sera jamais. Ou la gravité n'est point, ou elle est naturelle, et il est moins difficile d'en descendre que d'y monter.—*La Bruyère.*

GUERRE.

Il n'y a que deux puissances dans le monde: le sabre et l'esprit; j'entends par l'esprit les institutions civiles et religieuses. A la longue le sabre est toujours battu par l'esprit.—*Napoléon.*

HABITUDE.

On triomphe des mauvaises habitudes plus aisément aujourd'hui que demain.—*Confucius.*

Deux choses toutes contraires nous préviennent également, l'habitude et la nouveauté.—*La Bruyère.*

"Vous me reprenez de bien peu de chose, disait un jeune homme à Platon.—Ce n'est pas peu de chose que l'habitude," répondit-il.

Etablissez l'ordre, l'habitude l'entretiendra.—*Lévis.*

Celui-là me semble avoir très-bien conçu la force de la coutume qui le premier forger ce conte, qu'une femme de village, ayant appris de caresser et porter entre ses bras un veau dès l'heure de sa naissance, et continuant toujours à ce faire, gagna cela par l'accoutumance, que, tout grand bœuf qu'il était, elle le portait encore: car c'est, à la vérité, une violente et traîtresse maîtresse d'école que la coutume. Elle établit en nous, peu à peu, à la dérobée, le pied de son autorité: mais, par ce doux et humble commencement, l'ayant rassis et planté avec l'aide du temps, elle nous découvre tantôt un furieux et tyrannique visage, contre lequel nous n'avons plus la liberté de hausser seulement les yeux.—*Montaigne.*

C'est passe-temps aux mères de voir un enfant tordre le cou à un poulet, et s'ébattre à blesser un chien et un chat. Ce sont pourtant les vraies semences et racines de la cruauté, de la tyrannie: elles se germent là, et s'élèvent après gaillardement, et profitent à force entre les mains de la coutume.—*Idem.*

HAINE.

Il est indigne d'un honnête homme de se servir des débris d'une amitié qui finit, pour satisfaire une haine qui commence.—*Fenelon.*

Il ne faut pas, sans de fortes raisons, scruter le cœur des hommes. Se regarder scrupuleusement soi-même, ne regarder que légèrement les autres, c'est le moyen d'éviter la haine.—*Confucius.*

HAUTEUR.

Tout homme qui pense assez pour n'être pas haut, n'est jamais bas.—*Pascal.*

ANSWERS TO CORRESPONDENTS.

M. Mc' Gauran (Cavan) wishes to know the latest work on artificial memory, not too dear.—2. P. O. (Barnard Castle), will find a method of parsing laid down at p. 220, vol. I.—A. Mc' Kenna (Cappoquin): We think that France formerly exercised the greatest influence on the literature and science of England, but that Germany now bears the palm. On this subject, however, consult "Jeffrey's Contributions to the Edinburgh Review," or any volumes of the Review itself that may come in the way. We are glad that there is a "Mutual Improvement Society" in Cappoquin, Co. Waterford.—Discipulos (B. Field): Right about the lean horse. *Corporem* is not a Latin word, neither is *ingentem* applied to *bellum*; see p. 93, col. 2, vol. I. A Latin Dictionary would certainly be of great assistance to you. Thanks for the discovery of the "*round* world;" the word translated *round* in the passages of the Psalms found in the Prayer Book, is translated *habitable* in the Bible; but its true meaning seems to be unknown, as Geseenius, the best Hebrew scholar of modern times, seems to be quite at fault as to this point.

W. C.: His lines are capable of improvement.—A Beginner (Chelsea), should get Cassell's "French Manual," price 3s., and continue the study of the lessons in the P. E.—F. Buxton (Salford): Thanks for his solutions. A *millwright* should study mathematics in all its branches, both pure and mixed.—Adolphus (Hull): 12 o'clock *noon*, is neither A.M. nor P.M.; but the minute *after*, it is 0h. 1m. P.M.; and the minute *before*, it is 11h. 59m. A.M.—XXX (Liverpool): It is highly requisite in this age of strict inquiry for *every* clergyman to know the Scriptures in their original tongues; and it is equally requisite for every one who desires to confute gainsayers.—J. Russell (Kings-cavil): His new solution or rather form of the Pythagorean Theorum is ingenious; we shall endeavour to find it a place soon.—E. Pugh (Walsall), will obtain such drawings as he wants at Harvey and Darton's, Gracechurch-st.—Amico (Portsmouth): We shall do what we can to meet his views in relation to the European languages, &c., but Rome was not built in a day.—J. L. & G. W. (Glasgow) will now be satisfied.—A School-girl (Southwark): Genesis, chap. I., verse 9. If she be of suitable age, she may get some influential friend to recommend her as a proper person for enjoying the privilege of reading in the British Museum.

J. M. N. (Malta): His solutions to the questions in Cassell's Arithmetic are correct. We believe the P. E. will be found at Halifax in America.—S. Embleton (Blyth), and H. B. K. (Kingsland): Under consideration.—Nil Desperandum: A fortiori, means *much more therefore*, or *for the stronger reason*; a priori, means *for a reason founded on the nature of the thing*, or *for a reason exactly such as we might expect*; a posteriori, means *for a reason founded on some previous argument, statement, or fact, admitted to be true*; prima facie, means *at first sight:* a prima facie argument is a specious or imposing argument. If a man "cannot know what conscience is, until he knows something of metaphysics," he is much to be pitied! Every transgressor of a *righteous law* must both *know* and *feel* what conscience is (see Rom. chap. II, verse 14 and 15, and indeed the whole chapter).

Arthur Sharp: We thank him for his lines: but it would look like a wish for flattery to insert them.—Jean J. T. S. (Leeds): The "French Manual," published by Mr. Cassell, price 3s., is a substitute for the "Reading Book," to which he refers; he will also find in the P. E. in the "French Extracts" sufficient to engage his attention for a time.—J. C. C. (Clapham) may obtain the numbers he wants by calling on the Editor about the 5th March, at the office of the P. E.—N. M. L. (Barnard Castle): His last exercise is better than the former.—Y. A. S.: Her verses might be improved.—T. J. W. had better make up his mind from our columns.—Georgius: We are instructed to say that the whole 16 vols. of Mr. Cassell's Library will be in print within a fortnight,—that is, reprinted.—T. Guy (Broomside): *Go*, in the passage "*Go* to the ant, thou sluggard," &c. is not an interjection, but the 2nd person singular of the imperative mood of the verb *to go*. In the passages quoted from James, the words *go to* are the translation of the Greek *age*, which, like the Latin *age*, signifies, *literally, to do*, or *to be doing*, or *to hold, weigh, or consider*; they might, therefore, be translated, consider, or weigh well, *what I am going to say*, it is, therefore, used adverbially, like the words *behold, see, look, come now, well*, &c. The same words, *go to*, in the passages quoted from Genesis, are the translation of the Hebrew *haba*, which signifies, *literally, to give place, or set*,—that is, *to put yourselves in the attitude of attention*; as much as to say *hearken, listen*, &c., and is used adverbially just like the preceding words. As to the translation of Exod. xxxii. 35, it is so literal as to be obscure; it should be "they were the originators of the calf which Aaron made." The fact is, they compelled him to make it, and he submitted to them through fear.

R. L. A.: *Phonography* signifies *writing according to sound*; *stenography* means *writing in a small compass*. The origin and structure of the Low Islands extending from the Society Islands towards Cape Horn is the following: Coralline plants, growing at the bottom of the ocean, harbour a class of lithophytic (*stone producing*) insects, which, during their life, form round them a substance which after their death becomes hard as a stone. The rock-work of one generation affords a foundation to that of the succeeding, and layers are thus placed over each other till they reach the surface of the water and form islands. As soon as the rock is exposed to the air the insects quit the surface, leaving it perforated by numerous hollows; but they work for some time laterally (sideways), forming immediately under the water concealed table-reefs, which have given occasion to numerous and fatal shipwrecks. Meantime, from amid the interstices of the surface plants spring up, which, on their decay, are converted into soil, and thus by degrees the new island is covered with luxurious vegetation.—J. McKeever (Wigton): Under consideration.—J. Godfrey (Worksop) will see in the Literary Notices of the P. E. such books as will be useful to him and his friends; and by ordering them of the person who supplies him with the P. E. he will most readily obtain them.

H. F. McPherson (Grimsby): The error is now corrected. See also No. 46, p. 300, col. 1, line 60.—H. Fisher: In order to write "eleven thousand, eleven hundred and eleven," remember that *eleven hundred* is *one thousand one hundred*; so that the proper expression is *twelve thousand, one hundred, and eleven*.

LITERARY NOTICES.

Gin and Water; a pair of pictorial designs by Kenny Meadows, portraying the effects arising from the indulgence of those potent liquids. In the first, Gin, we have the interior of the drunkard's home, with a glimpse of the horrors which belong peculiarly to such homes; in the second, Water, we see how comfort, cleanliness, and peace attend the steps of the temperate man. The contrast is well sustained, and the pictures—which measure 24 inches by 16 inches—cannot but be popular. We have had too many songs and pictures in praise of the drinking customs of our country, and we are glad to perceive that our poets and artists are beginning to discover that they may get inspiration even out of water—

"Wine, wine, thy power and praise
Have ever been echoed in minstrel lays;
But water, I deem, hath a mightier claim
To fill up a niche in the Temple of Fame!"

These pictures, which should be framed and hung over every cottage chimney-piece, and on the walls of every factory, and workshop, and ragged school throughout all the land, can be obtained of every bookseller for one shilling. They are exquisitely engraved on wood, by Messrs. Henry Linton and William Measom.

The Autographs for Freedom; containing, in addition to a New Story by Mrs. Stowe, authoress of "Uncle Tom's Cabin," entitled "The Two Altars; or, Two Pictures in One;—The Altar of Liberty, or 1776; The Altar of ——, or 1850," a thrilling Narrative by Frederick Douglass, entitled "The Heroic Slave;" "Passages in the Life of a Slave Woman," by Annie Parker; "Placido, the Cuban Slave," by Professor W. G. Allen; "The Heroic Slave Woman," by the Rev. J. S. May, &c.; also, Contributions from the leading Writers in America on the Question of Negro Emancipation; and, on this side of the Atlantic, from the Earl of Carlisle, the Bishop of Oxford, Wilson Armistead, Joseph Sturge, &c.; with fac-similes of the Autographs of all the Contributors. Price 1s., in boards; or bound in cloth, with Eight beautiful Engravings from designs by Gilbert and Willis, price 1s. 6d.

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Printed and Published by John Cassell, 9, La Belle Sauvage-yard, Ludgate-hill.—March 19, 1853.

LESSONS IN PHONETIC SHORT-HAND.—No. VI.

By Alex. Melville Bell, F.R.S.S.A.,

Professor of Elocution and Vocal Physiology, Member of the British Phonetic Council, Author of the "Principles of Speech and Elocution"—"The Elocutionary Manual"—"Steno-phonography,"—&c.

68. The subordinate words given in the preceding lesson were uncontracted, except in size; written with all their elements, only without full-sized characters. The following list contains such words as are represented by a simplification of their alphabetic form, as *f t*, for *after*; *r ring*, for *round*; *b h*, for *behind*; *d r*, for *under*, &c.

69. The letters printed in *italics* in the list are those used to denote the words. Illustrations of the different forms are given, though, as they are all merely alphabetic, the student should be able to supply them for himself from the descriptive printing; and he is recommended to write them from this,—covering down the marks,—as the readiest means of fixing them upon the memory.

[As in the preceding lesson, an asterisk (*) after s, indicates the *hook s*; after r, the *horizontal r*; after m, n, or ng, *a ring*: (′) signifies write *upwards*; and (ᵇ), write *backwards*].

70. List of Subordinate Words

REPRESENTED BY A SIMPLIFICATION OF THEIR ALPHABETIC FORM.

*Be*hind		(N.) *in* or*der *to*	
*b'eyon**d		*in* or*der *that*	
(D.) *under**		Perhaps*	
*dur**ing*		(R.) her*	
		har**dly*	
*j*ust [*dzh*ust]		accor**ding**ly	
(F.) *af' ter*		accor**ding** *to* [*connected*]	
(K.) *c*an [*k*an]			
quit'e [*kwit'e*]		*roun**d*	
except [*eks**ept]		*rather*	
cross [a*kr**os]		Such [*s**ut*sh*]	
		*T'o*gether	
(L.) *little*		*et cet*era [*ts**t*]	
already		*which* [*whit'sh*]	
large [*lar**dzh]		be*tw*ixt	
Much [*m**ut*sh*]		be*tw*een*	
		*Th*ither	
im*m*ediately		V.) *ever*lasting*	
*m**ean**while*		(W.) not*withs**t'*and*ing*	

Exercises.

71. I.—Write the following compound words and phrases, by *uniting the subordinate symbols.*

Forasmuch, inasmuch, just so, just as, just about, just because, just like, just this, just thus, just that, just then, just one, just once, after all, quite so, quite as, quite enough, quite alone, quite another, except that, except as, except among, except indeed, except only, except some, except this, except which, except such, little less, little (or) none, large enough, as large as, perhaps so, perhaps always, perhaps indeed, accordingly therefore, rather than, rather far, rather near, rather better, rather less, rather soon, rather that, rather large, rather much, hardly (so) much, such as, as such, as much as, as little as, altogether, together with, whichever, her own, by and bye, thenceforward, thitherward, every one, very soon, very far, very little, very well.

II.—Write the following words, by adding the letters in *italics* to the subordinate words, omitting the letters within brackets:—

One *th*(ing), some*th*(ing), same *th*(ing), some*th*(ing) else, any*th*(ing), just*ly*, larger*, large*st'*, large*ly*, like*w'is**e*, under*n**eat*h*, some*t*(ime), some*t*(ime)*s**, same *t*(ime), often*t*(ime)*s**, far(the)*r**, far(the)*st*, never(the)less, here(to)fore.

72. Contracted letters never having vowels before them in full alphabetic writing, the addition of a *dot before any small character*, simple or compound, will furnish a distinctive symbol for any word to which it may be appropriated. This principle is employed to distinguish the past from the present form of the auxiliary verbs *do*, *can*, *may*, *shall*, and *will*. Thus.

A dot before	*do* (d) ..... is		did.
,, ,,	*can* (k) ..... is		could.
,, ,,	*may* (m′) ..... is		might.
,, ,,	*shall* (shl) ..... is		should.
,, ,,	*will* (wl) ..... is		would.

73. The same principle of distinction is applied to a few other words. Let the learner supply the symbols. Thus:—

A dot before	*l* (all) .... is		let.
,, ,,	*f* (off) ..... is		if.
,, ,,	*h* (he, him) ... is		who, whom.
,, ,,	*h s** (his) ... is		whose.
,, before	*a ring* (am, &c.,) is		i.e. [id est, that is].
,, ,,	*g* (ago) ..... is		e.g. or ex.gr. [Exempli gratia = By way of example].
,, ,,	*t* (to, it) ..... is		out.
,, ,,	*th* (they, them) is		though.
,, ,,	*thr** (there, their) is		through.
,, ,,	*thr**t* (thereat) is		throughout.
,, ,,	*w* (we) ..... is		away.
,, ,,	*wh'l* (while) ... is		awhile.
,, ,,	*l'k* (like) ..... is		alike.
,, ,,	*r, ring* (round) is		around.

74. Another similar and equally simple principle of distinction is employed in the notation of the words *at*, *thou* (*thee*, *thy*), *thine*, *us*, *ye*, and *down*. These words are individualised, and preserved from confusion with *to*, *they*, *then*, *so*, &c., by the addition of a little angular *tick* to the letters. Thus:—

at		t		us		s
thou (thee, thy)		th		ye		y
thine		thn		down		d

The Verb to Have.

75. *A full-sized H* is used to represent the verb *Have*. This character is perfectly distinctive, as it never occurs in ordinary English notation. In the word *ahoy* the final vowel would be indicated by a dot.

Having, *had*, &c., are represented by alphabetic additions, to "*have*." Thus:—

having		*have, ng.*
had		*have, d.*
to have		*t, have.*
have had		*have, repeater.*
had had		*had, repeater.*
having had		*having, repeater.*

Exercise.—Write the following phrases, by uniting the subordinate symbols:—

Have been, have to be, to have been, having been, had been, shall have, should have, will have, would have, may have, might have, can have, could have, must have, shall have been, should have had, to have had, will have to be, must have had, may have had to be, &c.

76. The verb to *do* is not, like *be*, *united* with other auxiliary verbs. It must be written to one side of the verb. This is necessary to prevent confusion between *had* and *have done*.

shall be.	will be.	may do.
should do.	would do.	might be done.

77. Exercise.—Write the following phrases, *uniting the words connected by hyphens*:—

To-be done, having-been done, have-to-be done, shall-be done, will-have-to-be done, do have done, to-have-been done, might-have-been done, should-have-to-be done, might-have-had-to-be done, &c.

The Adverbs *More* and *Most*.

78. The common sign of *plus* (+) is adopted to denote the synonymous word *more*; and *most* and *mostly* are represented by alphabetic additions to plus. Thus—

more.	(more, l) mostly.
(more, t) most.	

This symbol is applied to all compounds containing *more* and *most*; as

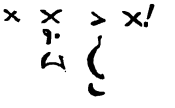
moreover.	almost.
evermore.	foremost.

79. Exercise.—Write the following phrases by *uniting the subordinate symbols*. Omit the letters within brackets:

Far-more, more-like, many-more, any-more, nothing-more, less(or)-more, more (or)-less, neither-more(nor)-less, some-more, still-more, more-than, what-more, little-more, much-more, perhaps-more, rather-more, more-so, more-immediately, more-according to.

The Negatives *No* and *Not*.

80. The negative particles *no* and *not* are represented by a very small oblique cross, written either constructively or separately. Thus:—



No, not in the least, I tell you, no!

81. The negatives *no* or *not* may be joined to any subordinate word—as *in* and *un* were indicated with prefixes—by *crossing the end* of the contraction, or *the ring*, if it is a ring letter. Thus:—

	no more.		be not.
	not less.		do not.
	am not, &c.		not to be.
	never[=not ever]		not to do.

 will not.

 shall not be.

must not be done.

82. Exercise.—Write the following negative phrases by uniting the component symbols, omitting the letters within brackets.

Not above, not below, not bad, no better than, not good, not so far as, no greater than, not here, not [at] all, not always, not [in the] least, may not be, might not have been, not to be done, not many more, not mine, not any more, not until then, not only so, not unless, not enough, not so, no sooner therefore, not [the] same, not as [it] was, not as if, not so often as, let [it] not be, if not, not his own, did not, would not be, should not have, cannot, could not have had, not quite, not perhaps, perhaps not, not according to, rather not have, not such as, not together, not to have, had not, not having had

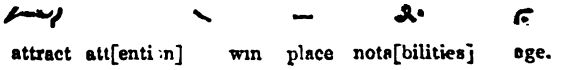
83. The list of the subordinate classes of words is now complete. So few of the symbols are in any degree arbitrary, that the learner can have but little difficulty in committing them perfectly to memory. They must now be familiarised to the hand and eye *by practice*. Perhaps the best exercise for this purpose will be to write in semi-stenography, or mixed short and long hand, for some time. This mode consists in writing the nouns, verbs, and other leading words in long-hand, while *prefixes*, *affixes*, and the *subordinate words*—articles, prepositions, pronouns, auxiliary verbs, conjunctions, and common adverbs—are supplied in contracted short-hand writing.

84. This method of writing in semi-stenography, besides being useful as a means of acquiring facility in the use of the subordinate symbols, has a further and permanent utility as a general *manuscript* style, applicable, especially, to lectures, sermons, and other compositions that are to be read from in public, or to be printed from. It is quite as easily read—even after only a few hours' study of the system—as full long-hand writing; and, as it saves more than half the time and space occupied by ordinary long-hand, it possesses no mean advantages to literary men, as an easily acquired *composition-style*, which any printer could very readily be taught to decipher and "set" from with accuracy.

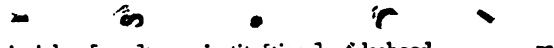
85. The following illustration exemplifies the mode of writing in semi-stenography. The leading words occupy a continuous line; they are first written, and the subordinate symbols are thrown into the interlinear space, just as we dot the *i*'s and stroke our *t*'s. Subordinate words pronounced *after* the leading words to which they accentually belong—as in the phrases "going *on*," "reflect *itself*," &c.—are written *in the line* of long-hand. Prefixes and affixes are drawn *across the lower end* of the long-hand letter next them. The words and syllables within brackets in the illustration are those that are to be thus written in short-hand in the line of the writing.

going [on] world men know notice. Events

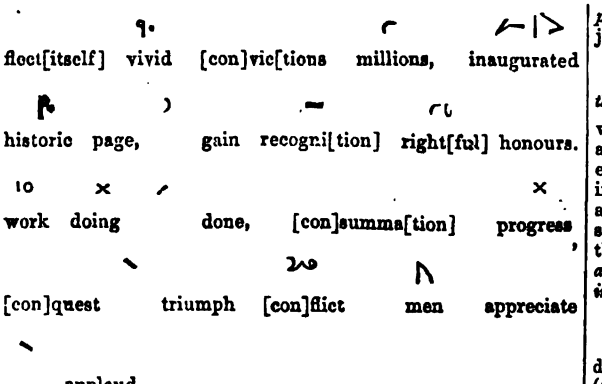
things attain certain size assume certain aspect,



attract att[enti n] win place note[bilities] age.



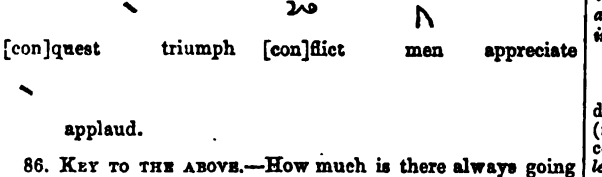
Principle [over]turn institu[tions] falsehood re-



fleet[itself] vivid [con]vic[tions millions, inaugurated

historic page, gain recogni[tion] right[ful] honours.

work doing done, [con]summa[tion] progress



[con]quest triumph [con]flict men appreciate

applaud.

86. KEY TO THE ABOVE.—How much is there always going on in the world which men either do not know or do not notice. Events, as well as things, must attain a certain size, and assume a certain aspect, before they will attract attention and win a place among the notabilities of the age. A principle must overturn the institutions of falsehood, and reflect itself in the vivid convictions of millions, before it can be inaugurated on the historic page, or gain a recognition of its rightful honours. It is work not doing but done, consummation not progress, conquest and triumph rather than conflict, which men appreciate and applaud.

LESSONS IN LATIN.—No. XLV.

By JOHN R. BEARD, D. D.

SYNTAX.

HAVING given these general explanations, I proceed now to take up each of the general divisions into which I have divided the subject of Latin syntax. And first I shall treat of

AGREEMENT.

Agreement, also, bears the name of concord. Agreement may take place variously, as between

1. A noun and a noun.
2. A noun and a pronoun.
3. A pronoun and a pronoun.
4. A noun and an adjective or a participle.
5. A noun with a verb.
6. A pronoun with a verb.

1. A noun agrees with a noun, e. g.,

Tomyris fuit *regina.*
Tomyris was queen.

Here observe the two nouns are subject and attribute. Tomyris is the subject, and regina is the attribute, and they are both in the nominative case, singular number, and feminine gender. We may then say, as a general rule, that a noun as an attribute agrees with its subject in gender, number, and case. The sentence before us presents an instance of another fact in Latin syntax, namely, that the verb esse (with some others) has the same case after it as before it.

Sometimes the attribute, though agreeing in sense with the subject, departs from it in gender alone, or in both gender and number, e. g., first as to gender,

Tomyris fuit patriae *decus*;
Tomyris was *the honour* of her country:

where decus, though referring to a feminine noun, is in the neuter gender.

In number, also, the attribute may vary from the subject, e. g.,

TOMYRIS fecit DELICIAE Scytharum.
TOMYRIS *was* THE DELIGHT *of the Scythians.*

A noun, moreover, agrees with a noun when one noun is added to another to explain its meaning or application. This construction is called apposition (from ad, *to*, and pono, *I place*), because the second (or third) noun is simply put or subjoined to the first, e. g.,

TOMYRIS, REGINA Scytharum, CYRUM, REGEM Persarum devicit;
TOMYRIS, THE QUEEN *of the Scythians, conquered* CYRUS, THE KING *of the Persians*;

where observe that regina, being in apposition with Tomyris, agrees with it in gender, number, and case. The same relation exists between Cyrum and regem. In this, as in the preceding instance of a noun agreeing with a noun, a departure is allowable in gender and in number, but not in case. Thus we may substitute decus or deliciae for regina. The essential point, then, in this construction is, that *A noun as an attribute must agree in case with its predicate, and a noun in apposition must agree in case with the noun to which it is appended.*

VOCABULARY.

Athenae, arum, f. *Athens*; Bactra, orum, n. *Bactria*; Londinium, i, n. *London*; Anglia, ae, f. *England*; situs, a, um (from sino), *placed, situated*; Leonidas, ae, m. *Leonidas*; cogo, cogere, coegi, coactum 3, *I bring together, compel, drive, restrain, lead*; cultor, oris, m. *a cultivator, one who attends to*; blandus, a, um, *soft, winning*; adulator, óris 3, *a flatterer*; incito 1, *I urge on, impel*; Corinthus, i, f. 2, *Corinth*; Carthago, Carthaginis, f. 3, *Carthage*; inventrix, trícis, f. 3, *a discoverer*; Cithaeron, ónis, m. 3, *Mount Cithaeron*; Scythae, arum, m. 3, *the Scythians*; domicilium, i, n. *an abode*; nutrix, nutrícis, f. 3, *a nurse.*

EXERCISES.—LATIN-ENGLISH.

Athenae fuerunt urbs; Romulus fuit rex; Bactra, regionis caput, sita sunt sub monte Parapamiso; Leonidas rex fuit Spartanorum; Jugurtha cogebat exercitum, agri et pecŏris magis quam belli cultorem; regina est pecunia; voluptates blandissimae sunt dominae; adulatores sunt pessimum genus hominum; viginti naves, classis Romanorum, remis incitantur; Pompeius, nostri amores, veniet; Corinthus, lumen totius Graeciae, est deleta; mors omnium rerum est extremum; Carthago atque Corinthus, opulentissimae urbes, eversae sunt; Lacedaemonios, fortissimos mortalium, non ferrum sed aurum vicit; Philosophia, veritatis inventrix, morum quoque et disciplinae magistra est.

ENGLISH-LATIN.

Thebes, the capital (caput) of Beotia, was (were) situated under Mount Cithaeron; London is the capital of England; London is the mistress of England; frugality is the producer of the other virtues; the Scythians, very warlike men, live on flesh; of all men, the Scythians are the most warlike; the Roman people is the conqueror of all nations; Rome was the capital (head) of the world; Athens was of old the abode of the arts, the nurse of philosophy and eloquence.

In regard to the sentence mors omnium rerum est extremum, *death is the end of all things*, a remark may be desirable. Here mors, the subject, is in the feminine gender, and extremum, the attribute, in the neuter. The rule, therefore, seems to be broken. The sentence, however, observes the usual law of Latin construction. In instances of this kind, negotium, *thing*, is generally said to be understood or implied. The simple fact is, that regard is here paid to the sense rather than the grammar; the grammar would require extremum to agree in gender with mors, and so to be extrema; but the sense, declaring that no gender is contemplated or concerned, puts the attribute into the neuter. Other examples are given here:—

Turpe senex miles, turpe senilis amor.—*Ovid.*
Triste lupus est stabulis.—*Virgil.*
Varium et mutabile semper (est) femina.—*Virgil.*
Aliud est actio bona, aliud est oratio.—*Pliny.*

It is in the same way, that is, by reference to the sense, that such phrases as the following are to be explained:—Excisa ferro est Pergamum, *Pergamum has been cut down by the sword*, where excisa is feminine to agree with urbs, city, though Pergamum is of the neuter gender. Explain thus, Eunuchus bis die acta est (that is, fabula or comedia).

In the sentence Athenae fuerunt urbs, Athens was a city, Athens is in the Latin of the plural number, and urbs of the singular. Here, again, the sense is regarded more than the sound; for Athenae, though plural in form, is singular in meaning. The sense must always have predominance. In this sentence:—

Amantium irae amoris integratio est;
Lovers' quarrels are the restoration of love;

where the plural subject irae is identified with the singular attribute integratio, the sense causes a departure from the strict grammatical rule; and an attempt to put the grammar right might issue in a change of the sense; for instance, for irae read ira, a lovers' quarrel is the restoration of love, one quarrel might not have the alleged effect; besides, what was general has now become particular.

In these two sentences,

1. Athenae fuerunt urbs;
2. Amantium irae amoris integratio est;

we find the subjects and the predicates of different numbers. The general rule in such cases is, that the verb should agree with the subject; accordingly, in number 1, fuerunt is connected with Athenae; but in number 2, the subject irae is plural, whereas the verb est is singular. This is a case of attraction, est is made singular by the proximity of the singular noun integratio.

2. A noun agrees with a pronoun, e. g.,

1. Trucidate *eum*, patriae *proditorem*.
   Slay him, the betrayer of his country.
2. *Vos*, *Quirites*, veneramini Jovem.
   You, O Quirites, venerate Jupiter.
3. *Meus frater* est diligens.
   My brother is industrious.
4. Quae *ego consul* dixi vera sunt.
   The things are true which I said when I was consul.

In number 1, the pronoun eum agrees with the noun to which it refers in gender, number, and case, both being in the masculine gender, the singular number, and the accusative case. In number 2, the noun Quirites agrees with the pronoun vos in number and person, both being in the second person plural; they do not agree in case, for vos is in the nominative, while Quirites is in the vocative case. In number 3, the possessive pronoun meus, like other adjectives, agrees with its noun frater in gender, number, and case, both being in the masculine gender, singular number, and nominative case. In number 4, the noun consul agrees with the pronoun ego in gender, number, and case, both being in the masculine gender, singular number, and nominative case. From these instances comes forth the rule that

A noun agrees with a pronoun in gender, number, and case, or gender and number.

The pronoun may be implied, e. g.,

Hostis hostem occidere volui.
(I) an enemy wished to kill an enemy.

Hostis is in the first person singular, in concord with the pronoun ego *implied* in volui, a verb of the first person singular, perfect tense.

The pronoun ille is used to mark out a person or thing emphatically, and generally in a good sense; iste, employed also for emphasis, conveys reproach, e. g.,

Magno ILLI Alexandro est simillimus.
He is very like THE CELEBRATED *Alexander the Great.*
Non erit ISTA amicitia sed mercatura.
THAT *would not be friendship but traffic.*

Observe that in the last example ista agrees with amicitia, though in a similar case the pronoun in English is in the neuter gender. The general fact may be stated thus, that in Latin *pronouns referring to something gone before, agree with the noun to which they are prefixed*; what has gone before may be a sentence, or a statement, or a fact, or even a noun, e. g.,

Pompeio, QUOD populi Romani *lumen* fuit, exstincto.
Pompey, WHO *was the* LIGHT *of the Roman people, being dead.*

We may invert our proposition; for, as a noun may agree with a pronoun, so may a pronoun agree with a noun, e. g.,

1. HAEC est nobilis ad Trasimenum PUGNA.
   THIS *is the famous* BATTLE *near Trasimenum.*
2. QUI CANTUS dulcior inveniri potest?
   WHAT *sweeter* SONG *can be found?*
3. QUOD CARMEN est aptius?
   WHAT VERSE *is more suitable?*
4. VIRGO, *quae patria* est TUA?
   O VIRGIN, *what is* THY *country?*
5. COLONIAM QUAM Fregellas appellant.
   The COLONY WHICH *they call Fregellae.*
6. LIBRI QUOS ad te misi optimi sunt.
   The BOOKS WHICH *I have sent to thee are very good.*
7. Est mihi FILIUS QUEM valde amo.
   I have a SON WHOM *I greatly love.*
8. Optima est FILIA tua, mater, EAM diligas.
   Thy DAUGHTER *is excellent, O mother, love* HER.

By studying these examples, particularly 1, 2, 3, and 4, you will see that in general

A pronoun agrees with its noun in gender, number, and case.

A relative pronoun and a demonstrative pronoun may agree with its noun only in gender and in number, as appears from 6, 7, and 8. There are cases in which the relative agrees with its noun or pronoun in person only, e. g.,

Ille EGO, QUI quondam, gracili modulatus avenâ.
I, that well-known poet, WHO, *&c.*
Nunc horrentia Martis arma CANO.
Now sing of the frightful arms of Mars.

The general rule may be given thus:—*The relative pronoun agrees with its antecedent in gender and number.* The antecedent is the word, noun, or pronoun, which goes before, and to which in sense the relative refers. In number 5, coloniam is the antecedent to quam; and in number 6 libri, is the antecedent to quos. A proposition may be the antecedent, as, ego cum Pompeio in sermonibus versatus sum; *quae* nec possunt scribi nec scribenda sunt. *I have discoursed with Pompey; which things* (that is, the things which were then spoken) *can neither be written nor must be written.* When the reference is made to a fact, the neuter quod is used commonly, having id before it, e. g., Timoleon, id quod difficilius putatur, multo sapientius tulit secundam quam adversam fortunam; *Timoleon bore good fortune much more wisely than bad, a thing* (that is, to do so) *which is thought more difficult* (that is, *it is thought more difficult to bear good fortune wisely than bad fortune*). In regard to gender, the same rules prevail between the relative and antecedent as between the subject and the attribute. In point of place, the relative is often put before the noun to which it refers, e. g.,

Cecidere manu, QUAS legerat HERBAS.
The HERBS WHICH *she had gathered fell from her hands.*

The demonstrative pronoun must occasionally be supplied, e.g.,

Quos cum Matio pueros miseram (il) epistolam mihi attulerunt;
Those boys whom I had sent with Matium brought the letter to me;

where, observe the marked difference of idiom, for boys, which is in the nominative case, and forms a part of the subject in English, is in Latin (pueros) in the accusative case, and forms part of the object.

The demonstrative pronoun is added to the relative for the sake of emphasis, e. g.,

Quam quisque novit artem, *in hâc* se exerceat.
Lit. Trans.:—*What each one knows art, in that himself let him exercise.*
Id. Trans.:—*Let each exercise himself in that art with which he is acquainted.*

The antecedent noun is sometimes repeated with the relative. Caesar is fond of this construction:—

Erant omnino itinera duo, QUIBUS ITINERIBUS domo exire possent.
There were in all two roads, by WHICH ROADS *they were able to quit their home.*

There are forms in which the relative is employed with the force of the demonstrative, e. g., quae tua est prudentia, which is equivalent to eâ prudentiâ, quae tua est; or, quâ tu es prudentiâ, for prudentia quâ es:—

Quâ es prudentiâ, nihil te fugiet.
Such is your forethought that nothing will escape your notice.

VOCABULARY.

Obfero, offerre, obtuli, oblatus 3, *I offer*; suscipio 3, *I undertake*; hebeto 1, *I make dull, heavy*; Epaminondas, ae, ae, am, a, â, *Epaminondas, a Grecian General*; honeste, *honourably*; jucunde, *pleasantly*; morior, mori, mortuus sum 3, *I die*; gigno, gignere, genui, genitum 3, *I beget*; metior, metiri, mensus sum 4, dep. *I measure, measure out*; Wellingtonus, i, m. *Wellington.*

EXERCISES.—LATIN-ENGLISH.

Quae prima mihi defensio est oblata (eam), suscepi; hae sunt de amicitiâ sententiae; hoc tibi juventus Romana indicimus bellum; tam mihi mea vita quam tibi tua cara est; medici ipsi se curare non possunt; quamdiu furor iste tuus nos eludet? confidit his

meis litteris se apud te, hominem benevolentem, fore gratiosum; jacet ille (Catilina) nunc prostratus; Marcellus hic noster huic sermoni intererat; Catullus non antiquo illo more sed hoc nostro fuit eruditus; melior est certa pax quam sperata victoria; haec (pax) in tuâ, illa (victoria) in deorum manu est; ignavia corpus hebetat, labor firmat; illa maturam senectutem, hic longam adolescentiam reddit; quem nostrûm illa moriens apud Mantineam Epaminondas non cum quâdam admiratione delectat? e suo regno sic Mithridates profugit, ut ex eodem Ponto Medea illa quondam profugisse dicitur; tricenti conjuravimus; haec morum vitia sunt senectutis; negat Epicurus, hoc enim vestrum lumen est, quemquam qui honeste non vivat, jucunde posse vivere; Thebae, quod Baeotiae caput est, in magno tumultu erant; domicilia conjuncta, quas urbes dicimus; arma, virumque cano, Trojae qui primus Italiam venit; loquimur de iis amicis quos novit vita communis; ex eo numero (for ex numero eorum) qui per eos annos consules fuerant, multi mortui sunt; si nos, id quod maxime debet, nostra patria delectat; ego qui te confirmo, ipse me non possum; in quem primum egressi sunt locum, Troja vocatur; quas ad me dedisti litteras accepi; quas res violentissimas natura genuit, earum moderationem nos soli habemus; eodem anno a Campanis Cumae, quam Graeci tum urbem tenebant, capiuntur; accidit ut luna plena esset, qui dies maritimos aestus maximos in Oceano efficere consuevit; Caesar intellexit diem instare quo die frumentum militibus metiri opporteret; spero, quae tua prudentia et temperantia est, te jam, ut volumus, valere.

ENGLISH-LATIN.

Thirty (of them) conspired; London, which is the capital of England, flourishes; Athens, which was the capital of Greece, was destroyed; I took the first stone that was offered me; that (great man) Wellington now lies in the earth; he lives pleasantly who lives honourably; I give thee all my money, such is thy honour; the war which was declared, brought many evils, a thing that (id quod) might be expected; the day is near in which you must die; thou who teachest others canst not teach thyself; men alone have power over those animals which God has created; very many are the animals which have been created by God; I hope that I shall be acceptable to (with) thee, a very honourable man; hast thou received the letter which I sent to thee? the letter which my mother sent has been received by my father.

LESSONS IN GEOLOGY.—No. XXVIII.

By THOMAS W. JENKYN, D.D., F.R.G.S., F.G.S., &c.

CHAPTER II.

ON THE ACTION OF WATER ON THE EARTH'S CRUST.

SECTION XII.

ON THE RECONSTRUCTIVE AGENCY OF THE OCEAN.

You have seen that coasts, cliffs, and shores, whatever may be the mineral character of their rocks, are exposed to destruction from the action of the waves, and from the encroachments of the sea. The cliffs, which are undermined by the breakers, at length, fall down and cover the shore with their ruins.

When the softer parts of the fallen materials have been rapidly disintegrated and washed away, the more solid fragments are broken and rounded, and remain within the influence of the tides. Along this line they are rolled and agitated, and, at last, are worked up into a beach of shingle, or of sand, to skirt the base of the cliffs, and to exert a conservative influence on the neighbouring land.

If the coast be low and sandy, the waves drive the lighter pebbles and gravel towards the land. As the drifted sand becomes dry at the reflux of the tide, it is carried inland by the wind; and, in some situations, it becomes accumulated in such quantities as to form a range of hills, which in their progress overwhelm fertile tracts of land, and engulph churches, castles, and even entire villages. These sand banks are called dunes.

It is also found that at the mouths of rivers the estuaries are silted up by the combined influence of rivers and tides. At a river's mouth, a bar of sand or mud is formed at points where the velocity of the turbid river is checked by the sea.

Hence it is obvious that the reconstructive agency of the ocean is developed in the formation of shingle banks, in the growth of sandy beaches and dunes, and in the silting up of the estuaries of rivers. This is not the place to consider either the agency of coral in the formation of sea reefs, or of sea currents in the construction of sea banks and shoals.

The beaches of shingle which you find on the sea shore, show that, during a gale, the breakers of every tide are more or less charged with gravel, pebbles, and boulders, which are forced land-ward as far as the broken wave can reach. That this is the case with every wave, is evident from facts which transpire every day on our southern and south-eastern coasts. Wherever a pier or groin is erected to stop the progress of the beach, a heap of shingle soon collects on the western side of such an artificial barrier. The gravel and pebbles continue to accumulate till they rise as high as the pier or groin; when the pebbles have risen to this height, the waves pour them over to the eastern side of the groin in great numbers.

As the pebbles held by the waves strike against the shingle formed on the shore, the pebbles of the breakers drive the pebbles of the shingles farther inland. It is in this way that shingles are projected and piled on the land so far, as you often find them, beyond the reach of the retiring wave. When these beaches are high, they are always the result of the combined forces of heavy gales and high tides.

Shingle beaches are always formed in the direction of the prevalent winds, which, of course, produce the largest breakers. We have instances of this on almost every coast in the world. The most striking illustrations of sea agency in the formation of beaches are found on the southern shores of the Baltic. Into this sea some of the most magnificent rivers of northern Germany, such as the Oder, the Vistula, and the Niemen, pour their accumulated waters. The discharge at the mouths of these rivers is checked by the strong west and north-west winds, and corresponding currents which come from the Atlantic. These western currents tear down the southern coasts, and, with their ruins, throw up beaches at the mouths of rivers. This is the case below Stettin on the Oder, near Dantzic on the Vistula, and between Königsberg and Memel, where several rivers discharge their waters.

The annexed diagram represents the action of currents in the Baltic, see fig. 62. The waves of the sea do not conform to the

Fig. 62.

A Beach thrown up by the Baltic.

delving bays of the shore, but pile up a beach, behind which a kind of lake of brackish water is formed, and the rivers discharge their water at a point far northward of that in which they

first met the sea. This diagram is sufficient to explain how the beaches are always formed according to the course of the prevailing winds and currents.

The progressive growth of beaches is far from rapid. They can grow only in proportion to the greater power or duration of one wind above another.

On the eastern coast of England their strike is generally towards the south. These are occasioned by the powerful north-west winds and corresponding currents in the German Ocean which sweep along that coast, charged with the fragments of the cliffs which they have wasted.

On the south coast of our island, when the prevailing winds are west and south-west, the shingles strike eastward, until they are arrested by some projecting land. For illustration, I might point you to the Slapton Sands, in Devonshire, or to Chesil Bank, which connects the Isle of Portland with the mainland; but I shall limit myself to Hurst Castle Bank, near Lymington, in Hampshire, and opposite to the north coast of the Isle of Wight.

Hurst Castle Bank is formed from west to east. The force of the waves at the entrance of the Solent Sea gives motion to the pebbles, which are rounded chalk flints, derived from the waste of Hordwell and other cliffs to the west. By this bank of shingle the Solent is crossed for more than two-thirds of its breadth. The bank itself is seventy yards wide, and twelve feet high, with an inclined plane to the west.

In these phenomena of the reconstructive agency of the ocean, it is necessary to consider the power of the waves. The amount of this power is indicated by the great size and weight of fragments and blocks which the waves can move. I referred you to this power of moving water in my Lesson upon Floods, where it was shown that the weight of blocks in water is not much more than half their weight in air, and that consequently a much less force would remove them. The knowledge of this wave-power will help you to account for the very large boulders and masses which you sometimes find in beaches of shingle.

During heavy gales, loose blocks of many tons in weight have been moved from their places, and even enormous stones, squared, jointed, and bolted together in the form of piers and jetties, have been with ease torn asunder. In the storm of November, 1824, at Lyme Regis, in Dorsetshire, a square block nearly two tons in weight, and strongly trenailed down in a jetty, was torn away and tossed about like a plaything. So at Plymouth Breakwater, during the same storm, large blocks of limestone, weighing respectively from two to five tons, were washed about like pebbles, and would give one the idea of old Neptune playing at marbles. Even 300 tons in blocks of these weights were carried to a distance of 200 feet, and that up the inclined plane of the Breakwater, and thrown over to the other side. At another place, a block of limestone weighing seven tons was washed from the western end of the Breakwater, and carried 150 feet.

Another peculiarity in this reproductive agency of the sea is, the wedging power of the waves by which they give firmness to beaches. These shingles are found to consist of large blocks or boulders mixed with smaller stones. Such is the solidity and firmness which these beaches acquire, that the smaller pieces are often forced among the larger masses so tightly as to need very great force to disturb or take them out.

In terminating these remarks on the formation of shingle beaches, I may mention that, though coast fragments, consisting of boulders, pebbles, and gravel, are removed in the direction of the predominating and strongest breakers, yet there is no evidence that retreating waves transport any of them outwards or into the depth of the ocean. On the contrary, the waves invariably strive to throw the pebbles, held in temporary suspension, upon the land. This has been found to be the case not only in stones and fragments from the land, but also in coral shells and marine plants produced in the sea itself. In tropical climates, large masses of coral rock are torn up from a depth of ten fathoms, and are thrown up and piled upon reefs to form beaches of coral shingles.

This explanation of the power of the ocean to act landwards accounts for the many beaches found on various shores which are composed entirely of comminuted marine shells. The action of waves around a coast tends to disturb the bottom of the sea to a certain depth, so as to move the shells, sands, and other substances, which rest there, towards the land. It is difficult to tell the exact depth to which the moving action of waves reaches vertically. It is supposed that ninety feet or fifteen fathom is the limit to which it extends. It has, however, been lately ascertained that sea currents, or large bodies of water in motion, disturb mud and sand at the depth of even 450 feet. This is warranted by the fact that around coasts and shores which are not deeper than ten or twelve fathom, the action of the waves is very apparent in the discoloration of the water during heavy gales. This turbidness of the water is due to the moving power of the waves on the bottom of sand or clay, and not to the muddiness of the returning tide.

The second instance of the reconstructive agency of the sea is the formation of beaches of sand and dunes. The question is often asked, where does all this sand come from? The answer is, that it comes from detritus worn down by rivers, from the friction of sea-shore pebbles against each other, and from the soils and sandstones of the neighbouring land.

When the force of breakers comes to be applied to light particles of sand, they will, of course, and especially when aided by a gale, drive it on the land to a far greater distance than they could impel shingle. The spray that could not hurl a pebble can project sand to a distance far inland. When, also, the tide is out and the sand is dried by the sun and the air, the sand is taken up and transported by the wind to such an extent as that districts once fertile are overwhelmed by it.

These sands sometimes accumulate in sufficient quantities to form hills, which are called dunes. These dunes are almost everywhere formed behind a sandy shore. The advance of dunes inland is almost irresistible. Lakes of fresh water, cultivated lands, dense forests, and populous villages disappear before them. The average of their progress is supposed to be from sixty to seventy feet per annum. On the shores of the Bay of Biscay, for instance, immense quantities of sand are annually drifting inland. They have already overwhelmed many villages, and they continue to cover extensive tracts of land. Instances analogous to this are found in our own country on the coasts of Norfolk and Suffolk, on the western coast of Cornwall, and on the shores of Lancashire.

It is obvious that when the wind from the sea drives the sand before it, the sand will be drifted onward until it meet with something to obstruct it, such as stones, bushes, or grass. It there accumulates in little heaps, which, in their turn, offer greater resistance to the wind and check the drifted sands, which cause the previous heaps gradually to rise into mounds or hills of considerable elevation. It seems that when these dunes have reached a certain height the wind has no power to increase their elevation, but drives the sand over their summits, which settles down to form a new ridge behind the other. It is in this way that the wind urges forward several ridges of dunes upon the land. It takes place thus: on the windward side of the hillock the grains of sand are forced up, from which they are swept off as they arise, and fall by their own weight on the opposite slope; while this mass is invading the land fresh materials are constantly brought from the sea by the winds. The inhabitants of dune districts have found that a species of plant called arundo arenaria thrives well in these sands, and prevents the winds from drifting them. Every hillock which becomes thus fixed will form an effectual barrier against the incursion of fresh sand from the sea.

In circumstances favourable to the process, sands, which have been transported inland, become consolidated into hard rock. Of this we have an instance on the north-west coast of Cornwall, where the matter thrown up consists of comminuted shells which are consolidated chiefly by oxide of iron. As these sands have been drifted at different periods in succession, each drift forms a layer, and the whole of the beds are stratified and interposed with vegetable remains. Even human remains are entombed in this calcareous sandstone; for the rock is formed over an ancient churchyard. This sand becomes exceedingly firm. It is used for building houses and churches. Holes are drilled in it for securing vessels to the cliff In Fistrel Bay high cliffs of this rock extend several miles, and along that shore the beach is covered with disjointed fragments, weighing two or three tons, which have been disintegrated from the cliffs above.

It was in a rock of this kind that, at Guadaloupe, human remains were found some years ago. At that spot the rock

an indurated beach composed of comminuted shells and coral. The coral reefs which surround the island of Guadaloupe are abraded by the incessant action of the waves. The detritus thus produced is drifted to the shore in the state of coralline sand, or mud, where, by the action of the atmosphere, or streams holding carbonate of lime in solution, the whole drifted mass becomes indurated, and forms a hard and compact limestone. It is evident that this rock was in a loose, soft, or plastic state, when this human being fell into it or was placed in it. This skeleton may be seen in the British Museum.

The third instance that I shall give you of the reconstructive agency of the ocean is the silting up of estuaries. The action of waves on coasts is exhibited both by piling up detritus in the direction of their greatest force on the shore, by which the mouths of rivers are deflected on one side, and also by heaping up bars, even at their mouths, by which navigation is rendered not only dangerous, but in some instances utterly impracticable.

Very frequently rivers are deflected from their course to the sea by beaches which, as we have seen in the Baltic, extend from one side, and which have been produced entirely by winds and tides. An instance of this may be seen at Shoreham, near Brighton. In some cases rivers, which have been thus deflected, find a way of escape into the sea by the sides of cliffs, which seem to aid their current in effecting a free channel for their waters.

On our eastern coast the mouths of rivers are generally deflected towards the south. The marine current, which sweeps from the north along that coast, is charged with the pebbles and gravel derived from wasting cliffs. The materials held in suspension by such a current are ready to form a bar at any spot where its course is interrupted by an opposing stream. Thus, at Yarmouth, the mouth of the Yare has been, within the last five centuries, diverted about five miles to the south of its ancient embouchure.

In our own country, one of the most remarkable instances of this silting agency of the sea is found on one side of the Isle of Thanet, in Kent. This portion of Kent was, in the time of the Romans, separated from the mainland by a navigable channel, through which the fleets of Cæsar sailed on their way to London. Bede says that in the eighth century this small estuary was three furlongs, or nearly half a mile, wide. It is supposed that this channel began to grow shallow about the time of the Norman Conquest. In 1485 it was so much silted up that an act was obtained to build a bridge across it. Since that period it has become marsh land abounding with small streams, and now the Isle of Thanet is no longer insulated.

Egypt furnishes an extraordinary instance of the gain of land from the sea. At the head of the Red Sea the Isthmus of Suez has been doubled in breadth since the age in which Herodotus described it. The town of Heroopolis was then, and down to the time of Arrian, on the coast of the Red Sea, but now it is midway between the Red Sea and the Mediterranean. The opposite land, called Tehama, in Arabia, has increased from three to six miles since the Christian era, by sand contributions from the Red Sea.

This reconstructive agency of the ocean has led some to think that by its action in throwing up shingles, in forming sand-banks and dunes, and in silting up estuaries, it makes a full compensation for the waste which its destructive agency produces on different coasts. It has been conjectured that on our eastern coasts the loss is more than compensated by the gain of land. In all estimates of this kind the amount of the loss has not been accurately calculated. The amount of the acquisition is manifest and palpable, but the coasts furnish no true index to the extent of land that has been destroyed. Hence, it appears that the compensation of the reconstructive agency of the ocean is scarcely equal to the waste of its destructive action.

LESSONS IN ENGLISH.—No. XL.

By JOHN R. BEARD, D.D.

DIVERSE STEMS.

I HAVE intimated that the French, Italian, and Spanish (and one or two others might be added), are, under the name of the Romance languages, very similar to each other, and similar also to their common mother the Latin. To all these languages the English is indebted. Hence it becomes both interesting and important to see how they are related one to another; and that the rather, because with comparison much may be learnt of the origin and propagation of languages. I therefore place before you a tabular view of

THE LORD'S PRAYER IN

English.	*Latin.*	*French.*	*Italian.*	*Spanish.*
our	noster	notre	nostro	nuestro
father	pater	père	padre	padre
who	qui	qui	che	que
art	es	es	sei	estas
in	in	au	ne	en
heaven	coelo	ciel	cieli	los cielos
hallowed	santificetur	sanctifié	sanctificato	sanctificado
be		soit	sia	sea
thy	tuum	ton	il tuo	el tu
name	nomen	nom	nome	nombre
thy	tuum	ton	il tuo	el tu
kingdom	regnum	règne	regno	reino
come	veniat	vienne	venga	venga
thy	tua	ta	la tua	tu
will	voluntas	volonté	volonta	voluntad
be	fiat	soit	sina	hagase
done		faite	fatta	
on	in	sur	in	en
earth	terrâ	la terre	terra	la tierra
as				
it	sicut	comme	come	como
is				
in	in	au	in	en
heaven	coelo	ciel	ciclo	el cielo
give	da	donne	dacci	da
us	nobis	nous	oggi	nosse
this	hodie	aujourd'hui		
day				
our	nostrum	notre	il nostro	nuestro
daily	quotidianum	quotidien	quotidiano	de cada dia
bread	panem	pain	pane	el pan
and	et	et	e	y
forgive	remitte	pardonne	remettici	perdona
us	nobis	nous		nos
our	nostra	nos	i nostri	nuestras
debts	debita	offenses	debiti	deudas
as	ut	comme	come	como
we	nos	nous	noi	nosotros
forgive	remittimus	pardonnons	rimattiamo	perdonamos
our	nostris	à ceux qui	a nostri	a nuestros
debtors	debitoribus	nous ont offensé	debitori	deudores
and	et	et	e	y
lead	inducito	indui	indurre	metas
us	nos	nous		nos
not	neve	ne point	non	no
into	in	en	in	en
temptation	tentationem	tentation	tentatione	la tentacion
but	sed	mais	ma	mas
deliver	libera	delivre	liberaci	libra
us	nos	nous		nos
from	a	du	dal	de
evil	malo	mal	male	mal

Now to study this tabular view properly, take each English word in turn, and compare it with the same word, first in Latin, then in French, then in Italian, and then in Spanish. You will gain instruction if you also alter the order, taking the Italian before the French, or the Spanish immediately after the Latin. Now look at these words father, pater, padre, padre, père. They are, you see, the same term under small modifications. The same is the case with several other words. And if you omit the English, as belonging to a different family of tongues, and compare the rest together, you will find with a few exceptions an almost identity. In the comparison you must make some allowance for idiom; for instance, the article appears in French where it is not placed in Italian, and so you have LA terre, THE *earth*, for terrâ, *earth*, of the Latin, and terra of the Italian. The Spanish carries the article so far as to place it before possessive pronouns, thus, el tu nombre, *the thy name*. The inferiority too, of the French is seen in that it is unable to render word for word "forgive our debtors," and is obliged to employ a circumlocution as "pardon those who have offended us." I offer these remarks merely as suggestions relative to the manner in which the table may be studied.

I subjoin a few instances of words in our tongue borrowed from the Italian and the Spanish:—

ENGLISH WORDS FROM THE ITALIAN.

basso-relievo,	*bass-relief*
bravo,	*one who murders for hire*
buffalo,	*a kind of wild ox*
canzonet,	*a little song*
capuccio,	*a capuchin or hood*
busto,	*a statue*
canto,	*a section of a poem*
burletta,	*a musical farce*
brocoli,	*a kind of cabbage*
belladonna,	*deadly nightshade*
camisado,	*an attack in the dark*
piano-forte,	*a well-known musical instrument*
adagio,	*slow time in music*
tenore,	*middle sound*
soprano,	*a soft sound*
violin,	*a fiddle*
violincello,	*a bass violin*
pantaloon,	*the buffoon in a pantomime*
harlequin,	*an outdoor buffoon*
gondola,	*a small boat*
gondolier,	*the boatman of a gondola*
gonfalon,	*a standard*
gonfalonier,	*a standard bearer*
doge,	*the chief magistrate in Venice*
cardinal,	*the order next the Pope*
mezzotinto,	*engraving resembling painting*
bandit, and *banditto*,	*one outlawed, a robber*
bagnio,	*a bathing house*
sonata,	*a tune*
piano,	*soft in music*
forte,	*strong in music*
piazza,	*a walk under a roof supported by pillars.*

Strikingly and painfully does the Italian language by certain words betray the character of the Italian people. What shall we say of a nation with which a lover of art (*virtuoso*) is the virtuous man; which makes the *opera* (work) the work of their lives; which finds in a loquacious and ignorant guide (*cicerone*) their representative of Cicero; and which identifies a *cut-throat* with a brave man (*bravo*)?

ENGLISH WORDS FROM THE SPANISH.

mirador,	*a balcony*
matadore,	*a principal card*
mulatto,	*one of mixed breed*
siesta,	*an after-dinner nap*
tobacco,	*a plant used for smoking*
guitar,	*a stringed instrument of music*
fandango,	*a lively dance*
hidalgo,	*one of noble birth*
cortes,	*the states assembled in Madrid*
gala,	*feasting and merriment*
armada,	*a sea-armament*
brocade,	*silk interwoven with gold, &c.*
olio,	*a medley*
palisade,	*an inclosure of pailings*
peccadillo,	*a petty fault*
privado,	*a secret friend*
querpo,	*a close dress*
barricado,	*a fortification*

From very various sources words have come into our English. *Razzia* is a very recent term. It came into existence within the last few years, to describe the sweeping destruction with which the French laid waste whole districts of northern Africa, in order to bring the country under their usurpation. According to Fuller, the term *plunder* is of German origin, and was brought hither by the soldiers who returned from the campaigns of Gustavus Adolphus. Frightful crimes may lead to the prevalence of a word, as in the term *to burk*, derived from the name of the first criminal; *cannibals*, as designating man-devouring savages, came into use with the great discoveries in the western world made in the fifteenth and sixteenth centuries.

From the Arabic we have *divan*, *vizier*, *cipher*, *zero*, *arabesque*; from the Hebrew we have, besides very many proper names, *Jehovah*, *amen*, *Jeremiad*, *lazaretto*, *lazaar-house*, *cherub*, *seraph*, *hallelujah*.

[illegible]rds called *canaries* have brought their name with them Canary Isles, and our *pheasants* from the Aziatic river aid to have been their original home.

pic, an invective, comes to us from the title of the orations d by Demosthenes against Philip king of Macedon, of e designs against the liberty of Greece he was aware,

The word *cabal* has two origins. In one sense, and generally, *cabala*, is Hebrew, and denotes the science (*falsely so called*) of the Jewish rabbis. In another, it designates a political intrigue, and owes its existence to the initials of the names of Clifford, Ashley, Buckingham, Arlington, and Lauderdale—C. A. B. A. L., the five celebrated cabinet ministers of Charles II.

We have in English words the names of natural objects, taken from the names of the places where the objects were produced; e. g., *peach*, Fr. pêche, that is Persh, or Persian; *Bergamot* (Bergamum), *Indigo*, *Mocha*, *Champagne*, *Burgundy*, *Madeira*, *Port*, and other names of wine. We have names of the products of art taken from the places where they were fabricated e. g., *bayonet*, invented at Bayonne, in France; *cachemir* (shawls), from Cachemir, in India; *cambric*, from Cambria, in France; *cordovan*, leather prepared at Cordova, in Spain; *damask*, from Damascus, in Syria; *muslin*, from Mossul, in Asiatic Turkey; *nankeen*, from Nankin, in China; *pistol*, from Pistoia, in Tuscany; *morocco* (leather), from Morocco, in Barbary.

Having shown the connexion of the English with the Romance languages, I subjoin another table, showing its connexion with the Teutonic languages. The latter is the more needful, because the latter are our cousin-germans.

THE LORD'S PRAYER IN TEUTONIC LANGUAGES.

Common English.	*English of Wiclif* (1380).	*German of Luther.*	*Lower Saxon* (1451).	*German* (720 A.D.).	*Gothic of Ulphilas* (360)
our	oure	unser	unser	unseer	unsar
father	fadir	fater	fader	fatter	atta
who	that		de du	thee	thu
art	art		bist	pist	
in	in	in	in	in	in
heaven	hevene	dem himmel	den hymelen	himele	himinam
hallowed	halowid	geheiliget	gehylliget	wihi	weihnai
be	be	werde	werde		
thy	thi	dein	dyn	dinan	thein
name	name	name	name	namun	name
thy	thi	dein	dyn	din	theins
kingdom	kyngdom	reich	ryke	rihi	thiudinassus
come	come to	komme	to comme	chweme	quimai
thy	thi	dein	dyn	din	theins
will	wille	wille	wille	willo	wilja
be	be				
done	don	geschehe	de werde	werde	wairthai
on	in	auf	in	in	ana
earth	erthe	erden	der erde	erdu	airthai
as					
it	as	wie	also	so	swe jah
is					
in	in	im	in	in	in
heaven	heavene	himmel	den hymmele	himile	himina
give	give	gib	gif	kip	gif
us	to us	uns	uns	uns	uns
this	this	heute	hyte	hiutu	himma
day	day				daga
our	oure	unser	unse	unseer	unsarana
daily		täglich	degelike	emezhic	
bread	breed	brot	brod	broath	hlaif
and	and	und	unde		jah
forgive	forgeve	vergib	forgif	oblaz	afet
us	to us	uns	uns	uns	uns
our	oure	unser	unse	unseero	thatei
debts	dettis	schuld	schulde	sculdi	skulans sijaima
as	as	wie	alse	so	swaswe jah
we	we	wir	wy	wir	weis
forgive	forgiven	vergeben	forgeven	oblasen	afletam
our	to our	unsern	unsen	uns	unsaraim
debtors	dettouris	schuldigern	schuldeners	skuldikem	skulaus
lead	lede	führe	enleyde	firletti	briggais
us	us	uns	uns	unsih	uns
not	not	nicht	nicht	ni	ni
into	in to	in	in	in	in
temptation	temptacioun	versuchung	bekoringe	khorunka	fraistubnjai
but	but	sondern	sonder	ak	ak
deliver	delyver	erlöse	lose	erlosi	lausei
us	us	uns	uns	unsih	uns
from	from	von	van	fona	af
evil	yvel	dem übel	obele	ubile	ubilin

This table is full of instruction. Go through it carefully word for word, making due allowance for diversity of spelling; for instance our word come re-appears in *come to*, *comme*, *to comme*, *chweme*, and *quimai*. In the "bist" of the Lower Saxon I recognise an old mood common in the South of England in my boyish days, where and when the present tense of the verb to be was thus conjugated, *I be*, *thou bist*, *he bees*, *we be*, *you be*, *they be*. The Gothic of Ulphilas offers the most striking points of comparison. I will go through it and point out the words which still form a part of the English tongue; unsar, *our*; thu, *who*; in, *in*; himinam,

heaven; weihnai, *vowed*; thein, *thy*; namo, *name*; quimai, *come*; wilga, *will*; ana, *on*; airthai, *earth*; gif, *give*; uns, *our*; daga, *day*; unsarana, *our*; hlaif, *loaf*; briggais, *bring*; lausei, *loose*; af, *of*; ubilin, *evil*. It is thus seen that our mother tongue had a substantive existence as early as the year of our Lord 360. And it is curious to observe that in this the oldest form of the Teutonic languages we find in several instances the nearest approach to our modern words and forms: e.g., himinem, *heaven*; thein, *thy, thine*; airthai, *earth*; gif, *give*; uns, *us*; daga, *day*; hlaif, *loaf*, the ancient word for *bread*; briggais, *bring*; lausei, *loose*.

These facts will enforce the advice I have given to the effect that you should let the Saxon come in for its full share in your phraseology. But here, as in all cases, moderation is necessary. And doubtless some usages connected with the Saxon are to be avoided. How freely and how loosely is the verb to get employed in ordinary life. I am not fond of giving specimens of bad English as a means of teaching persons to speak and write good English, for I think such a practice subversive of its object, and, therefore, I abstain from supplying you according to the usual practice with *exercises in bad English for correction*; but I may, and from time to time I shall, explain and enforce my meaning by examples of what is wrong, particularly when the examples given are so gross as to be beyond imitation. Here is a specimen of the hard labour which *get* is made to undergo.

On *getting* home, I *got* my dinner; and, *getting* the bad news you sent, *got* on horseback within ten minutes after I *got* your letter. When I *got* to Canterbury, I *got* a chaise for town, but I *got* wet through in *getting* to the inn; and I have in consequence *got* such a cold as I shall not be able to *get* rid of in a hurry; happy shall I be if I *get* hither by the time you *get* back. Being, however, compelled to see the minister, I *got* shaved and dressed as soon as I arrived in London, and *getting* some refreshment, *got* to the Treasury. I soon *got* into the great man's favour, and *got* out of him the secret of *getting* a memorial before the board, but I could not *get* an answer then; however a few days ago I *got* intelligence that I shall *get* an answer shortly. On my way back I *got* a beefsteak, and while trying to *get* the newspaper, I *got* my foot under a chair and *got* thrown down. I *got* up as well as I could and *getting* back to my own inn, *got* my supper, and *got* to bed. It was not long before I *got* to sleep. When I *got* up in the morning, I first *got* my breakfast, then *getting* a walk, I *got* a bath. After that, I *got* dressed, *got* a morning paper, and, ordering the waiter to *get* me a cab, *got* into it forthwith that I might *get* in time to *get* an answer to my memorial. I *got* the answer, and without delay *got* pen, ink, and paper to write to you; and this is all I have *got* to say.

LESSONS IN GERMAN.—No. XL.

Section LXXXIV.

Bedenken tragen (to bear or have hesitation) may be rendered, "to hesitate, to doubt." Ex.: Ich trage Bedenken, es zu thun; I hesitate to do it. Er trug Bedenken, es mir anzuvertrauen; he hesitated to entrust it to me.

I. Ver compounded with verbs commonly expresses the idea of, *away*, a *loss*, *wrong*, &c., (§ 97. 3. 4.); as, treiben, to *drive*; vertreiben, to drive *away*. Spielen, to *play*; verspielen, to *lose* at play. Leiten, to *guide*, verleiten, to *mis*guide, (to guide *wrong*). Ex: Wie schnell verfließt eine frohe glückliche Stunde; how quickly a joyful happy hour passes *away*. Ich habe mich verhört; I have heard *wrong* (misunderstood), &c. Certain uses however, of this and many others of the same class (§ 95., &c.) are best illustrated by examples; thus, sehen signifies to *see*, and versehen, to provide. Legen, to lay, and verlegen, to mislay: also figuratively, to furnish, and hence to publish (a book) that is, to furnish the necessary means for producing the book, &c.

II. Vor frequently answers to our "on." Ex.: Was geht hier vor? What is going on here?

Exercise 87.

Aeu'ßerung, *f.* utterance, expression; Anſpruch, *m.* requisition, claim, demand; Billard, *n.* billiards; Blaſen, to blow, sound; Buch'händler, *m* bookseller, stationer; Erra'then, to guess, divine; Faſſung, *f.* self-command, countenance; Flöte, *f.* flute; Geige, *f.* violin; Geſchick'lichkeit, *f.* skillfulness, cleverness; Harfe, *f.* harp; Horn, *n* horn; Inſtrument', *n.* instrument; Klavier, *n.* harpsichord; Partie', *f.* game; Röthe, *f.* redness, red; Schach, *n.* chess; Schachmatt, checkmated; Söhnchen, *n.* little son; Spieler, *m.* player; Stimmung, *f.* disposition, frame of mind, humour; Un'bekannt, unknown; Verlags'buchhandlung, *f.* publishing-firm; Verle'gen, (See above); Weßwe'gen, wherefore, for what reason.

Der Geſand'te trug Beden'ken, allen Worten des Mini'ſters zu trauen.	The ambassador hesitated to confide in all the words of the minister.
Dieſer Buch'händler hat Göthe's ſämmt'liche Werke verlegt'.	This bookseller has published the collected works of Goethe.
Ich habe meine Schlüſſel verlegt'.	I have mislaid my keys.
Der junge Mann könnte bei dieſer Frage in Verle'genheit kommen.	The young man may get into difficulty by this question.
Dieſer Herr will Kegel mit ihm ſpielen; allein er hat grö'ßere Luſt, eine Partie' Bil'lard zu machen.	This gentleman wishes to play ten-pins with him, but he has (a) greater desire to take a game of billiards.
Mein Bruder ſpielt das Fortepia'no, bläſt (ſpielt) die Flöte und verſteht' die Trommel zu ſchlagen (rühren).	My brother plays the piano, blows (plays) the flute, and understands beating (striking) the drum.
Spielt Ihre Fräulein Schweſter irgend ein Inſtrument'?	Does your sister play any instrument?
Sie ſpielte einmal auf der Guitar're, jetzt aber ſpielt ſie nicht mehr darauf'.	She played upon the guitar once, but now she plays upon it no more.
Dieſer Herr bläſt das Waldhorn ſehr ſchön.	This gentleman blows the buglehorn very finely.
Ich errieth' den Au'genblick, was ihn ſo außer Faſſung gebracht' hatte.	I divined in an instant what had brought him thus out of (his) self-possession.

1. Er trug Bedenken, dem Fremden die goldene Uhr anzuvertrauen? 2. Der Vater trug Bedenken, Alles zu glauben, was ihm ſein Sohn erzählte. 3. Wer zu viel Bedenken trägt, gewinnt wenig. 4. Sie hielten ihn für einen ordentlichen Menſchen. 5. Ich hielt ihn für den Bürgermeiſter dieſer Stadt. 6. Wir hielten ihn für etwas ganz Anderes. 7. Der junge Buchhändler hat ein neues Werk verlegt. 8. Iſt die neue Grammatik des Herrn N. ſchon verlegt worden? 9. Sie iſt ſo eben in der Verlagsbuchhandlung des Herrn N. erſchienen. 10. Ich bin ſehr in Verlegenheit, was ich in dieſer Sache thun ſoll. 11. Die Mutter iſt in Verlegenheit, wo ihr kleines Söhnchen ſein möchte. 12. Er iſt in Verlegenheit, woher er die ihm fehlenden zwanzig Thaler bekommen möchte. 13. Sie iſt in Verlegenheit über das plötzliche Erſcheinen eines Unbekannten. 14. Wollen wir eine Partie Schach oder Billard ſpielen? 15. Ich nehme lieber eine Partie Schach an, da bei dieſem Spiele mehr der Verſtand, als die Geſchicklichkeit in Anſpruch genommen wird. 16. Spielen Sie Schach gern (Sect. 44. I.)? 17. O, ja; nur habe ich zu wenig Gelegenheit es zu ſpielen, weßwegen ich bei geſchickten Männern ſehr oft ſchachmatt werde. 18. Spielen Sie ein Inſtrument? 19. Ja, ich ſpiele Klavier und habe ſeit einigen Tagen angefangen Geige zu ſpielen. 20. Spielen Sie Geige lieber als Klavier? 21. Nein, ich ſpiele das eine Inſtrument ſo gern, wie das andere. 22. Blaſen Sie Flöte? 23. Nein, aber ich habe vor das Horn blaſen zu lernen. 24 Wie lange blaſen Sie Flöte? 25. Seit ungefähr einem Monate. 26. Ich habe jene Papiere verlegt; ich weiß nicht, wo ſie zu finden ſind. 27. Die Schweſter hat ihre Handſchuhe und ihr Buch verlegt. 28. Den ſonſt ſo ruhigen Mann brachte ein ſolches Betragen ganz außer Faſſung, und ſeine kurzen Antworten und die Röthe ſeiner Wangen ließen errathen, was in ſeinem Innern vorging. 29. Ich errieth augenblicklich die Urſache, die dieſe Stimmung in dem Gemüthe meines Freundes hervorgerufen hatte und ließ es auch jenen errathen, damit er vorſichtiger in ſeinen Aeußerungen ſein möchte.

1. He hesitated to entrust his attorney with the affair. 2. The mother hesitated to believe everything that her daughter told her. 3. I have mislaid your book, and am therefore in much

trouble. 5. The child deceived its teacher, and, he therefore, hesitated to believe him again. 6. He played at billiards, and lost all his money. 7. Will you play a game at chess with me? 8. No, I prefer a game at billiards, for I do not know much about chess 9. Do you play any instrument? 10. Yes, I play the harpsichord, and I think of learning the violin. 10. Is your sister skillful at the piano. 11. No, but she is excellent at the harp. 12. By that question he lost all self-command, and knew not how to answer. 13. Mr. C. in London will publish the history of the kings of England shortly.

Section LXXXV.

Recht (right) and link (left) are often used with „zur;" as, zur Rechten, zur Linken, for zu der rechten Hand; to the right hand; zu der linken Hand; to the left hand.

I. Gefallen, literally, to fall, or happen (acceptably,) i. e. to be pleasing, or agreeable. Ex.: Dieses Buch gefällt mir; this book pleases me. Gefallen lassen = to submit to, "to put up with." Ex.: Ich kann mir diese Behandlung nicht gefallen lassen;. I cannot submit to this treatment, i. e. cannot let this treatment please me.

Exercise 88.

Auf'stellen, to post, draw up;
Belei'digung, *f.* offence, injury;
Beschlie'ßen, conclude, resolve, determine;
Feu'erglocke, *f.* firebell;
Gehö'rig, suitable, proper;
Gei'genspiel, *n.* violin-music;
Guitar're, *f.* guitar:
Lied, *n.* song, air;
Link, *adj.* (See above);
Links, *adv.* to the left;
Mozart, Mozart;
Natü'rlich, natural, naturally;
Recht, *adj.* (See above);
Rechts, *adv.* to the right;
Still'schweigen, to be silent, to hold one's peace;
Unterfu'chung, *f.* examination;
Unterwer'fen, to subject, submit;
Verwun'derung, *f.* astonishment, surprise.

Es ist Schade, daß bei vielen Menschen die guten An'lagen und Talen'te nicht besser aus'gebildet werden.	It is (a) pity that with many men (the) good endowments and talents are not better developed.
Es ist Schade, daß er nicht da war.	It is (a) pity that he was not there.
Das ist mir ganz recht.	That just suits me (is just as I'd have it.)
Dem frommen Tobi'as war Alles recht, was Gott über ihn verhäng'te	To the devout Tobias, all was right that God ordained concerning him.
Ein Verleum'der muß es sich gefal'len lassen, von seinen Mi'tmenschen verach'tet zu werden.	A calumniator must submit to be despised by his fellowmen.
In dem Stübchen dieser armen alten Frau saß zur Rechten die Noth und zur Linken das Elend.	In the little room of this poor old woman sat distress at the right hand, and wretchedness at the left.
Rechts sieht man die Schafe in der Wiese weiden, und links die Ziegen an dem Berge klettern.	At the right are seen the sheep pasturing in the meadow, and at the left the goats clambering upon the mountain.
Morgen über acht Tage reisen wir von hier ab.	A week from to-morrow we depart (hence) from here.
Er beglei'tete seinen Gesang' mit der Harfe.	He accompanied his song with the harp.
Die Begleitung dieses Stückes ist von dem berühm'ten Karl Mari'a von Weber.	The accompaniment of this piece is by the celebrated Charles Maria von Weber.
Unter solchen Um'ständen wurde das Versprech'en natürlich gebro'chen.	Under such circumstances the promise was of course broken.

1 Es ist Schade, daß Sie nicht eine Stunde früher gekommen sind. 2. Macht es wie ihr wollt, mir ist Alles recht. 3. Mir ist Alles recht, was die Versammlung beschlossen hat. 4. Er mußte sich diese Beleidigung stillschweigend gefallen lassen. 5. Er mußte sich Vieles gefallen lassen, was er sich unter andern Verhältnissen nicht hätte gefallen lassen. 6. Sie mußte es sich gefallen lassen, verleumdet worden zu sein. 7. Zur Rechten hatten wir das Gebirge und zur Linken den Fluß. 9. Rechts und links waren feindliche Truppen aufgestellt. 9. Ihr dürft weder zur Rechten noch zur Linken von diesem Wege abweichen. 10. Wer ist Schuld (Sect. 80. II.) an diesem Unglücke? 11. Unser Nachbar ist Schuld daran. 12. Der Schüler ist Schuld daran, daß er bestraft wird. 13. Wir selbst sind Schuld daran gewesen. 14. Morgen über acht Tage kommt ein Dampfschiff von New-York an. 15. Morgen über vierzehn Tagen wird es ein Jahr, daß ich ihn gesehen habe. 16. Gestern vor acht Tagen ist sein Vater gestorben. 16. Das junge Mädchen begleitete ihren Gesang mit einer Guitarre. 18. Der Freund begleitete mit dem Fortepiano das Geigenspiel des Italieners. 19. Die Begleitung dieser Lieder ist von Mozart. 20. Vieles würde uns natürlich erscheinen, wenn wir es einer gehörigen Untersuchung unterwerfen würden. 21. Wir fanden es sehr natürlich, daß er gestern nicht kam. 22. Ein natürliches Ereigniß erregt keine Verwunderung. 23. Haben Sie heute Morgen die Feuerglocken gehört? 24. Natürlich, (Sect. 83.) denn ich war selbst bei dem Feuer. 25. Es ist natürlich, daß wir sterben müssen. 26. Ich begleite meine jungen Freunde nach Hause.

1. It is a pity that your friend did not arrive half an hour earlier. 2. I must submit to whatever my father resolves on. 3. John's new book pleases me much. 4. One must submit in this life to many things. 5. I would not submit to it, if I were in your place. 6. To the right hand we had the river and to the left hand the mountainous forest. 7. Right and left we saw nothing but enemies' troops. 8. This day-week we go to Berlin. 9. To-morrow fortnight my brother will arrive here. 10. A week ago yesterday, a ship sailed for Australia. 11. Three days ago we had unexpectedly great pleasure. 12. It is a pity that the talents of this young artist are not better developed. 13. Your sister accompanied me with the harp, and sang to the piano of my friend. 14. It is quite natural that everybody must die. 15. The accompaniment of this piece is by Handel.

LESSONS IN GEOGRAPHY—No. XX.

MAP OF ASIA.

Asia, the cradle of the human race, and the original seat of Paradise, lies within the northern and eastern hemispheres, and to the east and south-east of Europe. The greater part of this continent lies within the north temperate zone; the exceptions being part of Siberia, which lies within the north frigid zone, and parts of Arabia, Hindostan, Chin-India, and China, which lies within the torrid zone. Asia is bounded on the north by the Arctic Ocean; on the south by the Indian Ocean and the Chinese Sea; on the east by the Pacific Ocean; and on the west by the continent of Europe, the Mediterranean Sea, and the Red Sea or Arabian Gulf. This continent extends from lat. 78° 20′ N., to lat. 1° 20′ S.; and from long. 26° 5′ E., to long. 169° 44′ W. or long. 190° 16′ E.; which shows that a very small portion of this continent lies in the northern and western hemispheres. Its length, from Cape Baba, in Asia Minor, in lat. 39° 30′ N. and long. 26° 5′ E., to East Cape in Russia in lat. 66° 6′ N. and long. 169° 44′ W., is about 6,880 miles. Its breadth, from Cape Severo-Vostochnoi in Siberia, in lat. 78° 20′ N. and long. 104° E., to Point Romania, in the Malayan Peninsula, in lat. 1° 23′ N. and long. 104° 17′ E. is about 4,600 miles. This continent is connected with that of Africa, at the Isthmus of Suez, which is said to be only 73 miles wide. The surface of Asia, including its islands, is reckoned by some to contain about 22 millions of square miles, and its population to be about 440 millions; if these approximations be somewhat near the truth, there will be, on average, about 20 inhabitants to every square mile of this division of the world; but much of it contains vast deserts, destitute both of useful vegetation and human population. Thus, in Siberia, which is reckoned by some to contain about 4,500,000 square miles, the population according to a recent estimate was scarcely more than a million of inhabitants; which allows only *one* inhabitant to every 4½ square miles. On the other hand, in China proper, the number of square miles is about 1,300,000, and the population, on the most moderate estimate, about 260,000,000 of inhabitants; and this allows about 200 inhabitants to the square mile! The linear extent of the coast line of the continent of Asia is reckoned by some at 35,000 miles.

COUNTRIES, KINGDOMS, EMPIRES, AND STATES OF ASIA.

Countries.	Capitals.	Latitudes.	Longitudes.	Present Ruler.	Form of Government.
Russia in Asia. Caucasus	Teflis	41° 21′ N.	45° 9′ E.	Nicholas I.	Absolute Monarchy
Russia in Asia. West Siberia	Tobolsk	58 12	68 6	Nicholas I.	Absolute Monarchy
Russia in Asia. East Siberia	Irkutsk	52 17	104 12	Nicholas I.	Absolute Monarchy
Turkey in Asia. Asia Minor	Smyrna	38 26	27 7	Abdul Medjed	Absolute Monarchy
Turkey in Asia. Syria	Aleppo	36 11	37 10	Abdul Medjed	Absolute Monarchy
Turkey in Asia. Palestine	Jerusalem	31 48	35 20	Abdul Medjed	Absolute Monarchy
Turkey in Asia. Mesopotamia	Bagdad	33 20	44 25	Abdul Medjed	Absolute Monarchy
Turkey in Asia. Armenia	Erzeroum	39 57	48 36	Abdul Medjed	Absolute Monarchy
Arabia	Mecca	21 27	40 18	Native Princes subject to [Turkey	Limited Monarchy
Persia	Teheran	36 10	51 20	Native Prince	Absolute Monarchy
Affghanistan	Caubul	34 24	69 0	Dost Mahomed	Limited Monarchy
Beloochistan	Kelat	36 43	60 14	Native Prince	Limited Monarchy
Turkestan, or Independent Tartary	Bokhara	39 40	64 55		
British India. Bengal Presidency	Calcutta	22 35	88 21	Victoria I. [Britain	Limited Monarchy
British India. Bombay Presidency	Bombay	18 56	72 54	Victoria I. [Britain	Limited Monarchy
British India. Madras Presidency	Madras	13 4	80 20	Victoria I. [Britain	Limited Monarchy
Central India	Hyderabad	17 12	78 51	Native Princes subject to	Limited Monarchy
Northern India	Cashmere	34 20	75 13	Native Prin. sub. to Brit	Limited Monarchy
Island of Ceylon	Colombo	6 57	79 57	Victoria I.	Limited Monarchy
Eastern India. Birmah	Rangoon	16 45	96 13	Native Prince	Monarchy
Eastern India. Siam	Bankok	13 59	100 34	Native Prince	Monarchy
Eastern India. Annam	Huć	16 36	107 16	Native Prince	Monarchy
Eastern India. Laos	Lanchang	15 0	105 0	Native Princes	Limited Monarchy
British China-India	Maulmein	16 10	98 20	Victoria I.	Limited Monarchy
Malayan Peninsula	Malacca	2 12	102 15	Victoria I.	Limited Monarchy
Pinang, or Prince of Wales Island	George Town	5 25	100 22	Victoria I.	Limited Monarchy
Singapore Island	Singapore	1 17	103 51	Victoria I.	Limited Monarchy
Chinese Empire. China	Pekin	39 54	116 26	Hien Fung	Absolute Monarchy
Chinese Empire. Thibet	Lassa	29 10	92 20	Hien Fung	Absolute Monarchy
Chinese Empire. Tartary	Cashgar	38 50	74 10	Hien Fung	Absolute Monarchy
Chinese Empire. Corea	Kingkitao	37 10	127 30	Hien Fung	Absolute Monarchy
Chinese Empire. Loo-choo Islands	Napakiang	26 20	128 30	Hien Fung	Absolute Monarchy
Hong-Kong Island	Victoria	22 13	114 13	Victoria I.	Limited Monarchy
Japan Islands	Jedo	35 40	139 50	Native Prince	Absolute Monarchy
East Indies. Sumatra	Bencoolen	3 48 S.	102 28	William III.	Limited Monarchy
East Indies. Java	Batavia	6 9	106 52	William III.	Limited Monarchy
East Indies. Borneo	Borneo	4 55 N.	114 55	Victoria I. & William III.	Limited Monarchy
East Indies. Celebes	Macassar	5 9 S	119 36	Native Pr. under Holland	Limited Monarchy
East Indies. Moluccas and Bandas	Amboyna	3 40	128 15	William III.	Limited Monarchy
East Indies. Philippines	Manilla	14 36 N.	121 3	Isabella II.	Limited Monarchy
East Indies. Sooloo Islands	Sooloo	6 1	121 12	Native Prince	Limited Monarchy

The *seas* and *gulfs* of Asia, on the West and the South, form an important feature of its natural divisions. The Red Sea and the Persian Gulf may be called *inland* seas. The Red Sea, so famous in sacred history, otherwise called the Arabian Gulf, with its two arms, the Aelanitic and Heroopolitan gulfs, over the latter of which the Israelites crossed on dry ground, is about 1,400 miles long, its breadth varying from one to two hundred miles, and its surface being about 200,000 square miles. The two arms above mentioned are also called the gulfs of Akabah and Suez, from the names of the towns at their northern extremities; and these inclose between them the desert region called the peninsula of Sinai, in which the forty years wanderings of the tribes of Israel were performed—fit emblem of the wanderings of human life in this lower world. The entrance to the Red Sea is by the strait of Bab-el-Mandeb, about seventeen miles wide. This sea opens out at this strait into the Arabian Sea, which washes the western shores of India, the southern shores of Arabia, and terminates in the entrance to the Persian Gulf, at the strait of Ormuz, through the Gulf of Omaun. The Persian Gulf contains about 95,000 square miles. The Bay of Bengal, whose waters wash the eastern shores of Hindostan, and the western shores of the Eastern Peninsula or Chin-India, is an arm of the Indian Ocean. The part of this bay which washes the shores of British Chin-India is called the Gulf of Martaban. To the east of the Indian Ocean lies the Oriental Archipelago, studded with the East India Islands. To the north of this lies the Chinese Sea, with the gulfs of Siam and Tonquin.

Between the Peninsula of Malaya and the Island of Sumatra, is situated the *Strait* of Malacca. Between the islands of Sumatra and Java, is the *Strait* of Sunda, these islands being called the Sunda Isles. From the Chinese Sea to the East Sea, the passage is through the Strait of Formosa; north of the latter sea, lies the Yellow Sea, whose waters wash the eastern shores of China proper; the north-west part of the Yellow Sea being called the Gulf of Pechelee. Between the peninsula of Corea and the islands of Japan, lies the Sea of Japan, the north part of which is called the Gulf of Tartary. North of this gulf lies the Sea of Ochotsk or Kurile Sea, which washes the western shores of the peninsula of Kamchatka. On the other side of this peninsula, is the Sea of Kamchatka, or Behring's Sea, bounded on the south by the Aleu ian Isles. All these seas and gulfs, from the Strait of Malacca to Behring's Strait between Asia and America, are branches or arms of the North Pacific Ocean. Behring's Strait, which is reckoned by some writers to be only 52 miles broad at the narrowest part, separates the Arctic Ocean from the Pacific. In the former, there are some gulfs which run into the northern parts of Siberia, namely, those of Kara, Obi, and Yenisei.

The *islands* which lie around Asia are of the highest importance both to that continent and to the continent of Europe, to which they principally belong, as possessions in the East. The East Indies, otherwise called the islands of the Oriental Archipelago, have been long famous for their produce, and situated under the burning line, or within the torrid zone, they yield such as cannot be found in more temperate climes. The Sunda Isles, Sumatra and Java, with others, lie to the south of the Eastern Peninsula (which, with Hindostan, is often included under the general name of the East Indies); the length of Sumatra is about 1,000 miles, and its breadth about 160 miles, it contains a surface of about 150,000 square miles: the length of Java is about 600 miles, and its breadth 100 miles, it contains a surface of about 45,000 square miles. The island of Borneo which lies to the east of Sumatra and to the north of Java, is about 850 miles long, and about 700 miles broad, and contains about 270,000 square miles. The island of Celebes is about 500 miles long and about 150 miles broad, and contains about 72,000 square miles.

The equator crosses each of these three islands nearly at the middle of each. Next follow the islands called *par excellence*,

the *Spice Islands*, or *Moluccas*, including *Amboyna*, thirty-two miles long, by twelve miles broad, and containing about 282 square miles; then the Philippine Islands, north of these, including Luzon and Mindanao; the former about 400 miles long, and about 100 miles broad, with a surface of about 56,000 square miles; and the latter about 300 miles long, and about 108 miles broad. North of the Philippines, is the island of Formosa, belonging to China, and the Loo-choo Islands north-east of Formosa, subject to China. North and north-east of these islands, are the Japan Islands, of which the largest is Niphon, about 800 miles long, and 100 broad; the next, Jesso, about 280 miles long, and 200 miles broad; next, Kiusiu, about 150 miles long, and 120 miles broad; and the next Sikokf, about ninety miles long, and fifty broad. These islands include a surface of about 160,000 square miles, and form an important appendage to the continent of Asia. The other islands on the west of Asia, and in the north Pacific Ocean, are of small size and importance. In the northern ocean, there are a few islands, of which very little is known. South of India, are the Andaman and Nicobar Isles in the Bay of Bengal, and the important island of Ceylon, south-east of the Carnatic, with an area of about 24,600 square miles, and a population of about a million and a half—a fine appanage of the British crown; it is separated from the peninsula of India by the Gulf of Manara, and the strait called Palk's Passage. On the other side of Cape Comorin, the most southern point of India proper, lie the Laccadive and Maldive Islands, south-west of the Malabar coast. In the Indian Ocean, between Africa and India, lie the Seychelle Islands.

LESSONS IN FRENCH.—No. L.

By Professor Louis Fasquelle, LL.D.

§ 27.—Numeral Nouns.

We shall, in order to render reference easier, place here some observations on nouns and adverbs of number.

(1.) The numeral nouns in use with the French are:—

unité,	*unit*	trentaine,	*thirty*
couple, paire,	*couple, pair*	quarantaine,	*two score*
trio,	*trio, three*	cinquantaine,	*fifty*
demi-douzaine,	*half dozen*	soixantaine,	*sixty*
huitaine,	*eight days*	quatre-vingtaine,	*eighty*
neuvaine,	*nine (nine days of prayer)*	une centaine,	*a hundred*
		deux centaines, &c.,	*two hundred*
dizaine,	*ten, half a score*	un millier,	*one thousand*
douzaine,	*dozen*	deux milliers,	*two thousand*
quinzaine,	*fifteen, fortnight*	une myriade,	*a myriad*
vingtaine,	*score, twenty*	un million,	*a million.*

(2.) The termination *aine* signifies *nearly*, and when added to words of number is equivalent to the English *some*, in cases like the following: I have *some* twenty books, i.e. about twenty books. J'ai une *vingtaine* de livres.

§ 28.—Fractional Numerals.

un quart,	*one quarter*	un cinquième,	*one fifth*
deux quarts,	*two quarters*	deux cinquièmes,	*two fifths*
trois quarts,	*three quarters*	un sixième, etc.,	*one sixth, etc.*
le tiers,	*the third*	un dixième, etc.,	*one tenth, etc.*
deux tiers,	*two thirds*	un centième,	*one hundredth*
la moitié,	*the half*	un millième,	*one thousandth*

(1.) It will be seen that, with the exception of tiers, quart and moitié, these numbers take the form of the ordinal numerals. They may, therefore, take the form of the plural when necessary.

(2.) The word *demi*, when used adjectively and preceding the noun, is invariable:—

une *demi*-heure f.,	*half an hour*
une *demi*-aune f.,	*half an ell.*

(3.) When coming after the noun to denote an *additional* half, it agrees in gender with the noun:—

une heure et *demie*	*one hour and a half*
une aune et *demie*,	*one ell and a half.*

(4.) When used substantively, *demi* may take the form of the plural:—

Cette horloge sonne les heures et les *demies*.	*This clock strikes the hours and the half-hours.*

§ 29.—Ordinal Adverbs.

(1.) Premièrement,	*first; in the first place*	Quatrièmement,	*fourthly*
		Cinquièmement,	*fifthly*
		Sixièmement,	*sixthly*
Deuxièmement, Secondement,	*secondly*	Septièmement,	*seventhly*
		Dixièmement,	*tenthly.*
Troisièmement,	*thirdly*		

(2.) These, like adverbs of manner, are formed by the addition of *ment* to the feminine form of the adjective.

§ 30.—Indefinite Adjectives.

(1.) The indefinite adjectives are used when anything is to be represented or referred to in a general or indefinite manner. They are,—

aucun,	*not any, not one*	quel,	*what*
chaque,	*every, each*	quelconque,	*whatever*
même,	*same*	quelque,	*some*
nul,	*no*	tel,	*such*
plusieurs,	*several*	tout,	*all.*

(2.) Aucun is generally followed by a noun, with which it must agree. It is followed by *ne* when it comes before a verb:—

aucun homme, *no man*;	*aucune* femme, *no woman*;
Aucun chemin de fleurs *ne* conduit à la gloire. La Fontaine.	*No flowery path leads to glory.*
On méprise tous ceux qui *n'ont aucune* vertu. La Rochefoucauld.	*All those who have no virtue are despised.*

(3.) *Aucun* is by the French authors sometimes used in the plural:—

Ils ne peuvent souffrir aucun empire légitime, ne mettent *aucunes* bornes à leurs attentats. Montesquieu.	*They can bear no legitimate dominion, set no bounds to their crimes.*

Aucun and *nul* should be put in the plural only before such words as are not used in the singular, or have in the singular a different acceptation.

(4.) Chaque is of both genders, and is used only in the singular. It always precedes the noun, and cannot be separated from it by an adjective or by a preposition. It should never be used without a noun:—

Chaque âge a ses plaisirs, *chaque* état a ses charmes. Delille.	*Every age has its pleasures, every situation its charms.*

(5.) Même, placed before the noun, has the sense of *same*, in English. Placed after the noun it means, generally, *himself, herself, itself*, or *themselves*. It may often be rendered by the word *even*. When *même* is an adjective it may take the form of the plural, but does not vary on account of gender:—

c'est la *même* vertu / *it is the same virtue*	c'est la vertu *même* / *it is virtue itself.*
Le peuple et les grands n'ont ni les *mêmes* vertus, ni les *mêmes* vices. Vauvenargues.	*The people and the great have neither the same virtues nor the same vices.*
Les écorces *mêmes* des végétaux sont en harmonie avec les températures de l'atmosphère. Bernardin de St. Pierre.	*The bark even of vegetables is in harmony with the temperature of the atmosphere.*

(6.) It is at times difficult to distinguish *même* an adjective from *même* an adverb, which is invariable. [See § 97 (2.) (3.)]

(7.) Nul is a stronger negative than *aucun*. It agrees in gender and number with the noun which it qualifies. Like *aucun*, when relating to the subject of the sentence, it requires *ne* before the verb:—

Nul homme n'est heureux; *nulle* chose ne peut le rendre tel. Boiste.	*No man is happy; nothing can render him so.*
Nulle paix pour l'impie; il la cherche, elle le fuit. Racine.	*No peace for the impious; he seeks it, it avoids him.*

(8.) *Nul* is sometimes used alone, in the sense of *no one*:—

Nul n'est content de sa fortune, ni mécontent de son esprit. Mme. Deshoulieres.	*No one is pleased with his fortune, nor displeased with his own wit.*

(9.) Plusieurs is, of course, always in the plural. It does not vary its form:—

Il faut bien qu'il y ait *plusieurs* raisons d'ennui, quand tout le monde est d'accord pour bailler. Florian.	*There must necessarily be several reasons for ennui, when all agree in yawning.*

(10.) QUEL takes the gender and number of the noun to which it relates. It is sometimes immediately followed by its noun, from which it may be separated by one or several words:—

Quel tableau ravissant présentent les campagnes! DELILLE.
Quelle invisible force a soumis l'univers? L. RACINE.
Quels son harmonieux, *quels* efforts ravissants,
De la reconnaissance égalent les accents?

What a delightful picture the country offers!
What invisible hand has conquered the universe?
What harmonious sounds, what ravishing strains, equal the voice of gratitude?

(11.) QUELCONQUE is always placed after the noun, and varies only for the plural:—

Toutes les jouissances sont précédées d'un travail *quelconque*. MME. CAMPAN.
Deux points *quelconques* étant donnés. . . . THE ACADEMY.

All enjoyments are preceded by some sort of exertion.
Two points of some kind being given. . . . .

(12.) QUELQUE in the sense of *some* (*a certain number*), or *whatever*, agrees in number with the noun:—

Il y a du mérite sans élévation, mais il n'y a point d'élévation sans *quelque* mérite. LA ROCHEFOUCAULD.
Quelques vains lauriers que promette la guerre,
On peut être héros sans ravager la terre. BOILEAU.

There is merit without elevation, but there is no elevation without some merit.
Whatever vain laurels war may promise, one may be a hero without ravaging the earth.

(13.) Quelque having the sense of *about* or *some* or *however*, is invariable:—

Quel âge avez-vous? Vous avez bon visage! Eh! *quelque* soixante ans. RACINE, *les Plaideurs*.
Alexandre perdit *quelque* trois cents hommes, quand il vainquit Porus. D'ABLANCOURT.
Quelque méchants que soient les hommes, ils n'oseraient paraître ennemis de la vertu. LA ROCHEFOUCAULD.

How old are you? You look well. Oh! some sixty years.
Alexander lost some three hundred men when he vanquished Porus.
However wicked men may be, they do not dare to appear enemies of virtue.

(14.) TEL makes in the feminine *telle*; in the plural masculine, *tels*; in the plural feminine, *telles*. It agrees with the noun which it qualifies:—

tel livre, *such book* — *telle* lettre, *such letter*
tels livres, *such books* — *telles* lettres, *such letters*.

(15.) TOUT meaning every, is of course always in the singular, but varies for the feminine:—

Tout citoyen doit servir son pays; le soldat de son sang, le prêtre de son zèle. LA MOTTE.
En *toute* chose, il faut considérer la fin. LA FONTAINE.

Every citizen should serve his country; the soldier with his blood, the priest with his zeal.
In everything we must consider the end.

(16.) *Tout*, in the sense of *all*, agrees in gender and number with the noun to which it relates:—

tout l'argent, *all the money*. — *toute* la toile, *all the cloth*.

Il était au-dessus de *tous* ces vains objets qui forment *tous* les désirs et *toutes* les espérances des hommes. MASSILLON.

He was above all those vain objects which form all the desires and all the hopes of men.

See § 97 (5).

§ 31.—THE PRONOUN.

(1.) The pronoun, in French, as in other languages, is a word used to represent the noun, in order to prevent its too frequent repetition.

(2.) The pronoun serves also to designate the parts which each person or thing takes in speech. This part is called *person*.

(3.) There are three persons: the first, or that which speaks; the second, or that spoken to; the third, or that spoken of.

(4.) There are five sorts of pronouns:—

The personal; The demonstrative;
The possessive; The relative;
The indefinite.

LESSONS IN GEOMETRY.—No. XVII.

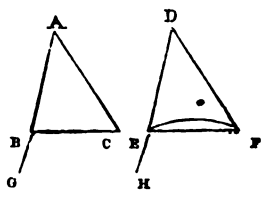
LECTURES ON EUCLID.

COROLLARY TO PROP. IV., BOOK I.

IF the sides A B and D E, or the sides A C and D F of the triangles A B C and D E F be produced, the angles upon the other sides of the bases of these triangles are equal.

In fig. (D), let the side A B of the triangle A B C be produced to G, and produce the side D E of the triangle D E F, so that D H shall be equal to A G, by Exercise on Prop. III. in our last lesson. The angle C B G is equal to the angle F E H.

Fig. (D).



For if the triangle A B C be applied to the triangle D E F so that the point A may be on the point D, and the straight line A G upon the straight line D H, the point G shall coincide with the point H, because the straight line A G is, by construction, equal to the straight line D H; and A G coinciding with D H, it may be shown as in the *fourth* proposition, that the part A B coincides with the part D E. But the remainder B G is equal to the remainder E H (I. Axiom 3); and because the point B coincides with the point E, and the point G with the point H, therefore B G coincides with E H. Now, it may be shown as in the *fourth* proposition, that B C coincides with E F; therefore, B G coinciding with E H, and B C with E F, the angle C B G coincides with the angle F E H; wherefore the angle C B G is equal to the angle F E H (I. Axiom 8). In the same manner, by producing the sides A C and D F, it may be shown that the other angles below the base are also equal. Q. E. D.

In the statement of this corollary, Dr. Thomson has taken it too readily for granted that the parts produced by the straight lines A B and D E would necessarily coincide when these straight lines themselves were made to coincide. This assumption is, in fact, taking for granted a corollary which Euclid has thought it necessary to demonstrate, and which is appended to the 11th Proposition of Book I., viz., that two straight lines cannot have a common segment, that is, they cannot coincide in part without coinciding altogether. Now, as this corollary cannot be assumed without demonstration, it became necessary to demonstrate the above corollary as we have done; and this demonstration includes in it a demonstration of Euclid's very corollary to the 11th, which would otherewise require to be taken for granted. We are now prepared for the demonstration of the *fifth* proposition in the way laid down by Dr. Thomson, which we must confess is a great simplification of Euclid's, and well worthy of the attention of teachers who find any of their pupils unable *to cross the bridge*.

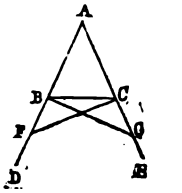
PROPOSITION V. THEOREM.

The angles at the base of an isosceles triangle are equal to one another; and if the equal sides be produced, the angles upon the other side of the base shall be equal.

Let A B C be an isosceles triangle, of which the side A B is equal to the side A C. And let the equal sides A B and A C be produced to D and E. Then, the angle A B C is equal to the angle A C B, and the angle C B D to the angle B C E.

In B D take any point F, and from A E the greater, cut off A G equal (I. 3) to A F the less. Join F C and G B.

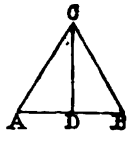
Because in the two triangles A F C and A G B, the side A F is equal to (*Const.*) the side A G, and the side A B to (*Hyp.*) the side A C, the two sides F A and A C are equal to the two sides G A and A B, each to each; and they contain the angle F A G common to the two triangles A F C and A G B. Therefore the base F C is equal (I. 4) to the base G B, and the triangle A F C to the triangle A G B. Also, the remaining angles of the one are equal (I. 4) to the remaining angles of the other, each to each, viz., those to which the equal sides are opposite; wherefore the angle A F C is equal to the angle A G B. Again, because the whole A F is equal to the whole A G, of which the parts A B and A C, are equal. Therefore the remainder B F is equal (*Ax.* 3) to the remainder C G. But the side F C was proved



to be equal to the side GB; therefore, in the two triangles BFC and GCB, the two sides BF and FC, are equal to the two sides CG and GB, each to each, and the angle BFC was proved to be equal to the angle CGB. Therefore, the two triangles BFC and GCB are equal (I. 4), and the angles ABC and ACB, on the other side of the base BC of these two triangles, are equal, by the preceding corollary; but these are the angles at the base of the triangle ABC. And because the triangles FBC and GCB are equal; therefore the angles FBC and GCB opposite to the equal sides FC and GB are also equal (I. 4); and these are the angles on the other side of the base BC of the triangle ABC. Therefore, the angles at the base of an isosceles triangle, &c. Q. E. D. Quod Erat Demonstrandum, *Which Was to be Demonstrated.*

ANOTHER PROOF.—Dr. Thomson has inserted in his edition the following proof of this important theorem:—In fig. (E), let ABC be the isosceles triangle, of which the sides AC and CB are equal to one another; and let the angle ACB opposite the base AB, be bisected by the straight line CD, that is, divided into two equal parts, viz., the angles ACD and BCD. Because, in the two triangles ACD and BCD, the side AC is equal to the side CB, by hypothesis, and the side CD is common to the two triangles; therefore the two sides AC and CD are equal to the two sides BC and CD each to each; but the angle ACD is equal to the angle BCD, by hypothesis, therefore the base AD is equal to the base DB, and the triangle ACD to the triangle BCD; also, the remaining angles of the one are equal to the remaining angles of the other each, viz., those to which the equal sides are opposite; therefore, the angle CAD is equal to the angle CBD; and these are the angles at the base of the isosceles triangle ACD.

Fig. (E).

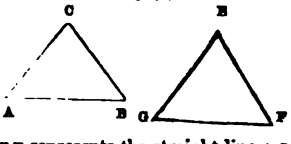


And if the equal sides CA and CB were produced, the angles on the other side of the base would be equal, by the corollary to the *fourth* proposition, as above demonstrated.

The only objection to the preceding demonstration, which is short and clear, and obvious to every capacity, is that in assuming the bisection of the angle ACB, we virtually employ an additional postulate, viz., "That any rectilineal angle may be divided into two equal parts." This, of course, increases the number of postulates, which Euclid was evidently desirous to avoid. Besides, it anticipates the construction of the 9th proposition of this book, where Euclid shows how to bisect a given rectilineal angle; and it was a principle with him, never to take any problem for granted of which it was possible to show the construction and demonstration.

A THIRD PROOF.—In his notes on the *fifth* proposition, Dr. Thomson, as others have done before him, suggests another mode of proof, which we here insert in full for the sake of learners. In fig. (F), let ACB be the isosceles triangle, of which the sides AC and CB are equal; and let the triangle ABC be applied obversely (that is, with its present face downwards) to the plane in which it is, at any point E, so as to leave a trace or outline EFG, in which EF represents the straight line AC; EG the straight line CB, and FG the straight line AB. Also the angle GEF represents the angle ACB; the angle EGF represents the angle CBA; and the angle EFG, the angle CAB. Because AC is equal to CB, by hypothesis, and that EG is equal to CB, by construction (being its trace), therefore AC is equal to EG (I. Axiom 1). In the same manner, it may be shown that CB is equal to EF. Because the angle ACB is equal to the angle GEF, by construction (being its trace); therefore in the two triangles ACB and GEF, the two sides AC and CB are equal to the two sides GE and EF, and the angle ACB is equal to the angle GEF; wherefore the two triangles are equal; and the remaining angles of the one are equal to the remaining angles of the other, &c. (I. 4). Therefore the angle CAB is equal to the angle EGF, and the angle ABC to the angle EFG. But the angle EGF is equal to the angle CBA by construction (being its trace); therefore the angle CAB is equal to the angle CBA (I. Axiom 1); and these are the angles at the base of the isosceles triangle ABC. In the same manner, it may be shown by the application of the corollary to the *fourth* proposition, above demonstrated, that if the equal sides CA and CB were produced, the angles below the base would also be equal.

Fig. (F).



COROLLARY.—Hence every equilateral (*equal-sided*) triangle is also equiangular (*equal-angled*). For any side being made the base, it can be shown that any two angles at the base are equal; therefore, all the three angles are equal to one another.

The enunciation of this *fifth* proposition is more clearly and logically expressed by saying that "*if two sides of a triangle be equal to one another, the angles which are opposite to the equal sides are also equal to one another; and, if the equal sides be produced, the angles upon the other side of the base shall likewise be equal.*"

A KEY TO THE EXERCISES IN THE LATIN LESSONS.

(*Continued from page* 343, *Vol. II.*)

By JOHN R. BEARD, D.D.

Page 70, col. 2, vol. II.—LATIN-ENGLISH.

God has given us a mind than which nothing is more excellent, the victory cost us much blood; the mother of all good arts is wisdom, than which nothing more productive, nothing more excellent has been bestowed by the everlasting God on the life of men; God has placed the body as a (quandam) garment round the soul (God has surrounded the soul with the body as with a garment), and has clothed it outwardly; those whose fathers or forefathers were distinguished by any glory (glorious deeds), endeavour for the most part to excel in the same sort of praise (praiseworthy deeds); we ought to hold our parents very dear, because by them life has been given to us; he has not conferred a benefit who unwilling has done good (who has done good unwillingly); who are more yours than those to whom you have restored safety, when they were destitute of hope? the citizens showed themselves most energetic defenders of liberty; a great multitude surrounded the orator in the market-place; eloquence has been given by nature for the safety of men; eloquence has been given by nature for the preservation of men; a wicked orator turns eloquence to the ruin and destruction of the good; what is so inhuman as to turn eloquence, given by nature for the safety and preservation of men, to the ruin and destruction of the good; pay had not been given to the soldiers for a long time; sedition arose among the soldiers; because pay had not been given for a long time, sedition arose among the soldiers; you, my friend, will evince fidelity to me; I know for certain that you, my friend, will evince fidelity to me; nothing hinders us; nothing will hinder us; we may obtain a victory; I believe that nothing will stand in our way so that we may not obtain the victory (to prevent our obtaining the victory); the victory cost the death of many brave men; we did not doubt that the victory would cost the death of many brave men; will you persist in your opinion? I know not whether you will persist in your opinion.

N.B.—On page 70, col. 2, line 11, for constĕti read constĭti.
do. do. line 12, for perstĕti read perstĭti.

Page 70, col. 2, vol. II.—ENGLISH-LATIN.

Classem duci dedit; tibi classem dabit; censesne se fratre meo classem daturum esse? nihil pluris hominibus constitit quam avaritia; Deus mihi dedit sororem, quâ nihil mihi est carius; soror mea mihi se amantem per totam vitam praestabit; milites fortissimos se praestiterunt, sed victoria morte multorum virorum fortium constitit; nihil obstat quominus victoriam adipiscamur; victoriam, credo, adipiscemur; Socrates omnibus philosophis praestitit; quis neacit Socratem omnibus philosophis praestitisse? credis ne filium tuum omnibus sociis praestaturum esse? ingens hominum multitudo oratorem circumstat; stipendium militibus non est datum; stipendium militibus dabo; cave ne seditio inter milites oriatur; perstaturusne es in sententiâ tuâ? nescio perstaturus ne sim in sententiâ meâ.

Page 71, col. 1, vol. II.—LATIN-ENGLISH.

Nothing hinders to prevent our doing that which pleases us most; I will not oppose to prevent his reading everything; death does not deter a good man from consulting the welfare of the republic; they may interrupt me to prevent my being honoured, provided they do not interrupt to prevent the republic from being well managed by me; no pretext appeared sufficient to excuse any citizen from being present; he surrounded the bed with a broad ditch; he surrounds the enemies' camp with his army; he surrounds himself with soldiers; he will put his arms round your neck; he surrounded the city with a mound; I will endeavour to go beyond these limits with which I have surrounded myself; he gave a distinguished character to the peace; patrons have invested him with this fame.

Page 71, col. 1, vol. II.—ENGLISH-LATIN.

Nihil impedit quominus puer bonus esse possis; famam tibi circumdabo; circumdabit mihi vestem; honorem sorori suae circumdedit; circumdate urbi ignes, quominus cives egredi non possint; quominus adsis, nulla excusatio justa est.

Page 82, col. 2, vol. II.—LATIN-ENGLISH.

N.B.—On page 82, col. 2, line 7 from bottom, for *necuri* read *necui*.
do. 83, do. 1, do. 4 from top, for *pettre* read *petire*.
do. 83, do. 1, do. 43 do. for *acipitrem* read *accipitrem*.
do. 83, do. 2, do. 8 do. for *accipetri* read *accipitris*.
do. 83, do. 2, do. 9 do. for *second* read *third*.

Who comes (venit)? the door creaked; the leader violently abused the soldiers; the whole city resounded with the voices of citizens exulting (exsultantium) on account the of victory gained over the enemies; come, let us go to lie down; the Romans by their arms completely subdued many tribes and nations; we are taught by the authority and command of the laws to possess regulated desires, and to restrain all passions; great springs of water gushed forth from the fountain; the wise men of the Indians devote themselves to the flames; the wise men of the Indians are burnt without a groan; the wise men of the Indians when they have devoted themselves to the flames are burned without a groan; Cicero applied himself to (studied under) Molon the philosopher; the wise man endeavours to unfold the involved idea of his mind; when you have laid open the history of the times you will find many examples both of virtues and vices; when the city was taken, every place on all sides sounded with the lamentations of women and children; we are frightened (terremur) when it has thundered (tonuit) in calm weather; we strive after what is forbidden; Augustus forbad the poems of Virgil to be burned; Augustus forbad the poems of Virgil to be burned in opposition to the modesty of his (Virgil's) will.

Page 82, col. 2, vol. II.—ENGLISH-LATIN.

Forium cardines crepuerunt; mater filium innocentem increpuit; milites per totam noctem excubuēre; nautae hostium classem domabunt; ad Ciceronem me applicabo; veto te ad Aristotelem te applicare; nitēmur in vetitum; tota domus hominum gemitibus aegrorum sonuit; urbs armis sonat; Jupiter nutu caeteros Deos domat; passim gemitus ploratusque sonant; leonem perdomui.

Page 83, col. 1, vol. II.—LATIN-ENGLISH.

I fear that I have revived your regret and grief by my letter; you are about to revive the past misfortunes of the republic by your wicked deeds; there is no doubt that you will revive the past misfortunes of the republic by your wicked deeds; Tantălus, touchiug the top of the water, is repesented by the poets as tortured by thirst; do you not know how much that talkative man has tortured me by chattering? Caius Marius, when he was flogged, at the first forbad that he should be bound, and no one before Marius is said to have been flogged unbound; husbandmen carry the corn, when cut down, into barns; unless you have restrained your desires, in vain will you endeavour to live happily; who knows not how much Cicero aided his country? not only fortune but your industry also has assisted you in your undertaking; if fortune lends our soldiers any aid, we do not doubt that we shall gain a splendid victory over the enemies; the army advanced by long marches (itineribus) to assist the blockaded (cinctos) citizens; do not sup before you have washed your hands; as you are about to wash your body, fetch pure water from the running stream.

Page 83, col. 1, vol. II.—ENGLISH-LATIN.

Pueri, expergiscimini, lavate, et quum lavissetis ad negotium se applicate; hae mulieres me garriendo enecuerunt; non dubito quin hae mulieres te garriendo enecuerint; hae puellae garrulae me garrulitate enecabunt; vetabo filium garrire; lavistine manus? age! bene manus prius lava quam accumbes; nolunt pedes lavare; patris verbum filium adjuvat; naves veniunt urbem obsidione cinctam adjūtum; non est dubium quin ducis exercitus nostri brevi urbem adjuvaturus sit; secuistine pollicem? crus secui; dolorem meum refricuisti; nolens refricui dolorem tuum; fortuna fortem juvat; servus alligatur; pater vetat filium alligari.

Page 92, col. 1, vol. II.—LATIN-ENGLISH.

N.B.—On page 91, col. 2, line 27 from top, { for cītum read cītum. / for cĭtum read cĭtum.
do. 92, do. 1, do. 7 do. for connivēre read connivēre.

Minerva taught Cicero all arts; the mingled earnestness of modesty is greatly to be admired; so many times have I been occupied, and with such important business, that I am unable (that it is not allowed to me) to breathe freely; know you not how many toils, how many dangers, how many miseries the soldiers have sustained on their way? if virtue has restrained you from bad desires your life will be happy; Cicero having been told all things (cuncta) by the ambassadors (legatos), ordered the prætors to seize the Allobroges on the bridge; let not their minds mingle with the vices of men; the ascent to heaven is easy to the good; the less minds have mingled with and attached themselves to the errors and vices of men, the easier to them will be the ascent to heaven; the nature of the mind is simple, nor has it in it any thing mixed; we live on grapes dried in the sun; we have dried many grapes this season; Cato was of opinion that Carthage should be destroyed; every fifth year all Sicily was subjected to the census; two most powerful cities, Carthage and Numantia, were destroyed by Scipio; no forgetfulness has ever blotted out the fame of the Greeks and Romans, nor ever will blot it out; God has filled the world with all good things, and has mixed with it nothing bad; while the general is absent the soldiers excited sedition; the slaughter having been declared to be greater than it really was (than the reality was), excited terror in the city; Catiline was calmed neither by watching nor by rest, conscience so harrased his excited mind; it was enjoined by the laws that the dead should be buried after the third day; I doubt not that you have always shunned the intimacy of impure men; I am not ignorant that you have always favoured me and mine; chickens having been cherished and hatched are anxiously watched by their mothers; will you doubt that I have always cherished the greatest affection toward you; you so embraced me, so held me in your hands, so fondled me, that I could never forget that day; Brutus and Cassius, the murderers of Caesar, caused a great war; he is ungrateful who returns thanks, when witnesses are removed; many commanders of the Romans devoted their lives (heads) to the safety of their country; in the same year three temples were publicly vowed (to be built) and consecrated.

Page 92, col. 1, vol. II.—ENGLISH-LATIN.

Cicero a Minervâ omnes artes edoctus est; cives sex templa publica voverunt; templum Veneri dedicaverunt; mater infantem fovet; mater semper liberos fovebit; uxores maritos foverunt; cave ab mulieribus impuris; militum clades per urbem magnum ploratum movit; nescio quot labores sustinuerit; nescis quot labores sustinuerim; pater te a vitio arcuit; age patri gratias, quum te a vitio arcuerit; cave ne animus vitae sollicitudinibus se admisceat; magnum fovi in pectore meo amorem; in meo pectore magnus amor in te fotus est; quis hoc bellum movit? hostium duces hoc bellum moverunt; tua mens excita nunquam sedabitur; delete haec verba; historiam imperii ejus delevit; mala non sunt facilia deletu; pater tuus vitium delendum esse censuit.

Page 92, col. 2, vol. II.—LATIN-ENGLISH.

Teach me how I may escape these things; I did not receive the letter which should inform me what you were doing; I told you your brother's reason; the judge must be informed of the cause of the affair; his father informs the judges concerning the injuries of Augustus; your uncle will instruct you about your journey; it is fit and pleasant to teach those desirous of learning; I envy your master who for so large a fee has taught you to be wise in nothing; I teach many scholars the Latin language; I must be taught to speak Greek; he taught my daughter to play on the lyre; they may teach him to ride a horse and to use weapons; will you teach me the Greek language? teach these my sons music; gladly will I teach you letters.

Page 92, col. 2, vol. II.—ENGLISH-LATIN.

Doce me quo modo tibi prodesse possim; filium tuam grammaticam docebunt; docui uxorem meam Latinam linguam loqui; me docent fidibus; Latinam linguam doctus est; doce eos Graece loqui; a patre doctus multa sum; musicam a sorore meâ docentur; nescio quid te docuam de belli evento; Latinam linguam docendi sunt pueri; doctus sum Graece loqui; multi discipuli a me Latinam linguam docti sunt.

THE MOUSE AND THE KITE.

A fable by Æsop.

A kite, caught in a snare, besought a little mouse to set him free by gnawing the meshes of the net (the meshes of the net being gnawed). Which being done, the liberated kite seized the mouse and devoured it. This fable shows what thanks the wicked are wont to give in return for benefits.

Les hommes sont comme les statues: il fait les voir en place.—*La Rochefoucauld.*

Les hommes sont nés les uns pour les autres: il faut donc les instruire ou les supporter.—*Idem.*

La plupart des hommes ont, comme les plantes, des propriétés cachées que le hasard fait découvrir.—*Idem.*

ANSWERS TO CORRESPONDENTS.

The following extract from *The Times* of February 26, will be of some interest to a great number of our subscribers:—THE BOOK-POST.—We are glad to find from an announcement in the *Gazette* that the book-post, which has now become an important channel for the diffusion of literature, will be commenced on the 1st of May between this country and the East Indies. The total charge from any part of the United Kingdom to any part of our vast Indian Empire for a book not exceeding half a pound in weight will be 6d.; not exceeding a pound, 1s.; not exceeding 2lb., 2s.; and not exceeding 3lb. (the *maximum* by this post), 3s.

T. M. CROWHURST (Plymouth): Mensuration certainly.—LITTLE HARRY: *Will receive* forms *one part* of the verb *to receive*, viz, the future tense. *will* being an auxiliary verb to *receive*. In the question relating to Arithmetical scales, the *radix* is always mentioned in the *name* of the scale, thus: in the *decimal* scale, *ten* is the radix; from the Latin *decem*, ten. But, in order to make it all clear, take this table:—

NAMES OF THE SCALES.	RADIXES.
Binary	*two*
Ternary	*three*
Quaternary	*four*
Quinary	*five*
Senary	*six*
Septary	*seven*
Octary	*eight*
Nonary	*nine*
Denary or *Decimal*	*ten*
Undenary	*eleven*
Duodenary or *Duodecimal*	*twelve*

A WOULD B. FARMER: Hebrew will come in its turn; Greek after Latin. A number is divisible by 8 when its three last figures are divisible by 8, because 8 is the cube of 2, and 2 is one of the factors of the number 10, the radix of the decimal scale. For 9, see p. 66, vol I.

G. WILLIAMS (Bristol): See vol. I., p. 368, col. 2, line 20.—D. M. LANGLEY (Limerick): What he suggests will be done. We do not know the book he mentions.—T. H. (Somers town): Thanks, but too late to be acknowledged in the lessons.—SELF-TAUGHT (Duke-street) will obtain the case of mathematical instruments by applying at the office of the Society of Arts, St. John-street, Adelphi, Strand.—BYRD (Pontypool) is *quite right* as to the four sounds he mentions. The expense of colouring would be too great.—DELTA (Barlby): See vol. II., p. 33.—AIE: There is no attempt made to give the meaning of *ch*, as far as we can see; we think *Aie* is hypercritical; but we must no doubt consider this a benefit conferred on us; for

> "*Critics* indeed are valuable men,
> But *hypercritics* are as good again."

—R. B. W.: Greek will follow Latin. The best Greek dictionary is Liddell and Scot's, of which there is an abridgment for the use of learners. —ERASMUS (Ashton-under-Lyne) must imitate the great man whose name he has assumed.

E. L. M. (Holloway) will learn English composition by carefully studying our Lessons in English.—S. W. (Hull): We recommend the maps to be bound at the end of the volume to which they belong, where they can be most easily referred to.—G. GRIFFITH (Carmarthen): Under consideration. —J. D. B. wishes to know who is the publisher of a work on drawing issued by the Government School of Design.—A. T. M. should study the Lessons in Geography; his question is answered at p. 253, col. 1, line 35, vol. II.

H. W. (Liverpool): Navigation *will* come in course.—W. H. HAGGOTT (Southampton): We do not know; try the members of Parliament for the northern district of burghs or for the western ditto in Scotland.—H. T. M.: Dementate means *infatuated, insane*; meteyard, *a staff of a certain length wherewith measures are taken*; molar, *having power to grind*: nihility, *nothingness, the state of being reduced to nothing*; otiose, *at leisure, unoccupied*: normal, *according to rule, properly regulated, standard*.—ALPHA (Brecon): His case is so peculiar that we can scarcely offer him our advice. We would recommend English and French, or English and Latin, to be studied together, and history, botany, &c., for recreation. Our object in inserting the Regulations of the University of London, was to give some clue or guide to the order and arrangement of studies.—T. WHITE (Codnor) and his friends will find some directions, with a splendid example as to the method of studying Euclid, in the "Self and Class Examiner in Euclid," price 3d., published by Mr. Cassell.—E. LORD (Manchester) and his friends are informed that the rule concerning "a vowel which comes before two consonants is long by position," is quite correct. To fix pencil drawings so as not to smear by contact with another leaf, pass over them a little milk and water, taking care that all the cream be first skimmed off; or a *very weak* solution of isinglass in water. The liquid should be passed over *quickly* with a flat camel's-hair brush.

R. S. W.: The value of x is found thus:—

$$x = \frac{100\times500\times28{\cdot}6765}{100+(7\times28{\cdot}6765)} = \frac{5\times286765}{100+200{\cdot}7355} = \frac{5\times286765}{300{\cdot}7355} =$$

$$\frac{286765}{60{\cdot}1471} = \text{£4767 14s. 6}\tfrac{1}{2}\text{d.; rem. 396522.}$$

GUTHRUM (Grimsby): Zumpt's Latin Grammar is reckoned one of the best; Latin before French; if you have time for both, they may be studied together.—A MARLBURNIAN: We should prefer *composed* to *produced* in reference to music.—GABRIEL (Islington) should call on Mr. Bagster, Paternoster-row, and get a copy of his Oriental Catalogue.

ERRATUM.

Vol. II., p. 253, col. 1, line 24 from bottom, for *north frigid* read *south frigid*.

LITERARY NOTICES.

ATHEISM CONSIDERED THEOLOGICALLY AND POLITICALLY. This Volume, consists of thirteen Lectures, by the Rev. LYMAN BEECHER, D.D. (father of Mrs. H. B. Stowe.) These Lectures enter fully into the momentous question now at issue, or, at least, under discussion, between "Secularism" and Christianity. For close reasoning and eloquent declamation, these Lectures have rarely been surpassed. The Volume, just issued, is well printed, and is sold for 3s. 6d. bound in cloth. It is important in ordering this work, that John Cassell's edition should be specially named.

GIN AND WATER; a pair of pictorial designs by Kenny Meadows, portraying the effects arising from the indulgence of those potent liquids. In the first, GIN, we have the interior of the drunkard's home, with a glimpse of the horrors which belong peculiarly to such homes; in the second, WATER, we see how comfort, cleanliness, and peace attend the steps of the temperate man. The contrast is well sustained, and the pictures—which measure 24 inches by 16 inches—cannot but be popular. We have had too many songs and pictures in praise of the drinking customs of our country, and we are glad to perceive that our poets and artists are beginning to discover that they may get inspiration even out of water—

> "Wine, wine, thy power and praise
> Have ever been echoed in minstrel lays;
> But water, I deem, hath a mightier claim
> To fill up a niche in the Temple of Fame!"

These pictures, which should be framed and hung over every cottage chimney-piece, and on the walls of every factory, and workshop, and ragged school throughout all the land, can be obtained of every bookseller for one shilling. They are exquisitely engraved on wood, by Messrs. Henry Linton and William Measom.

THE AUTOGRAPHS FOR FREEDOM; containing, in addition to a New Story by Mrs. STOWE, authoress of "Uncle Tom's Cabin," entitled "The Two Altars; or, Two Pictures in One;—The Altar of Liberty, or 1776; The Altar of ——, or 1850," a thrilling Narrative by FREDERICK DOUGLASS, entitled "The Heroic Slave;" "Passages in the Life of a Slave Woman," by Annie Parker; "Placido, the Cuban Slave," by Professor W. G. Allen; "The Heroic Slave Woman," by the Rev. J. S. May, &c.; also, Contributions from the leading Writers in America on the Question of Negro Emancipation; and, on this side of the Atlantic, from the Earl of Carlisle, the Bishop of Oxford, Wilson Armistead, Joseph Sturge, &c.; with facsimiles of the Autographs of all the Contributors. Price 1s., in boards; or bound in cloth, with Eight beautiful Engravings from designs by Gilbert and Willis, price 1s. 6d.

THE ALTAR OF THE HOUSEHOLD: a Series of Services for Domestic Worship for every Morning and Evening in the Year; Select Portions of Holy Writ, and Prayers and Thanksgivings for Particular Occasions; with an Address to Heads of Families. Edited by the Rev. John Harris, D.D., Principal of New College, St. John's Wood; Author of "The Great Teacher;" "Mammon;" "Pre-Adamite Earth," &c. &c., assisted by eminent contributors. The following are among the Ministers engaged in the preparation of THE ALTAR OF THE HOUSEHOLD:—The Rev. J. Sherman, the Rev. W. Urwick, D.D., the Rev. W. H. Bunting, M.A., the Rev. R. Ferguson, LL.D., the Rev. F. A. Cox, D.D., LL.D., the Rev. Professor Lorimer, the Rev. Newman Hall, B.A., the Rev. B. S. Hollis, the Rev. W. Chalmers, A.M., the Rev. J. Beaumont, M.D., the Rev. Samuel Martin, the Rev. William Brock, the Rev. John Kennedy, A..M, the Rev. William Leask, the Rev. Charles Williams, the Rev. W. W. Ewbank, A.M., the Rev. J. Stoughton, the Rev. W. Reid, the Rev. George Smith, &c. &c. The Work will be completed in Twelve Parts, one to appear on the First day of each successive month; the whole forming One Handsome Volume, with Frontispiece engraved on steel by a first-rate Artist. Parts I. to III. are now ready, price 1s. each, or in one Quarterly Section, price 3s.

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The PATHWAY, a Religious Magazine, price 2d. each Number, enclosed in a neat wrapper. The Fourth Volume has just commenced—Vols. I. and II. price 2s. 3d. each, Vol. III., price 2s. 9d., neatly bound, are now ready.

UNCLE TOM'S CABIN, with Twenty-seven Illustrations on wood, by George Cruikshank, and an excellent Portrait of the Authoress.—Three Editions of this popular work are now on sale at our office—a Drawing Room Edition, demy 8vo., price 4s. 6d. elegantly bound, with gilt edges; crown 8vo., neatly bound, gilt edges, 3s. 6d., or plain binding, 3s.

THE ILLUSTRATED EXHIBITOR AND MAGAZINE OF ART—The First Two Parts of a new and improved Series of this work, under the title of the ILLUSTRATED MAGAZINE OF ART, are now ready, price One Shilling each. The Weekly Numbers are now enclosed in a neat wrapper, price 3d. In addition to numerous Engravings in the text, each number contains a fine Engraving, worked on Plate Paper. With the first Part was presented a splendid View of the Interior of St. Paul's Cathedral, during the Interment of the late Duke of Wellington, printed upon fine Plate Paper, measuring eighteen inches by thirteen, in addition to four separate Engravings, and a large number of choice Illustrations, with which each Part is embellished.

Printed and Published by JOHN CASSELL, La Belle Sauvage-yard, Ludgate-hill, London.—March 19, 1853.

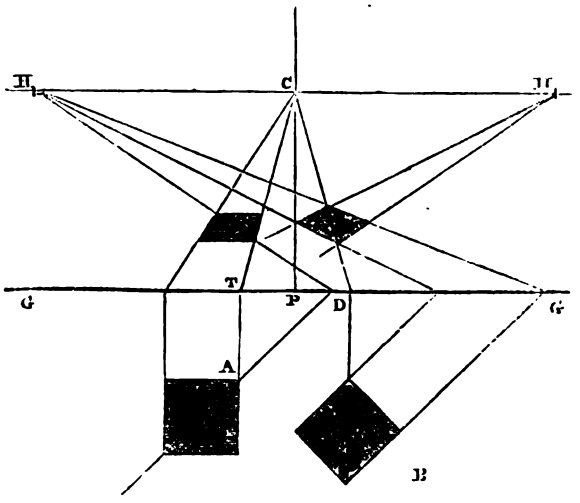
LESSONS IN DRAWING.—No. VIII.

PERSPECTIVE.—Section II.

(*Continued from page* 347).

In fig. 76 we exhibit the method of putting a square into perspective. A is a square with a side measuring twenty-four inches. It is situated two feet six inches from the ground line, and at a distance, laterally, of eighteen inches from our position, that is, lying eighteen inches on one side, and to the left of a line drawn to the centre of the picture at right angles to the horizontal line; for it is evident that a line so drawn would mark that position. The centre of the picture depends on that position, and on nothing else, and as we change our position the centre of the picture changes with it. This appears to be the reason why it has received the name of the *point of sight*,—the changes in other vanishing points not being so obvious.

Fig. 76.

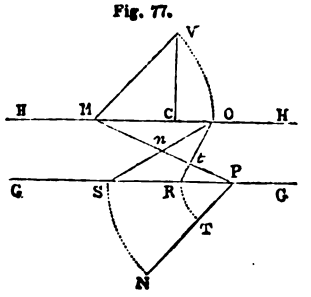


We begin by fixing on some length to represent one foot, then, drawing G G, the ground line, suppose the eye to be five feet six inches above it, at that height draw H H; this is the horizontal line; make C the centre of the picture, and bring down from C a perpendicular to meet the ground line in P, then take one and a-half from the scale and set it off to the left; from T this point, eighteen inches from P, draw T A at right angles to G G. The square to the left is to have one side parallel to the ground line, the other side is therefore in T A. Setting off from T, in the first place, two feet six inches, and then twenty-four inches for the side of the square, and completing the square, we have its *plan* correctly drawn in position and magnitude; the sides being brought up to the ground line, lines drawn to C, will give the perspective lines. You can now find the perspective of the diagonal, by means of the vanishing point of lines at 45°; this is at a distance from the centre C equal to that of the eye from the plane of the picture, as may be deduced from the example given in fig. 73. Suppose this to be seven feet; set this distance from C on H H by the scale; produce the diagonal to cut the ground line in D, join this point and the vanishing point just found, draw parallels to the ground line through the extremities of the perspective diagonal, and the figure is complete.

The square B has its nearest angle at the same distance as the side of the square A, its sides are at 45° with the ground line, its diagonal is therefore perpendicular to the ground line, and its sides have for their vanishing points H and H.

[6.] The student will be able, from the study of the preceding articles, to find the representation of any line lying in the ground plane, for he has there the means by which he may ascertain the vanishing points of any lines making any angle with the ground line; and by drawing lines to V from the extremities of the original lines, Q R or T N (see figs. 73, 74, and 75), the perspective lengths may also be found; but where V is taken at any considerable distance from C, lines so drawn are attended with some disadvantages; they are inconveniently long, and will often lie so close to each other as to create confusion. This is obviated by adopting another method of determining the intersections, as follows, in fig. 77.

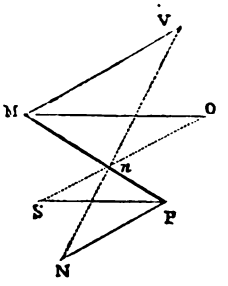
Fig. 77.



From M, the vanishing point of the line T N, set off towards the centre C, and on the horizontal line H H, a part M O equal to M V. From P, the point in the ground line, where it is cut by the original line produced (i. e. extended), set off P R equal to P T in the opposite direction to M O; join O and R; then the point *t*, where the line O R cuts the line P M, is the perspective representation of the point T. Similarly, taking P S equal to P N, and drawing S O, its intersection with P M, namely *n*, is the perspective representation of the point N. The point O varies for each vanishing point, depending as it does on the length of M V, and, from its use, has received the name of the *measuring* point, or the *measuring centre*. In the case of lines at right angles to the ground line, it is at the same distance from C, the vanishing point of such lines, as V, the place of the eye is from this point; the measuring point of lines at right angles to the ground line is sometimes called the *distance point*, being also the vanishing point of lines making 45° with the ground line.

The geometrical reason for this procedure is contained in the following theorem.

Fig. 78.



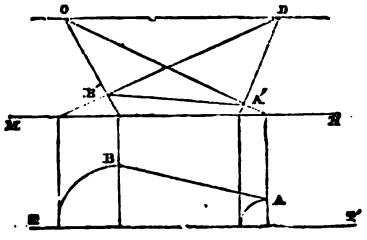
In fig. 78, if parallel lines V M and P N be drawn at the extremity of a line P M, and a line V N be drawn, joining the extremities of these parallels, then a line O S, joining the extremities of another pair of parallels, equal to the first pair, and drawn from the same points P and M, such as P S and O M, will cut the line P M in the same point *n*. If O M were taken half the length of V M, and P S half the length of P N, or in any other ratio, the line O S would still pass through the same point *n*. This property enables us to economise space, where the lines would run to an inconvenient length.

[7.] We have now given, as concisely as possible, the principles upon which all perspective constructions are founded; rules are but the application of principles, and without a knowledge of the latter, the former are likely to fail when doubt arises in the mind of the student. It may be of assistance to those who are studying these lessons, if at this point we recapitulate the essentials, that is, those points and lines which, according to what has preceded, must be definitively ascertained, before we can determine with certainty any perspective representation whatever. They are, 1°. The *distance of the eye* from the plane of the picture, which is determined by a line drawn from the eye at right angles to this plane; such as V C in any of the preceding figures, which gives 2°, the point C the *centre of the picture*. 3°. The *horizontal line* drawn through this point C, parallel to 4°, the *ground line*, or line where the plane of the picture cuts the ground plane. *Intersecting line* is a term used for this line, and of wider application; but *ground line* will be better understood in most cases. 5°. The *vanishing points*—lying all in a vanishing *line*, which, for the ground plane, is the horizontal line. 6°. The *measuring points*, as just explained.

These six particulars have been so far explained, as to put it in the student's power to produce the perspective representation of any plane figure lying in the ground plane; and we now proceed to give some examples, by way of simplifying the whole procedure, especially by reducing the number of the vanishing and measuring points.

[8.] Any point whatever in the ground plane may be supposed to lie somewhere in a line at right angles to the ground line, and any *two* points may be supposed to lie in two such lines. In fig. 79 is shown a method of obtaining the perspective of *any* line, derived from such a supposition.

Fig. 79.



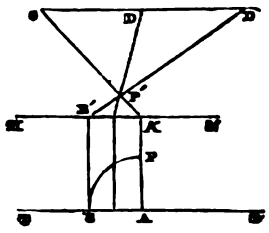
To get the perspective of any line A B, draw lines through the points A and B, at right angles to the ground line. O, being the centre, is their vanishing point, and D, the distance point, (see Art. 6), is their measuring point. Now, suppose the ground plane to be detached from the intersection M N, and *reversed*; then, T T′ represents the ground line in this new position, and A B will be at its proper distance from T T, unaltered; but T T′ may be placed at any convenient distance from M N, taking care only that it is parallel to M N. Transfer the points A and B to T T′, as directed in Art. 6, and bringing up these points to the line M N, draw lines to D, and the points of intersection, A′ and B′, are the perspective representations of A and B.

[9.] This arrangement is much more compact than that which we have hitherto described; but it could not be satisfactorily explained before entering into the considerations on which the art of perspective is founded. As a method, it has many advantages. In the example just given, the vanishing point of the line A B, is comparatively at a great distance from O, the centre; and as the measuring point would have to be taken in the opposite direction, the reduced space required in comparison with the other method is obvious. The reversal of the *plan*, by bringing the ground line into the position T T′, has also the advantage of showing the original and its representation *not* in *opposite* directions, as may be seen by comparing fig. 79 with fig. 77.

The centre and the distance points are the only vanishing and measuring points required, in order to find the perspective representation of any line whatever lying in the ground plane.

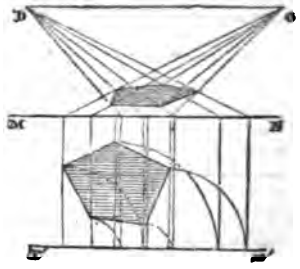
[10.] We shall give more examples of this convenient arrangement. In fig. 80 you have the perspective representation of a point P, found in the same manner; and in this

Fig. 80.



figure, A B in T T′ being bisected (i.e. halved), and the bisecting point brought up to the line M N, a line drawn to D, the bisecting point of the line O D D, shows an application of the principle noticed in the explanation of measuring points.

Fig. 81.



In fig. 81, a pentagon is treated in the same manner as an example; the extremities of the lines forming the boundaries of the figure are brought to the line T T′, and perpendiculars are drawn through the angular points, each line being treated as the line A B, in fig. 79; then, drawing lines from the intersections with the line M N, to O the centre, and to D the distance point, the perspective figure is obtained complete.

LESSONS IN ENGLISH.—No. XLI.

By JOHN R. BEARD, D.D.

THE CELTIC ELEMENT.

THE Celtic element in the English language has received far less attention than it deserves. Till recently, indeed, its existence was scarcely known; and when at length it compelled recognition, its appearance was restricted to names of places, particularly the great outlines of the country, such as hills, mountains, headlands, rivers, &c.

The ordinary teaching of the schools was, that the original British natives of these islands were extirpated by the invading and conquering Saxons to such an extent that the former were able to sustain themselves only in the mountain fastnesses of the extreme parts of the country, Scotland in the north, Cornwall in the south, and Wales in the west. In those parts, unquestionably, the native British successfully withstood their Saxon invaders, and there transmitted their vernacular tongue from generation to generation. Not less is it true that the British element in the population of the lowlands was neither uprooted nor absorbed. Extermination is a rare event in the migrations and changes of tribes and nations. Scarcely would it be too much to affirm that extermination never takes place. And even absorption is only partial. Besides, if blood is absorbed it does not lose its primitive qualities. Still less easy of absorption is a language. A living language,—that is, a language vernacular to the aboriginals of a country—stamps itself on the entire land and on the whole life of the people. That impression is all but indelible. Only the attrition and abrasion of centuries can wear the image down, much less wholly efface it. The language of the cottage is one of the few permanent things on earth; and when, by the extruding power of the language of the court, and of

books, and of commerce, it is compelled to withdraw into narrower and narrower limits, it ceases to be a language only to become a dialect and *a patois* (the language of the peasants of a province); and still maintains an existence in what we call provincialisms and vulgarisms, when at length it is wholly banished from cultivated society. Nor only there does it survive; it lives on in the warp and the woof of the spoken and written tongue. These allegations are borne out by the fact that in our present English, the original Celtic of these islands still remains to no inconsiderable extent.

The Celts (or, as the fashion now is, the Kelts), as far back as history goes, were the primitive inhabitants of England, Wales, Scotland, and Ireland. The race at large, in an ante-historic period, migrated from Central Asia into Europe, and, spreading over its surface, penetrated to its western limits.

The Celtic language is now acknowledged to have affinities with the important group of languages denominated the Indo-Germanic, of which the Sanscrit, the Greek and the German may be taken as representatives. At the same time, the Celtic language, as being a language spoken by an independent family of nations, possesses essentially independent features.

There are still six Celtic tongues or dialects recognised in Europe. Of these, four belong to the British islands. A fifth, the Cornish, now nearly or quite extinct, also pertained to the same insular home of the Keltai or Celts. The sixth, the Armorican, belongs to Brittany, a country connected with Britain in history as well as name.

THE CELTIC TONGUES.

I. THE GALLIC OR BRITISH. including	II. THE GAELIC OR ERSE. including
1. Cymric or Welsh.	1. Fenic or Irish.
2. Cornish.	2. Gaelic or Highland Scotch.
3. Armorican or Breton.	3. Manx.

I may confirm the statements I have made, as to the survival of the Celtic element in our national life and literature, by a quotation from an author of merit, whose studies and whose subject would naturally incline him to give predominance to Saxon claims: "Nothing is more common or less true than the exaggerated account of total exterminations and miserable oppressions in the traditional literature of conquered nations; and we may very safely appeal even to the personal appearance of the peasantry in many parts of England as evidence how much Keltic blood was permitted to subsist and even to mingle with that of the ruling Germans; while the signatures to very early charters supply us with names assuredly not Teutonic (or Saxon), and therefore possibly borne by persons of Keltic race, occupying positions of dignity at the courts of Anglo-Saxon kings."*

In a list given by the very learned German philologist Adelung (Mithridates II., 40) of genuine Celtic words found gathered from very ancient sources, and found in Teutonic tongues, the following have representatives in the English of the present day:—

Aber, as in *Aber*conway, and several other Welsh names, denotes the *mouth of a river*, the confluence of a river with the sea; and hence a bay or harbour; it is found in the French *Havre* (Havre-de-Grace), and in the English *harbour*: Webster seems wrong when he gives harbour as from the Saxon *here berga*, the station of an army.

Alpes, the ancient Gallic designation for any high land; hence our *Albion*, so called from its lofty cliffs.

Bard, the Gallic name for *poet, singer, prophet.*

Bastard, from the Welsh bas, *low*, and tardd, *to come forth*; hence, persons of low and unworthy birth.

Becco, Gallic, our *beak.*

Beria, a *level field, a plain*; hence, the numerous instances of *bery* as a termination of English names of places.

Braca, Gallic, *a dam, a limit;* Scotch, *bray*; French, *braie*, a hedge.

Braccae, Gallic, *breeches.*

Brace, i. e. *corn*; whence the Gauls made their beer; hence, the words *brew, brewer, beer.*

Bria, briga, perhaps from the Welsh *brig, brigyn*, a hill-top; briga itself signifies in the Celtic a *town*, as in *Boroughbridge.*

Carn, a *group of stones* or *rocks*; hence our *Carn* or Cairn and Cornwall (stony Wales).

Carra, a Gallic four-wheeled *carriage*, a *car, cart*, to *carry, carter.*

Carruca, among the Gauls a convenient travelling carriage; French, *caroche*; English, *coach.*

Craig, in Welsh a *rock*, precipice; our *crag.*

Druid, the Gallic name for *priest.*

Dur, water, Welsh *dwr*, as in *Der*went, *Der*by, *Dor*chester.

Foll, foolish, Welsh *ffol*, French *fou*, Scotch *fou* (tipsy), English *fool*, German *toll.*

Lancea, Gallic for *lance.*

Marga, marl; whence *Marl*borough, and Albe*marle.*

Nant, water, river; whence *Nant*wich.

Pen, a *summit, head*; as in *Pen*craig in Hereford, and *Pen*gover in Cornwall, *Pen*istone in Yorkshire, *Pen*rith in Cumberland.

Rit, a *ford*; hence the ending rit as in Cambori*tum*, Cambridge.

Solduri (sol, *bond*, and *ur*, Latin *vir*) a *man*; *boundmen*, or men engaged to each other and to their leader in war, our *soldier.*

Spatha, a *two-edged sword*; whence through the German *spaten*, is our *spade.*

Tan, land, as in Britain (Brit*tan*ia, the land of the *Britti*, or painted people; so we say *the blacks, the whites, the fair*).

The names father, mother, sister, and brother, are of necessity among the first, they are also the most enduring. Consult then this table:—

Breton.	*Welsh.*	*English.*
tad (dad),	tad,	father, *dad*, daddy.
mamm,	mam,	mother, mamma, mammy.
breur,	brawd,	brother.
choar,	chwaer,	sister.

Our words *father* and *mother* come to us from the Indo-Germanic stem; but the cottage words, the nursery words, the words of intimate affection, *dad, daddy, mam, mamma, mammy*, are derived from our British or Celtic forefathers. The oldest forms of a language are found in the cottage and on the hill-side. In both those spots, and in the provincialisms which still in a measure survive (but, alas! are fast giving way before railroads, and commerce, and ignorant *euphuists*, that is, *seekers after finery in language*), a considerable number of Celtic words remain. These words are among the most expressive. Take the term *mettle*. Even Webster, after other great lexicographical authories, originally derived this from the Greek root which gives us metal, namely, metallan, *to scrutinise, to seek for*, by digging; as if *a man of mettle* and *a man of metal*, were not as much opposed to each other as *a high-spirited man* and *a money-grub*. Turn to the Welsh and you find in *meddwl, mind, courage*, which by the vulgar is called *pluck*, the exact idea which mettle conveys, e.g.,

> "The winged courser, like a generous horse,
> Shows most *true mettle* when you check his course."—*Pope.*

To fettle, is in the genuine Lancashire dialect a very expressive word, giving rise to the general idea of making a thing good, excellent, delicious; and occurring in such instances as *to fettle a horse*, means to restore him to soundness; *to fettle a wife*, means to put her to rights; *fettled ale*, means ale warmed with spice, spirits, eggs, &c. The word, together with our common term *fat*, of which *fettle* is a diminutive verbal form, has its origin in the Welsh *Ffaeth, luxuriant, ripe, rich.*

We have cast our eye down a page or two of an Irish Dictionary and found these coincidences:—

Irish or Fenic words identical with English.	*German.*
Abal, an *apple.*	*Apfel.*
Acra, an *acre.*	*Acker.*
Aer, *air* (Greek, aer)	
Aes, *age* (Latin, aetas).	
Airc, a *chest, ark* (Latin, arca).	*Arche.*
Airbhe, a *rib.*	*Rippe, ribbe.*
Aird, a *country, earth* (Scotch, *yird*).	*Erde.*
Baban, a *baby, infant.*	
Babloir, a *babbler* (? Babel).	*Plapperer.*
Bainis, a *wedding*, the *bans.*	
Bairghin, a *son, bairn.*	
Bairile, a *barrel.*	
Baitselear, a *bachelor.*	
Ball, a *ball, globe.*	*Ball.*
Bann, a *band* of men.	*Bande.*
Baran, a *baron.*	*Baron.*
Barc, a *boat, barque.*	*Barke.*
Bard, a *poet, bard.*	*Barde.*
Barra, a *bar.*	*Barre.*
Be, *life, being.*	
Be, *is, be.*	
Beach, a *bee.*	*Bien.*

* "The Saxons in England," by J. M. Kemble, 2 vols., 8vo., 1849; vol. I., p. 21.

Irish or Fenic words identical with English.	*German.*
Bear, a *bear.*	*Bär.*
Bearim, *I bear, carry, bring forth.*	
Bearbaim, I shave the *beard* (Latin barba).	*Barbieren.*
Beathach, a *beast*, French, *bête.*	

From the Welsh the following among other instances have been given by the Rev. R. Garnett.*

Coincidences between the Welsh and the English.

Basged, a *basket.*
Bottwm, a *button.*
Bran, *skin of wheat, bran.*
Brat, a *clout*, a *brat* or *pinafore.*
Brodiaw, to *embroider* (Fr. *broder*).
Bwyell, a *hatchet*, a *bill* (Germ. *biel*).
Cab, caban, a *hut, cabin* (Fr. *cabane*).
Cae, an *enclosure, quay* (Fr. *quai*).
Ceubal, *cobble*, a *boat* (Sax. *cuople*).
Crochan, a *pot, crockery* (Sax. *crocca*).
Crog, a *hook, crook* (Celt. *crok*).
Dantaeth, a *choice morsel, dainty.*
Darn, a *patch, darn* (Sax. *dearnan*).
Fflasged, *flasket* (Fr. *flasque*).
Fflaw, a *shiver, flaw.*
Ffynel, a *funnel.*
Gwichet, a *wicket* (Fr. *guichet*).
Hem, a *border, hem* (Sax. *hem*).
Llath, a *lath* (Sax. *latta*).
Matog, a *matlock* (Sax. *mattuc*).
Mop, a *mop.*
Paeol, a *pail.*
Pan, a *bowl, pan* (Sax. *ponne*).
Pare, an *enclosure, park* (Fr. *parc*).
Pelen, a *little ball, pellet* (Fr. *pelote*).
Piser, a *jug, pitcher.*
Rhail, a *fence, rail* (Germ. *ralle*).
Rhasg, a *slice, rasher.*
Soch, a *drain, sough.*
Tael, *instrument, tackle* (Germ. *takel*).
Tasel, *fringe, tassel.*

A knowledge of the laws which affect the permutation of letters in words as they appear in different languages or dialects would disclose to the student many Celtic terms in English, of which otherwise he would have no suspicion. I have given clear examples. Other very clear examples could be added. I shall for exercise subjoin a few Celtic words with their several meanings, leaving the student to discover the corresponding English terms.

Exercise.

Celtic Words.	*Meanings.*	*English.*
Cic (kik),	a *foot*,	
Cluder,	a *heap*,	
Cnoc (knok),	a *rap*,	
Cnol,	a *hillock*,	
Coblyn,	a *sprite*,	
Cocru,	to *indulge*,	
Chwant,	*desire*,	
Dwn,	*dusky*,	
Esmwyth,	*even, soft*,	
Filawg,	a *young mare*,	
Fug,	*deception*,	
Fwrw	*down*,	
Glyn,	a *valley*,	
Gweddu,	to *unite*,	
Gwylaw,	to *weep*,	
Llawd,	a *youth*,	
Llodes,	a *girl*,	
Mwygl,	*sultry*,	
Posiaw,	to *embarrass*,	
Priawd,	*one's own, spouse*,	
Pwmp,	a *knob*,	
Rhwyb,	to *tear*,	
Souba,	to *dip*,	
Tal,	of *high stature*,	
Tariaw,	to *loiter, stay.*	
Tosiaw,	to *throw*,	
Tripiaw,	to *stumble*,	
Troddi,	to *move forwards*,	
Wyna,	to *bear lambs*,	

* "Proceedings of the Philological Society," vol. I., p. 171 In these and the preceding examples, we have appended the corresponding words in German, French, and Saxon, in order to enable our readers to judge for themselves. It is more than possible that many of these words in the Welsh are borrowed from the English. It is a very difficult matter to separate the original words from those that are borrowed.

LESSONS IN GERMAN.—No. XLI.

Section LXXXVI.

The dative of the personal pronoun of the first and second person (seldom translatable) is often employed in familiar style, to intimate in a wholly indefinite manner a participation or interest on the part of the speaker or the person addressed. Ex.: Ich lobe mir den Knaben; I praise (for myself) the boy. Gehe mir nicht auf's Eis; do not go upon the ice. In der blut'gen Schlacht bei Lützen ritt er Euch unter des Feuers Blitzen auf und nieder mit kühlem Blut. (Schiller.) In the bloody battle at Lützen he rode amid the lightnings of the firing, up and down in cool blood.

I. Davonlaufen = to run off, to run away; as, Er ist bei Nach und Nebel davon gelaufen; he has run away by night and fog.

Durchgehen has sometimes a like signification; as, Der Diener ist mit dem Gelde durchgegangen; the servant has run away with the money.

Exercise 89.

An'merken, to perceive; Neugierig, inquisitive, curious; Störung, *f.* disturbance; Bewir'thung, *f.* entertainment, reception; Rettung, *f.* deliverance; Um'sehen, to look about; Freundlich, friendly; Scheu, shy, skittish; Verdrie'ßen, to grieve, vex, trouble. Gezie'men, to become, beseem; Somit, consequently, therefore;

Das Tanzen macht mir kein Vergnü'gen.	Dancing affords me no pleasure.
Ich merke es Ihnen an, daß Sie nicht zufrieden sind.	I perceive (Sect 52. Sieht man &c.) that you are not contented.
Das ist eine verdrieß'liche Sache.	That is a vexatious affair (or business).
Die Rede hat die Zuhörer verdroß'sen.	The speech (has) displeased the auditors.
Er ist davon gelaufen.	He has run away.
Sehen Sie sich nach einer Wohnung um?	Are you looking about (you) for a residence (boarding place)?
Es geziemt' mir nicht, dem Greise zu widersprech'en.	It does not become me to contradict the aged man.
Ich habe ihn nie mit irgend einem Worte beleid'igt.	I have never offended him by a single word.
Der Jähzorn machte Alexander dem Großen viel Verdruß'.	Sudden passion caused Alexander the Great much sorrow.
Ich lobe mir jenen Ehrenmann.	I praise that man of honour.

1. Vielen Menschen scheint es ein Vergnügen zu machen, Andere zu beleidigen. 2. Ich merkte es ihm an, daß er sich beleidigt fühlte. 3. Er beleidigte nicht nur mich, sondern auch meinen Oheim. 4. Diese Sache hat mir schon viel Verdruß gemacht. 5. Der ungerathene Sohn macht dem Vater viel Verdruß. 6. Es verdrießt den Lehrer, eigensinnige Schüler zu haben. 7. Diese Rede verdroß manchen Anwesenden. 8. Der verdrossene Knabe ließ seine Arbeit liegen. 9. Es verdroß den Freund, daß ich ihm seine Briefe nicht beantwortete. 10. Ich verdanke ihm meine Rettung. 11. Somit verdanke ich ihm nächst Gott Alles. 12. Wenn es nicht bald anders wird, so laufe ich davon. 13. Bei solchen Ereignissen möchte man davon laufen. 14. Dem Knaben ist sein kleiner Hund davongelaufen. 15. Dem Richter geziemt es, nach der Ursache dieser Störung zu fragen. 16. Es geziemt mir, über diese Sache zu schweigen. 17. Der Neugierige pflegt sich nach jeder Kleinigkeit umzusehen. 18. Um mich ein wenig umzusehen, ging ich in die Stadt. 19. Mein Freund will sich nach einer andern Wohnung umsehen. 20. Ich lobe mir die alten Zeiten. 21. Ich lobe mir die schönen Zimmer und die freundliche Bewirthung. 22. Die Pferde wurden scheu und gingen mit uns durch.

1. It does not become a child to contradict its parents. 2. I went to the town for the purpose of looking about. 3. I admire these beautiful apartments and their pleasant situation. 4. The thief ran away with the money, before it was possible to overtake him. 5. He ran away for fear they should take him in the act. 6. It is a vexatious affair that he has lost my

money. 7. I perceive that this little present pleases you. 8. I perceive that he has not spoken the truth. 9. Are you looking about for your father? 10. No, I am looking for my friends. 11. I praise these intelligent scholars. 12. Do not fall, little child. 13. My brother shoots a bird from a tree at eighty paces.

Section LXXXVII.

Kosten, when used transitively signifies "to test, or try by tasting." Ex. Er kostet den Wein; he tastes the wine.

Versuchen has sometimes the same signification; as, er versucht den Wein; he tries the wine (that is, by tasting.)

I. **Schmecken**, to relish; denotes properly the impression made by tasting. Ex.: Der Wein schmeckt gut; the wine tastes good. Es schmeckt mir nicht; (it does not relish to me,) I do not relish it. Die Speise schmeckt nach Rauch; the food tastes of smoke (is smoky.)

Exercise 90.

Aendern, to alter, change;	Ker'termeister, *m.* jailer;	Stellung, *f.* situation;
Bitter, bitter;	Kuchen, *m.* cake;	Verschaff'en, to procure;
Empfan'gen, to receive;	Los'geben, to set free, release;	Wunder, *n.* wonder, miracle, prodigy;
Gemüse, *n.* vegetables;	Miß'brauchen, to misuse;	Züch'tigung, *f.* chastisement, correction.
Jetzig, present;	Selig, blissful, blessed, happy;	

Die That ist gesche'hen und alle Reich'thümer der Erde können sie nicht ungesche'hen machen.	The deed has transpired and all (the) riches of this earth cannot make it otherwise. *(Exercise 43. Meinem Neffen &c.)*
Der Träge weiß nicht was er thun soll (Sect. 75. II.) um sich die Langewei'le zu vertreiben.	The slothful (man) knows not what to do in order to drive away (the) tediousness.
Dieser Rinds'braten schmeckt mir besser als jenes Geflü'gel.	This roast-beef relishes (to me) better than that poultry.
Es war der Pa'pagei, der soeben gesproch'en hat.	It was the parrot, that just spoke.
Der Jüngling fühlte sich über den Verdacht', den man auf ihn hatte, tief gekränkt'.	The youth felt (himself) deeply mortified, on account of the suspicion which rested upon him.

1. Das Unglück ist geschehen, und nicht mehr zu ändern. 2. Wann ist ihm dieses Unglück begegnet? 3. Es geschah vor einer Stunde. 4. Was geschehen kann soll geschehen, um diesen Leuten eine bessere Stellung zu verschaffen. 5. Es ist schon oft der Fall gewesen, daß das Vertrauen mißbraucht worden ist. 6. Es fanden in früherer Zeit mehr Wunder und Zeichen Statt, als in der jetzigen. 7. Es geschah ihm recht, einmal eine Züchtigung empfangen zu haben. 8. Es geschieht nichts ohne Gottes Wissen und Willen. 9. Der Müßiggänger weiß nicht was er thun soll. 10. Der fleißige Knabe wußte nicht was er weiter thun sollte. 11. Der Kerkermeister fragte was er thun solle, um selig zu werden. 12. Wie schmeckt Ihnen das Gemüse? 13. Es schmeckt mir vortrefflich. 14. Schmeckt Ihnen dieser Kuchen nicht? 15. O ja, er schmeckt mir sehr gut. 16. Schmeckt Ihnen das Essen? 17. Nein Herr Doctor;—es schmeckt mir Alles bitter. 18. Ich bin es, der dies spricht und gesprochen hat. 19. Er ist es, der diese Worte zu sprechen wagte. 20. Nicht war, Sie sind es, der gesprochen hat man möge die Gefangenen losgeben. 21. Ja, und Sie sind es, der mir widersprochen hat. 22. Diese Worte haben unsern jungen Freund tief gekränkt. 23. Sie scheint gekränkt worden zu sein. 24. Man darf sich nicht über jede Kleinigkeit gekränkt fühlen. 25. Man darf den Gedanken, gekränkt worden zu sein, nicht lange Raum in dem Herzen geben. 26. Haben Sie schon dieses Obst versucht? 27. Ja, ich habe es soeben versucht.

1 When did your friend meet with the accident? 2. It happened yesterday; he knows not how to get over it. 3. We will try everything to better his situation. 4. If the circumstances of those people were to be changed, everything would go well with them. 5. It has often been the case that his goodness has been abused. 6. The punishment, which those idle boys received, was right. 7. Happen what will, I shall trust in God. 8. What is done, cannot be undone, and what has been said, cannot be unsaid. 9. Do you relish your food? 10. No Doctor, I relish nothing, everything tastes bitter. 11. It was my friends who spoke these words; they might assist these poor emigrants. 12 What did your new carriage cost *(you)*? 13. It cost *(me)* fifty guineas. 14. Have you already tasted this cake? 15. Yes, I have, but I do not like it; have you any other?

Section LXXXVIII.

Versetzen (from ver, against, &c., § 97. 3., and setzen), has a variety of significations; as, "to put in a wrong place, to misplace, to remove;" also, "to set against, i. e. to fetch, deal out or give" as a blow, &c. It likewise signifies to *reply*. Ex.: Auf diese Fragen und Beschuldigungen versetzte er Folgendes; to these questions and accusations he *replied* as follows (following). Er versetzte dem Pferde einen Schlag; he gave the horse a blow. Der Glaube versetzt Berge; (the) faith removes mountains.

I. **Ueber Feld gehen**, literally to go over field, signifies, to make a short pedestrian tour, a jaunt or tour on foot; as, wir gehen morgen früh über Feld; we are going to take a tour on foot tomorrow morning.

II. **Daß** (that) is sometimes used instead of seit, and may then be translated, "*since*." Ex.: Ist es lange, daß Sie ihm gesehen haben? Is it long *since* you have seen him?

Exercise 91.

Aus'bitten, to beg for, ask for, request;	Goldstück, *n.* gold-piece;	Städter, *m.* townsman, citizen;
Beseh'en, to look on, at, to view;	Herauf, hereupon;	Treiben, to drive;
Dazu', thereto, to it;	Mangel, *m.* want, lack, deficiency;	Verrätherei', *f.* treachery;
Dürf'tigkeit *f.* necessity, indigence;	Poli'tisch, political;	Versetz'en, (See above);
Einfach, simple, plain;	Post'meister, *f.* post-master;	Vormittag, *m.* forenoon;
Fangen, to take, seize;	Schlicht, plain, homely;	Welttheil, *m.* part of the world or globe;
Flach, flat, even;	Spötteln, to jeer, jibe, banter;	Worü'ber, of what, whereof, whereat.
Flüchtling, *m.* fugitive;		
Fülle, *f.* fulness, plenty;		

Der heim'tückische Mensch versetz'te mir hinterlistiger Weise einen Schlag in den Rücken.	The malicious man gave me, in a deceitful manner, a blow upon the back.
Der Vater geht diesen Nachmittag über Feld.	The father goes this afternoon over the country.
Er weiß nicht, wie er zu diesem Re'genschirm gekom'men ist.	He does not know how he came by this umbrella.
Er geht bei'nahe alle Tage auf's Land und erfrischt' sich an Milch und Obst.	He goes nearly every day into the country and refreshes himself with milk and fruit.
Das Verbrech'en dieses Mannes ist an den Tag gekom'men.	The crime of this man has come to light.
Er ist lange nicht bei uns gewe'sen.	He has not for a long time been at our house.
Er ist nicht lange bei uns gewe'sen.	He has not been long at our house.

1. Er versetzte ihm einen Schlag in das Gesicht. 2. Scherzweise versetzte mir die Schwester einen Schlag mit der flachen Hand. 3. Es schickt sich nicht für Knaben, einander zu schlagen. 4. Der Vater ist über Feld gegangen und wird erst gegen Abend zurückkommen. 5. Der Bruder war diesen Vormittag im Felde, um die Früchte zu besehen, und diesen Nachmittag geht er über Feld, um seinen kranken Vetter zu besuchen. 6. Wie sind Sie zu diesem Goldstücke gekommen? 7. Ich habe es, als ich in das Feld ging, gefunden. 8. Man weiß nicht, wie dieser Mann zu seinem Reichthume gekommen ist. 9. Reiche Leute wohnen den Winter über in der Stadt und den Sommer auf dem Lande. 10. Wenn reiche und stolze Städter auf das Land kommen, so spötteln sie gern über die schlichten und einfachen Sitten seiner Bewohner. 11. Ludwig XVI. wurde noch an den Grenzen Frankreichs durch die Verrätherei eines Postmeisters gefangen genommen. 12. Der Dieb wurde von der Nachtwache gefangen genommen,

als er aus dem Hause entfliehen wollte. 13. Man wußte lange nicht, wer die Fremden waren, bis es endlich an den Tag kam, daß es politische Flüchtlinge waren. 14. Endlich ist es an den Tag gekommen, worüber Jahre lang der Schleier der Verschwiegenheit gedeckt war. 15. Ehe er sich zu mir in den Wagen setzte, bat er sich die Bedingung aus, daß ich langsam fahren möchte. 16. Als er gefragt wurde, warum er diese entwürdigende Handlung begangen habe, versetzte er, daß ihn die Noth dazu getrieben habe. 17. Hierauf versetzte ich ihm, daß Mangel kein Grund zu Diebstahl, und Noth kein Grund zu einem Verbrechen sei. 18. Das Schicksal versetzte ihn aus der Fülle in die größte Dürftigkeit, wie es mich oft aus einer Stellung in die andere, aus einem Lande in das andere und aus einem Welttheil in den andern versetzte,—aber den härtesten Schlag versetzte es mir dadurch, daß es mir an dem Tage meiner Ankunft in Amerika den Bruder sterben ließ.

1. My brother goes to-morrow morning with his friend over the country, and will return in the evening. 2. How came you by this book? 3. As I went over the country I found it. 4. The father gave the boy a blow with his hand. 5. Upon the questions, which the judge asked the criminal, he replied: that he had not committed the crime purposely. 6. I have not been for a long time in Germany. 7. I have not been long in Germany. 8. It is a long time since I have seen my parents and brothers. 9. He did not know for a long time who it was that had taken his pencil-case, after it was found. 10 Let us take a pedestrian tour, as we have beautiful weather to-day. 11. How long is it since you have heard anything of your friends? 12. I do not know, but I believe it is more than a month since I have heard anything of them.

LESSONS IN LATIN.—No. XLVI.

By JOHN R. BEARD, D.D.

SYNTAX.

3. A PRONOUN may agree with a pronoun, e. g.,

Caveto ne alios vituperes, qui fortasse laude digniores sunt quam tu ipse.

Take care you do not blame others who perhaps are more worthy of praise than you yourself.

Here the relative qui agrees with its antecedent, the pronoun alios, in gender and number; and tu agrees with ipse in gender, number, case, and person, both being in the second person, nominative case, singular number, and masculine gender.

The rule may be stated thus:—

Pronouns agree with pronouns in gender and number, or in gender, number, person, and case.

Idem, added to another pronoun, gives force to a proposition, e. g.,

Ptolemæus quum vivus filio regnum tradidisset, ab *eodem illo* vitâ privatus dicitur.

Ptolemy is said to have been deprived of life by the very son to whom in his lifetime he had given up his kingdom.

Idem, in conjunction with another pronoun, must be rendered by *also*, or *the same as*, or *yet*, e. g.,

Ultimus cœli complexus, *qui idem* æther vocatur.
The great expanse of the sky, which is also called æther.

Ipse may be joined to all persons, whether they are subjects or objects. Ipse adds force to the word with which it is connected; ego ipse, *I myself*; ille ipse, *he himself*. Ipse sometimes stands without a personal pronoun. If ipse refers to the subject, it is in the case of the subject; if it refers to the object, it is in the case of the object, e. g.,

Subject:—Non egeo medicinâ; me *ipse* consolor.
I do not need medicine; I console myself
Object:—Fac ut diligentissime *te ipsum* custodias.
Take care to guard yourself most attentively

Et ipse is used with the force of our *even*; *alone*, that is, *by itself, without going further*, e. g.,

Virtutes *et ipsæ* tædium pariunt.
Even virtues beget wearisomeness.

Ejus (from is, ea, id) differs from suus, though both are rendered *his* in English. Ejus is properly *of that person* or *that person's*. Suus is *one's own*. The former is the genitive singular of is, *that man*; the latter is connected with se, sui, sibi, the reflective pronoun, denoting *one's self*. In these distinctions, lies the root of the diverse usages of the two. These usages may find a classification if we call ejus a demonstrative and suus a reflective pronoun. As a demonstrative, ejus is used when a reference is made to some person or thing not being the subject of the immediately-connected verb; but the reflective suus must be used when the reference is to the subject of the immediately-connected verb, e. g.,

Alcibiades quum desertus ab omnibus jaceret,
When Alcibiades lay deserted by all,
amica corpus *ejus* texit pallio suo,
a female friend covered HIS *body with her cloak.*

Here ejus is requisite because the demonstrative is needed to point out that corpus refers to Alcibiades. With pallio, however, ejus would be wrong; suus is required there, because the cloak belonged to the subject of the verb texit; *her* cloak; *whose* cloak? the cloak of the female friend.

The distinction is marked in these two instances:—

1. Omitto Isocratem discipulosque ejus.
I omit Isocrates and his disciples.
2. Isocrates cum discipulis suis adfuit.
Isocrates with his disciples was present.

Both ejus and suus are rendered into English by *his*, but they are of different import. In 1, *his* refers to discipulos, and not to the subject of the sentence, and therefore its proper Latin representative is ejus; not so the *his* in 2; there the pronoun refers to Isocrates, the subject of the sentence, and, in consequence, you want not the demonstrative ejus, but the reflective suus.

VOCABULARY.

Potissimum, *most of all*; signa conferre, *to join battle*; num, *asking a question, requires an answer in the negative*; natus, ûs, m. *birth*; natu, *by birth*.

EXERCISES.—LATIN-ENGLISH.

Cnelum Pompeium omnibus qui unquam fuerunt, P. Lentulum mihi ipsi antepono; se ipsos omnes naturâ diligunt; Junius necem sibi ipsi consciviit; scio ista hæc facta proinde ut proloquor; tu es is qui me saepissime ornâsti; ego is sum qui Caesari concedi putem utilius esse, quod postulat, quam signa conferri; transeat idem iste sapiens ad rempublicam tuendam; qui ipsum illum Carneädem diligepter audierat; ridiculi sunt, qui alios id docere conantur, quod ipsi neque experti sunt, neque sciunt; ille quoque ipse confessus est; est idem ille tyrannus deterrimum genus; il qui divinis legibus parent secundum naturam vivunt; is dici non potest vir magnanimus, qui suam salutem cum salute publicâ conjungere dubitat; ego me ipsum vitupero; saepe ii qui sibi maxime placent, aliis maxime displicent; quicquid honestum est, idem est utile; ea omnia, quae adhuc a me dicta sunt, iidem isti vera esse concedunt; musici qui erant quondam iidem poetae; ego vir fortis idemque philosophus vivere pulcherrimum duxi; illa erat splendida et eadem faceta oratio; petam a vobis ut ea quae dicam non de memet ipso, sed de oratore discere putetis; non ita abundo ingenio ut te consoler quum ipse me non possim; ignoratio rerum, e qua ipsâ horribiles existunt saepe formidines; Themistocles a suis civibus patriâ pulsus est; Fabius a me diligitur propter summam suam humanitatem; Deum cognosco ex operibus ejus; Deus cognoscitur ex operibus suis; non audit Cicero quae de eo dicit posteritas; num ait Cicero posteritatem multa de se mala dieturam esse?

ENGLISH-LATIN.

They themselves confessed; I who have confessed expect death; thou preferrest a friend to thyself, and, at the same time (idem), lovest thyself very much; thou art that wise man whom I myself and we all desire to hear; they blame themselves; they who blame themselves, may become wise; whatever is good, the same is useful; he a foolish, yet (idemque) a kind man, entreats thee to take care of thyself; console thyself; they have consoled me, yet are they wretched; Aristides was banished by his (fellow) citizens; Aristides and his (fellow) citizens were Greeks (Hellenes) by birth; the maid took off her cloak, and covered with it the dead body of her sister; the cloak of her husband being taken off, the wife, according to custom, burnt the corpse; all men love themselves; I love myself; they do not love themselves wisely who take care of themselves most of all.

4. A noun agrees with an adjective or participle, e. g.,

1. Adj. :—PATRIA Ciceroni CARISSIMA est.
His COUNTRY *was* MOST DEAR *to Cicero.*

2. Part.:—CARTHAGO DELETA est.
CARTHAGE *has been* DESTROYED.

In the first instance, the adjective carissima is in the same gender, number, and case as the noun patria. In the second instance, the participle deleta is in the nominative case, singular number, and feminine gender, because Carthago is in the nominative case, singular number, and feminine gender.

The rule, then, is,

A noun agrees with an adjective or participle in gender, number, and case.

If the subject consists of more than one noun, the attributives (the adjective or participle) must, together with the verb, be in the plural number, e. g.,

Pater et filius MORTUI sunt.
The father and the son ARE DEAD (*have died*).

If the subject contains nouns of different genders, for instance, one masculine and one feminine, then, the masculine, being what grammarians call the more worthy, requires the predicate to be in the masculine, e. g.,

Pater mihi et mater MORTUI sunt.
My father and mother ARE DEAD.

The gender is in some cases determined by attraction, the noun nearest the adjective or participle attracting or drawing the adjective or participle into its gender, e. g.,

CONVICTA est MESSALINA et Silius.
MESSALINA *was* CONVICTED *and Silius.*

This construction may be explained by the supposition that he predicate agrees in reality with the nearest noun only, and is to be considered as repeated after the second noun, thus :—

Convicta est Messalina, et Silius convictus est.
Messalina was convicted, and Silius was convicted.

When nouns in the subject represent things, the predicate is in the singular, though one or more of the nouns may be masculine or feminine, e. g.,

Secundae res, honores, imperia, victoriae, FORTUITA sunt.
Prosperity, honours, commands, victories, are GIFTS OF FORTUNE.

Here the subject contains one masculine noun, honores, and two feminine nouns, secundae res and victoriae, yet the attributive is in the neuter gender, fortuita. A masculine noun, however, requires the adjectives or participle to be in the masculine gender. The gender may also be determined by proximity, that is, by the gender of the nearest noun,

When the subject, though in the feminine or neuter gender, denotes male persons, then the construction, being determined by the sense rather than the sound, requires the predicate to be in the masculine, e. g.,

CAPITA conjurationis PERCUSSI sunt.
THE HEADS *of the conspiracy were* PUNISHED WITH DEATH.

A difference is to be observed between an *epithet* and a noun in apposition. The attribute is called an *epithet* when it consists of an adjective or participle. The attribute is said to be in apposition to the subject when the attribute is a noun. Epithets, whether used as *predicates* or merely as adjectives, must be in the same gender, number, and case as their nouns, e. g., mons altus, *a high mountain*; mons est altus, *the mountain is high*; gramen viride, *green grass*; gramen est viride, *grass is green.* Care must be taken to ascertain whether the subject is singular or plural, e. g.,

Placuit, consules circa PORTAS Collinam Esquilinamque ponere castra.
It was resolved that the consuls should pitch the camp around the Colline and Esquiline GATES.

Here you have the epithets Collina and Esquilina in the singular, though the noun portae is in the plural; the reason is, that there were two separate individual gates, the Porta Collina, and the Porta Esquilina. Had the adjectives been common and not proper, and so had the qualities which they represent been shared by the noun gates, then would the epithets have been in the plural, e. g.,

Portas urbis munitissimas refregit.
He broke open the very strongly fortified gates of the city.

If the two or more nouns are taken separately, the epithet is to be put in the singular number, e. g.,

Inter Esquilinam Collinamque PORTAM posuit castra.
He placed the camp between the Esquiline and the Colline GATE.

Apposition requires nouns to agree in case, whether they agree or not in number and gender, e. g.,

ALEXANDER, REX Macedonum, magnus appellatur.
ALEXANDER, KING *of the Macedonians, is called great.*

VOCABULARY.

Bene actae vitae, *of a well-spent life*; de coelo tacta sunt, *were struck with lightning*; indagatrix, icis, f. *an investigator*; expultrix, icis, f. *an expeller.*

EXERCISES.—LATIN-ENGLISH.

Aesōpus scriptor clarus, fuit gibbosus; Scythae, homines belli-cosi, terribiles fuerunt; Phoenices erant nautae peritissimi; Graecia fuit patria multorum hominum illustrium; conscientia bene actae vita jucunda est; Graeca lingua est difficillior quam Romana; anser et ovis et asinus videntur esse bestiae stultissimae; omne animal mortale est; nos sumus amici vos estis inimici; quanta est imbecillitas tua! Grammatica quondam et musica junctae fuerunt; misericordia in eo et perfidia dilectae sunt; Samnitium caesi sunt tria millia ducenti; stultitia et temeritas et injustitia et intemperantia fugienda sunt; pax et concordia victis utilia, victoribus pulchra sunt; captivi militum praeda fuerunt; opes sunt irritamenta malorum; murus et porta de coelo tacta sunt; duo fulmina Romani imperii fuerunt Cneius et Publius Scipio; Brutus et Cassius interfectores Caesăris fuerunt; Vespasianus quaestor Cretam et Cyrenas provinciam sorte cepit; Pompeius, a militibus desertus, Aegyptum petiit; Philosophia vitae est dux, virtutis indagatrix, expultrixque vitiorum; quid dicam de thesauro omnium, memoriâ?

ENGLISH LATIN.

Who were the assassins of Caesar? Brutus and Cassius; memory is the treasury of the soul; religion is the guide of life; is not religion the expeller of vices? the philosophy of religion is the medicine of the soul; religion and philosophy are very benign; who were the thunderbolts of the Roman empire? generals, the thunderbolts of the Roman empire, went (proficiscor) to the war; in Greece, the mother of great men, lived Solon and Aristides; riches and honour are perishing things; the man and his wife have suddenly died; the wall, the threshold, and the ship, have been struck with lightning; you are friends, we are enemies; was Aesop a renowned writer?

Aesopi Fabulae.

ASINUS AND EQUUS.

Asinus equum beatum praedicabat, qui tam copiose pasceretur, quum sibi post molestissimos labores ne paleae quidem satis praeberetur. Forte autem bello exorto, equus in praelium agitur, et circumventus ab hostibus, post incredibiles labores, tandem, multis vulneribus confossus, collabitur. Haec omnia asinus conspicatus, "O me stolidum," inquit, "qui beatitudinem ex praesentis temporis fortunâ aestimaverim!"

AGRICOLA ET FILII.

Agricola senex quum mortem sibi appropinquare sentiret, filios convocavit, quos, ut fieri solet, interdum discordare noverat, et fascem virgularum afferri jubet. Quibus allatis, filios hortabatur, ut hunc fascem frangerent. Quod quum facere non possent, distribuit singulis singulas virgas, fisque celeriter fractis, docuit illos, quum firma res esset concordia, quamque imbecillis discordia.

MULIER ET ANCILLAE.

Mulier vidua, quae texendo vitam sustentabat, solebat ancillas suas de nocte excitare ad opus, quum primum galli cantum audivisset. At illae, diuturno labore fatigatae, statuerunt gallum interficere. Quo facto, deteriore conditione quam prius esse coeperunt. Nam domina, de horâ noctis incertâ, nunc famulas saepe jam primâ nocte excitabat.

VOCABULARY.

Praedico 1, *I declare*; pascor, pasci, pastus sum 3, dep. *I feed*; molestus, a, um, *hard, severe*; praebeo 2, *I afford*; confodio 3, *I stab, run through*; exorior 4, dep. *I arise*; fascis, is, m. *a bundle*; virga, ae, f. *a rod*; distribuit singulis singulas virgas, *he gave a rod to each of them.*

LESSONS IN FRENCH.—No. LI.

By Professor Louis Fasquelle, LL.D.

§ 32.—The Personal Pronouns.

(1). The personal pronouns are so called because they seem to designate the three persons more especially than the other pronouns.

These pronouns are:—

	Nominative Form.		*Relative Form.*	
	Singular.	*Plural.*	*Singular.*	*Plural.*
1.	je, *I*;	nous, *we*;	me, *myself*;	nous, *ourselves*;
2.	tu, *thou*;	vous, *you, ye*;	te, *thyself*;	vous, *yourselves*;
3.	il, *he, it*, m.; elle, *she, it*, f.;	ils, m *they*; elles, f. *they*.	se, soi, *himself*; *herself*; *itself*;	se, *themselves*.

(2.) *Direct regimen, or Accusative.*

When placed before the verb.			When placed after a verb.		
Singular.	*Plural.*		*Singular.*	*Plural.*	
1. me, *me*;	nous, *us*;		moi, *me*;	nous, *us*;	
2. te, *thee*;	vous, *you*;		toi, *thee*;	vous, *you*;	
3. le, *him, it*, m.; la, *her, it*, f.;	les, *them*,	m. f.	le, *him, it*, m; la, *her, it*, f.;	les, *them*,	m. f.

(3.) *Indirect regimen, or Dative.*

When placed before the verb.

Singular.	*Plural.*
1. me, *to me*;	nous, *to us*;
2. te, *to thee*;	vous, *to you*;
3. lui, *to him*; *to her*; *to it*;	leur, *to them*; (both genders).

When placed after the verb.

Singular.			*Plural.*		
moi,	à moi,	*to me*;	nous,	à nous,	*to us*;
toi,	à toi,	*to thee*;	vous,	à vous,	*to you*;
lui,	à lui, à elle,	*to him*; *to her*;	leur,	à eux, m. à elles, f.	*to them*.

(4.) *Indirect regimen; Genitive and Ablative.*

Always placed after the verb.

Singular.	*Plural.*
de moi, *of* or *from me*;	de nous, *of* or *from us*;
de toi, „ *thee*;	de vous, „ *you*;
de lui, „ *him*;	d'eux, „ *them*, m.;
d'elle, „ *her*;	d'elles, „ *them*, f.

§ 33.—Remarks on the Personal Pronouns.

(1.) The French, as well as the English, use the second person plural for the second person singular, in addressing one person.

(2.) The second person, however, is used, as in English, in addressing the Supreme Being:—

Grand Dieu! *tes* jugements sont remplis d'équité. Des Barreaux.	*Great God! thy judgments are full of equity.*

(3.) It is also used in poetry, or to give more energy to the diction:—

O mon souverain roi! Me voici donc tremblante et seule devant *toi*. Racine, *Esther*.	*O my sovereign king! Here I am, trembling and alone before thee.*

(4.) It is used by parents to children, and also among intimate friends.

(5.) The pronoun *il* is used unipersonally, in the same manner as the English pronoun *it*:—

Il pleut, *it rains*; *Il* gèle, *it freezes*.

(5.) Observe that the personal pronouns of the third person are not used for the indirect regimen to represent inanimate objects. The relative pronouns EN, *of* or *from it* [§ 39 (17)], Y, *to it* [§ 39 (18)], are used instead of the personal pronouns. Thus, in speaking of a *house*, we do not say, Je *lui* ajouterai une aile, *I will add a wing to it*. We must say:—

J'*y* ajouterai une aile; *I will add a wing to it (thereto)*.

In speaking of an author, we may say:—

Que pensez-vous *de lui*? *What do you think of him?*

But in speaking of his book, we should say:—

Qu'*en* pensez-vous? *What do you think of it (thereof)?*

(6.) The word *même*, plural *mêmes*, may be used after the pronoun in the sense of *self, selves*:—

le roi *lui-même*,	*the king himself*.
la reine *elle-même*,	*the queen herself*.
les princes *eux-mêmes*,	*the princes themselves*.
les princesses *elles-mêmes*,	*the princesses themselves*

(7.) The pronouns *moi, toi, lui, eux*, are often used after the verb, to give greater force to a nominative pronoun of the same person, in those cases where the emphasis is placed on the nominative in English, or where the auxiliary *do* is used:—

je le dis, *moi*,	*I say so*, or *I do say so*.
il le dit, *lui*,	*he says so*, or *he does say so*.

(8.) The same pronouns, *moi, toi, lui, eux*, are used instead of the nominative pronouns, *je, tu, il, ils*, for the English pronouns *I, thou, he, they*, when those pronouns are employed without a verb in an answer, when they are used by themselves, or have a verb understood after them:—

Qui est arrivé ce matin? Moi.	*Who arrived this morning? I.*
Lui et *moi*. *Vous* et *eux*.	*He and I. You and they.*
Vous écrivez mieux que *lui*.	*You write better than he.*
Vous lisez aussi bien que *moi*.	*You read as well as I.*

(9.) The same pronouns are used in exclamations, and in those cases where the English pronouns, *I, thou*, &c., are followed by the relative pronoun *who*; also after *c'est, c'étoit*, &c.

Moi lui céder!	*I yield to him!*
Eux aller à Londres!	*They go to London!*
Moi qui suis malade . . .	*I who am sick . . .*
Lui qui est officier.	*He who is an officer.*
Eux qui sont savants.	*They who are learned.*
C'est *moi*; c'est *lui*.	*It is I; it is he.*
Ce sont *eux*.	*It is they.*

Pénélope, sa femme, et *moi* qui suis son fils, nous avons perdu l'espérance de le revoir. Fenelon.	*Penelope, his wife, and I who am his son, have lost the hope of seeing him again.*

(10.) These same pronouns are also used instead of the nominatives, *je, tu*, &c., when the verb has several subjects which are all pronouns, or partly nouns and partly pronouns. The verb may then be immediately preceded by a pronoun in the plural, representing in one word all the preceding subjects:—

Votre père et *moi*, nous avons été longtemps ennemis l'un de l'autre. Fenelon.	*Your father and I were a long time enemies.*
Rica et *moi* sommes peut-être les premiers. Montesquieu.	*Rica and I are, perhaps, the first.*

(11.) The recapitulating pronoun and the verb sometimes come first in the sentence:—

Nous avons, *vous* et *moi*, besoin de tolérance. Voltaire.	*You and I have need of tolerance.*

(12.) The reflective pronoun SE, *himself*, &c., is used for both genders, and for both numbers; for persons and for things; and always accompanies a verb:—

Les yeux de l'amitié *se* trompent rarement. Voltaire.	*The eyes of friendship are seldom deceived (deceive themselves).*

(13.) The same pronoun has sometimes a reciprocal and sometimes a reflective meaning, according to the context:—

ils *se* flattent,	*they flatter themselves.*
ils *se* flattent,	*they flatter one another, each other.*

(14.) Soi, *himself, itself*, &c., is of both genders and numbers, and is applied to persons and things. It is used in general and indeterminate sentences; having commonly an indefinite pronoun for the nominative:—

On a souvent besoin d'un plus petit que *soi*. La Fontaine.	*We have often need of one more humble than ourselves.*
Il dépend toujours de *soi* d'agir honorablement. Gerault-Duvivier.	*It is always in our power to act honourably.*
Etre trop mécontent de *soi* est une faiblesse. Mme. de Sable.	*To be too much displeased with one's self is a weakness.*

For additional rules on personal pronouns, see Syntax, § 98, and following.

§ 34.—Possessive Pronouns.

(1.) The possessive pronouns, which are formed from the personal pronouns, represent, in the radical part, the *possessor*, while in termination they always agree with the thing possessed. Some relate to one person, some to several.

(2.) Possessives relating to One Person.

The object possessed being in the—

Singular.		*Plural.*		
Masc.	*Fem.*	*Masc.*	*Fem.*	
1. le mien,	la mienne,	les miens,	les miennes,	*mine;*
2. le tien,	la tienne,	les tiens,	les tiennes,	*thine;*
3. le sien,	la sienne,	les siens,	les siennes,	*his, hers, its.*

(3.) Two or more Persons.

The object possessed being in the—

Singular.		*Plural.*	
Masc.	*Fem.*	*Masc. and Fem.*	
le nôtre,	la nôtre,	les nôtres,	*ours;*
le vôtre,	la vôtre,	les vôtres,	*yours;*
le leur,	la leur,	les leurs,	*theirs.*

§ 35.—Remarks on the Possessive Pronouns.

(1.) It may be seen from the above table that, as before said, the termination of the possessive pronoun agrees in gender and number with the object possessed:—

Votre canif et *le mien*. — *Your penknife and mine.*

Votre plume et *la mienne*. — *Your pen and mine.*

Vos frères et les *miens*. — *Your brothers and mine.*

Vos sœurs et les *miennes*. — *Your sisters and mine.*

On voit les maux d'autrui, d'un autre œil que les *siens*. Corneille — *We see the misfortunes of others differently from our own.*

Les ministres du roi sentent que leur gloire, comme *la sienne*, est dans le bonheur national. Bernardin de St. Pierre. — *The ministers of the king feel that their glory, like his own, is in national happiness.*

(2.) These pronouns should relate to a noun previously expressed. This rule is often violated in mercantile correspondence:—

J'ai reçu *la vôtre* en date du, etc., — *I received yours dated the, &c.,*

is incorrect. It should read thus:—

J'ai reçu votre lettre en date du, etc., — *I received your letter dated, &c.*

(3.) These pronouns may, however, be used absolutely when we mean thereby our family, near relatives, or intimate friends:—

Moi, j'ai les *miens*, la cour, le peuple à contenter. La Fontaine. — *I have my family or friends, the court, the people to please.*

Malheureux . . . . qui porte chez les *siens* le glaive et les flambeaux. Colardeau. — *Wretched is he who carries among his fellow-citizens the sword and the torch.*

C'est à nous à payer pour les crimes des *nôtres*. Racine. — *We must bear the penalty of the crimes of our family or people.*

(4.) *Le mien* and *le tien* are also used absolutely as the word *mine* and *thine* in English, in the sense of possession, property:—

Et *le mien* et *le tien*, deux frères pointilleux. Boileau. — *And mine and thine, two punctilious brothers.*

Le tien et *le mien*, sont les sources de toutes les divisions et de toutes les querelles. Girault-Duvivier. — *Mine and thine (meum and tuum) are the sources of all divisions and quarrels.*

LESSONS IN GEOGRAPHY.—No. XXI.

MAP OF ASIA.

The *Peninsulas* of Asia are: Arabia, which lies between the Red Sea and the Persian Gulf; Asia Minor, between the Black Sea and the Mediterranean; India, or Hindoostan, between the Arabian Sea and the Bay of Bengal; the Eastern Peninsula, and its branch, the Malayan Peninsula, between that bay and the Chinese Sea; Corea, between the Yellow Sea and the Sea of Japan; and Kamchatka, between the Sea of Ochotsk and Behring's Sea. The *Isthmus* which unites Malaya to the Eastern or Indo-Chinese Peninsula is called the Isthmus of Kraw. The *Capes* of Asia are: in Asia Minor, Cape Baba, near the ruins of Troy, and Cape Anemur, in Caramania; Cape St. Andrew, in Cyprus, and Cape Beyrout, in Syria. In Arabia, Cape Aden, and Cape Ras-al-Had, or Rosalgat, the most eastern point of that peninsula; in Southern India, or the Western Peninsula, Cape Comorin, the most southern point of the Malabar Coast; and Point Calimere, on the Coromandel Coast. In the Eastern Peninsula, Cape Negrais, on the coast of Ava; Point Romania, in the south of Malaya; Cape Cambodia, and Cape Padaran, projecting into the Gulf of Siam and the Chinese Sea; on the eastern coast of China, the promontory of Shantung; in Kamchatka, Cape Lopatka; and at Behring's Strait, the East Cape. Of the capes in the Northern or Arctic Ocean, the principal is Cape Severovostochnoi.

In Asia, there are many vast *Lakes*, which deserve and have received the name of Seas. Of these, the principal is the Caspian Sea, between Russia and Turkestan, said to be more than 700 miles long; it covers a surface of about 125,000 square miles, and varies in depth from 12 feet, on its northern shores, to 150 feet, on its other shores; being about 2,800 feet deep in the middle. This inland sea is salt, but less so than the great ocean which surrounds the continent; it lies in a basin whose surface is lower than that of the sea in general, having been ascertained to be about 83 feet lower than that of the Black Sea. The Sea of Aral, in Turkestan, is about 300 miles long; it covers a surface of about 23,000 square miles, being shallow and slightly salt; this lake is slightly raised above the general level of the ocean. The Lake Baikal, in Siberia, is about 350 miles long, and varies from 35 to 60 miles in breadth; it covers a surface of about 25,000 square miles, and is raised about 1,400 feet above the level of the sea; its waters are fresh, and abound in fish. Other lakes of smaller size, but still occupying a large surface, are: Balkash or Tengiz, in Turkestan; Zurrah, in Afghanistan; Zaizan, in Chinese Tartary; Baktegan, in Persia; the Dead Sea or Lake Asphaltites, in Palestine; and many others in this vast continent.

Asia contains the most extensive plateau (*platform*) or *table-land* to be found on the surface of the globe. It lies generally between the parallels of 30° and 50° north latitude, and between the meridians of 70° and 120° east longitude; its length is about 2,500 miles, and its breadth varies from 1,200 to 1,400 miles. Its mean elevation above the level of the sea is about 2,000 feet. The plateau of Mongolia is about 3,000 feet in elevation; and the loftiest parts of the plateau of Thibet reach the amazing altitude of 16,000 feet. Between these plateaus lies the Great Sandy Desert of Tartary, called Gobi (*desert*) or *Shamo* (*sea of sand*), having an average elevation of 2,500 feet above the level of the sea. The plateaus of Persia and Afghanistan are of less elevation than those of Thibet; the former being, on an average, 3,500 feet high, and the latter 6,000 feet high. The high table-land of Armenia, upon which the ark of Noah is said to have rested, is about 6,000 feet in elevation; and that of Asia Minor varies from 6,000 feet to 3,000 feet. In India, to the south of the great table-land region, are the plateaus of Malwa, the Deccan, and Mysore, the two former being each 2,000 feet, and the latter 3,000 feet in elevation above the level of the sea. The table-land of Arabia, which is one vast desert in the interior, varies in elevation from 3,000 to 4,000 feet. These vast and elevated plateaus exercise a striking influence on the climate of Asia in general; they are much colder than might be expected from their latitudes, as compared with the general surface of the globe; and they interrupt the atmospheric currents between the polar and equatorial regions, which would otherwise equalise the temperature and render it more genial; hence the northern regions are extremely cold, and the southern regions extremely warm.

The great *plains* and *lowlands* of Asia form a balance and counterpart to the *mountains* and *table-lands* of that continent. The plain of Siberia in the north extends from the foot of the Uralian mountains, between the shores of the Arctic Ocean and the bottom of the great Altaian range of mountains, to the most eastern extremity of the continent. The plain of Independent Tartary extends from Siberia, on the south-west, to the high table-land of Persia, including the Sea of Aral. The plain of China, which extends 500 miles inland from the East and Yellow Seas, is well watered and cultivated, and very populous; the plains of Chin-India partake of the same character; and the plain of Hindoostan, which divides the plateaus of Southern India from the Himalayan range of mountains, is the land of rice, sugar, indigo, and cotton. The great Mesopotamian plain of India, the space between the Indus and the Ganges, includes the preceding fertile tract, the great Indian Desert, and the plain of Sinde, which, embracing the lower course of the Indus, is very fertile. The plains of Mesopotamia

(*in the middle between the rivers*), now called *Al-jezirah*, and Babylonia, now called *Irah-Arabi*, include the greater part of the countries watered by the rivers Tigris and Euphrates. The so-called Mesopotamian or northern plain is rather barren; but the southern or Babylonian plain, extending to the Persian Gulf, is naturally much more productive, and formerly supported a much larger population than at present.

In Asia are to be found the loftiest *mountains* on the surface of the globe, as well as vast *plateaus* or table-lands of great elevation, and immense *plains* or *deserts* destitute of useful vegetation. The following table exhibits a list of the Asiatic mountains, with their elevations and positions.

TABLE OF THE MOUNTAINS OF ASIA.

Names of Mountains.	Ranges and Countries where situated.	Elevations in feet above Sea level.
Kapitan	Aldan, Siberia	4,263
Shievelutch	(Volcanoes) Kamchatka	10,591
Klinchevsk	(Volcanoes) Kamchatka	16,512
Awataka	(Volcanoes) Kamchatka	8,760
Bielukha	Altai, Siberia, & Mongolia	11,600
Pe-shan	Thian-Shan, Mongolia	10,000
Tsung-ling or Kuen-lun	Thibet and Mongolia	from 16,000 to 18,000
Pet-sha	In-shan, Chinese Tartary	10,000
Yung-ling	China and Thibet	12,000
Mei-ling	Nan-ling, China	8,000
Chumulari	Himalaya, India and Thibet	23,929
Donkiah-lah	Himalaya, India and Thibet	23,175
Lachoong Pass	Himalaya, India and Thibet	18,000
Kanchan-jhow	Himalaya, India and Thibet	22,000
Kunchin-jinga	Himalaya, India and Thibet	28,177
Wallanchoong Pass	Himalaya, India and Thibet	16,700
Dhawalaghiri	Himalaya, India and Thibet	26,862
Jawahir	Himalaya, India and Thibet	26,670
Nectee Pass	Himalaya, India and Thibet	16,814
Kailas	Himalaya, India and Thibet	21,000
Gangoutri Pyramid	Himalaya, India and Thibet	21,219
Karakorum Pass	Himalaya, India and Thibet	18,600
Koh-i-Baba	Hindoo-Koosh, Afghanistan	18,000
Beloor-Tagh	Turkestan and Bukharia	from 15,000 to 20,000
Takht-i-Soleimaun	Soleimaun, Afghanistan	12,000
Demavend	Elburz, Persia	14,700
Rowandiz	Zagros, Persia and Koordistan	10,568
Keli-Shin Pass	Zagros, Persia and Koordistan	9,500
Jawur-tagh	Zagros, Persia and Koordistan	13,000
Agri-dagh	Ararat, Armenia	17,260
Sevillan	Ararat, Armenia	13,000
Sapan-tagh	Ararat, Armenia	10,000
Taurus	Asia Minor	from 4,000 to 5,000
Golek-Boghaz Pass—(*Cilician Gates*)	Asia Minor	3,812
Bulghar-dagh	Asia Minor	10,000
Arjish-dagh—(*Argæus*)	Asia Minor	13,100
Hassan-dagh	Asia Minor	9,000
Kara-dagh	Asia Minor	8,000
Chechish-dagh, or *Olympus*	Asia Minor	9,000
Kaz-dagh, or *Ida*	Asia Minor	4,930
Akma-dagh—(*Amanus*)	Syria	6,000
Beilan Pass—(*Syrian Gates*)	Syria	1,300
Jebel Kheserik—(*Rhosus*)	Syria	5,400
Jebel Okrah—(*Casius*)	Syria	5,318
Lebanon	Syria	from 6,000 to 7,000
Jebel Libnan, or Libanus	Syria	9,500
Jebel-esh-Sheikh—(*Hermon*)	Syria	10,000
Sinai	Sinaitic Arabia	9,300
Jebel Katerin—(*St. Catherine*)	Sinaitic Arabia	8,593
Jebel Mousa—(*Moses*)	Sinaitic Arabia	7,498
Serbal	Sinaitic Arabia	6,762
Avarulli	Hindoostan	3,600
Vindhya	Hindoostan	from 2,500 to 3,000
Ghauts, Highest peak	Hindoostan	8,000
Neilgherry Hills	Hindoostan	8,960
Fusiu	Niphon, Japan	12,000
Peaks in	Formosa	12,000
Kina-balow	Borneo	13,680
Indra-pura	Sumatra	12,300
Peaks in	Java	12,000
Pedrotallagalla	Ceylon	8,280
Oros Troados—(Olympus)	Cyprus	6,590

In the preceding list of mountains, it is manifest that the Himalayan range is the highest in this continent; and indeed this range is the highest on the surface of the globe. The mountains, Dhawalagiri in Asia, and Chimborazo in South America, must succumb to the Kunchinjinga, which is now the highest point on the surface of the globe, its elevation being 28,177 feet, or 5 miles, 2 furlongs, 27 rods, 3 yards, and 2½ feet above the level of the sea.

CORRESPONDENCE.

MR. EDITOR,—We submit the following lines to your perusal; at the same time humbly requesting you (if they be worthy of such a distinction) to insert them in a corner of the POPULAR EDUCATOR.

Yours truly,
THE BROTHERHOOD.

Near Bradford, Yorkshire, Feb. 21, 1853.

AN INVITATION TO ALL.

Now is the time to lead the van,
Come, raise your banners to the sky;
Through all the land, join every man,
For "onward" is the battle-cry.

Let superstition now take wing,
And prejudice before us fly;
Through hill and dale the gauntlet fling,—
For "onward" is our battle-cry.

Let ignorance now kiss the dust,
Let him aloft our flag descry;
Now perish from the land he must,
For "onward" is our battle-cry.

Malice amongst us shall not live,
Nor jealousy to us come nigh;
And envy to the winds we'll give,
For "onward" is our battle-cry.

All sottishness must fade away,
And every sin of deepest dye—
Come, hasten all the happy day,
For "onward" is our battle-cry.

Now learning shall o'erspread the land,
And knowledge beam in every eye:
Wisdom shall reach from strand to strand,
For "onward" is our battle-cry.

The age of darkness now is past,
We into hidden secrets pry;
The magic spell is broke at last,
For "onward" is our battle-cry.

Hark! from the grave, the illustrious dead
Mingle their shouts with ours on high:
Stand not aloof, nor learning dread,
For "onward" is our battle-cry.

We seek for righteousness and truth;
We seek to check the deep-drawn sigh;
We seek to save the erring youth;
For "onward" is our battle-cry.

To liberty true knowledge tends,
To stop the loud and piercing cry
Of mortals torn from home and friends,
To toil in vain, and meanly die.

The time is come, the day doth dawn,
The clouds are flying fast away;
The star of freedom, 'cross the lawn,
Now ushers in millennial day.

Then call not these ambitious strains,
For man must soar above the sky:
Now cast away your slavish chains,
For "onward" is our battle-cry.

Z. B. H. (amended).

MODE OF STUDYING FRENCH.

DEAR SIR,—I feel it a duty incumbent upon me to acknowledge the benefits and the pleasure which the POPULAR EDUCATOR has conferred upon me. I have taken it weekly from its commencement, for its general subject-matter; but for the last six months I have made the French language a *subject* of study, at least in so far as the limited time and circumstances of a working man permit,—my occupation being that of a journeyman tailor. I have, according to instructions given in No. 1, POPULAR EDUCATOR, availed myself of the "French Lessons," which have been very useful to me; and now that the second part has begun this week, for which I have been most anxiously waiting, I feel more than ever convinced that *some* day I shall be enabled to *read*, if not to *speak*, the French tongue—*thanks* to the POPULAR EDUCATOR.

I will now state to you the plan upon which I commenced. After reading the earlier numbers of the POPULAR EDUCATOR very *often*, and treasuring up in my memory the *articles*, the verbs *être* and *avoir*, the nouns in the vocabulary, &c.,—and reading the "French Lessons" over and over again,—I have written down in a copy-

In bland discourse—in learn'd delights,
Shall f.t away the days and nights,—
In nc ting well her words that fall,
Like oozing nectar, one and all;
Whereby she curbs mirth's gay excess,
And draws the sting from dire distress;
Wherein the power of deep good sense
Is only neared by eloquence.—
Such I can fancy to have been
That hapless nymph, and beauty's queen,
Who wedded Orpheus!—Ah! the tale
Of death I will not now reveal:
But sure I am the minstrel bold,
Had never, for her weight in gold,
Gone down through toil to Pluto's dell,
To fetch a rustic dame from hell.
uch too, I trow, was Naso's child,
o famed for verse, and genius wild;
ho well nigh gained the laurel bough
song, which deck'd her father's brow.
l such, I ween, was Tullia fair,
ow'd with soul, and learning rare,—
lark so dear, that ne'er, I know,
ather lov'd a daughter so.
oo was she of passing worth,
ave the winning Gracchi birth;
ght her sons those noble arts,
wayed at will proud Roman hearts;—
r gifted from above,
struct as well as love.

R. S.

CORRESPONDENTS, &c.

The Philosophy of Study, Nos. 1. and 2.; ient Hymns; 104, Important Announce- ity of London, Nos. 1. and 2.; 155, The eletons of Leaves and Fruits; 255, 315, oblems and Queries; 299, Poetry, Solid Comets, Nos. 1. and 2., with Glossary.

wworm; 119, 195, Autobiography of a Socratic Method; 223, Professor extending our Circulation; 239, Self- pirit, Construction of the Violin, Co- The Lean Horse, Construction of to all; Mode of Studying French; hoice of a Wife.

—12, Keith on the Globes, Irre- Lord Brougham, Area of a Circle, by money, Property of eternal, ematical Instruments, Original postles, Immateriality of the ial, Series for the Rectification , Question in Mensuration, ematical Queries, &c.; 76, ernia, Albino and Albinesse, Grammar, Mr. Knowles, Phosphorescence of the ssayists, Richardson's Dic- of Mathematical Instru- , Trisection of an Angle, ity of Light and Sound, 136, Algebraic Problems, sion of the Roman Em- 80, System of Music, be-making, Problems, nmended, Receipt for Pronunciation, &c.; ed, Problems, &c.; blems, Queries, &c.; criptures, Explana- 284, Books recom- ooks, Chronology, ical Hints, Arith- na; 360, Books, ructure of Coral nd Radixes of of Problem, Matriculation, s, Problems, be, Explana- the Channel

ANSWERS TO CORRESPONDENTS.

HEINRICH (Islington): Cases for the numbers of the P. E., to keep them clean, may be had at 9, La Belle Sauvage Yard, Ludgate-hill, price 1s.—A SUBSCRIBER (Coleraine): See P. E., vol. I., p. 356, col. 2, line 43. A pocket compound microscope may be had of Messrs. Watkins and Hill, Charing-cross, at prices varying from 36s. to 52s. 6d.—J. WOODCOCK (Barnsley): There is a "Guide to Photography" by Thornthwaite; it may be had of Hebert, Cheapside.—J. J. (Whitehaven): The difference of the two totals, 143,000, is the population of the Isle of Man and the Channel Islands.—K. S., in answer to the inquiry by W. L. (Ellon) for a Medical Vocabulary, recommends the "People's Medical Dictionary," published by Vickers, Holywell-street, London, at about 2s. In answer to R. S. B—'s inquiry how the degree of Doctor of Music may be obtained from a German academy, he states that to the best of his knowledge, Oxford and Cambridge are the *only Universities in Europe* from which that degree can be obtained. He adds that when the Germans desired to render homage to the musical attainments and great genius of Felix Mendelssohn Bartholdy, not being able to make him Doctor of Music, they conferred on him the degree of *Doctor of Philosophy*.

W. BARNES (Newton Heath): It is our intention to give a lecture on, or explanation of, every proposition in Cassell's Euclid, with the solutions of all the exercises.—V. WHITE (Huddersfield): We, of course, recommend Cassell's History of England by Dr. Ferguson, price 3s. 6d.—ALPHA: Oxford and Cambridge are universities partially independent of government. We never heard of a Westminster university. Dieu et mon droit *(God and my right)* is very good French.—JOTU (Shrewsbury): Types for the Greek Lessons are in preparation.—J. W. D. (Brunswick-square): On stammering, consult Mr. Smart, or Mr. Knowles, 33, Howland-st., Fitzroy-square.—T. B. (Ringwood) is informed that by "any radius greater than half the line," we mean that he should open the compasses till the distance between the ends of the legs is greater than half the length of the line.—PHILOS (St. John-st.): Such is our intention.—J. T. G. should get an alarum clock, which will enable him to rise at any hour he pleases. Or he might get the watchman to wake him for a penny a morning. Or he might get a friend or servant to put a wet sponge to his nose at the hour required.—F. J. H. (Castle Hedingham), may quote the old proverb, "Let them laugh that win." He should study the course prescribed for Matriculation in No. 36, and pursue it, without saying a word to any one. Perseverance overcomes every difficulty. As to being laughed at, that is nothing, whether you do, or do not succeed. Solomon observes, "I said of laughter, *it is mad*; and of mirth, *what doeth it?*"

EPHA PYRRONTA (Plymouth): Thanks; the matter shall be attended to.—F. K. (Notts) will get pieces of loadstone, called Natural Magnets, at Watkins and Hill's, Charing-cross, at all prices, from 1s. 6d. to 42s., and Artificial Magnets from 2s. to 10 guineas.—TYRO: We shall be able to tell better from a specimen of the poetry.—CAUSALITY: The publication of the work on "Natural History" is postponed.—W. ELPHINSTONE (Alexandria): Thanks for his solutions.—H. RICHARDSON (Manchester): Under consideration.

W. P. S. (Durham), wishes to know where he can get a book called the "Book-binder's Manual."—J. A. L.: Thanks for his note of encouragement; may his wishes be realised.—R. M.: We would advise him to study all Thomson's works, and particularly the Calculus, which probably was out of print when he wanted it; it is now published at 8s. 6d. In French, there is an excellent work, entitled *Mathematiques Pures*, by Francoeur.—UN JEUNE HOMME (Tavistock): Lessons on Bookkeeping will soon appear in the P. E.

W. MORGAN (Lynn): A circle that measures 43 feet *in diameter*, contains 1452½ square feet; for 43×43×7854=1452·2046, see p. 72, vol. II.

J. WHITFORD (Ware): Received.—RODERIGO (Blackfriars'-road): His exercises will do. In almost every Mechanics' Institution in London or elsewhere, there are French classes which he may join. There are also other institutions where the same may be had; for instance, at Crosby Hall, Bishopsgate-street; also, at Hoxton House Academy, Buttesland-street, Hoxton.—JOHN MARTIN (Strood): His communication is very ingenious; but we must take another opportunity of explaining the subject of the Rectification of the Circle more fully.

A. B. (Earby): The word *present* is an *adjective;* by putting the definite article before it, it becomes a *substantive*, thus, *the present*; by putting the preposition *at* before it, it becomes an *adverb*, or rather an *adverbial phrase*, thus, *at present*.—S. ROULTON: True religion is the *cause*, not the *effect* of order.—J. P. (Norwich): In the answer to the question at the bottom of p. 316, col. 1, the fraction $\frac{1}{12}$ has been inadvertently omitted.—C. H. E.: Smart's Walker.—SCOTIA wishes to know the desired requirements as regard *classical* qualification for a student's admission into the Royal College of Surgeons, Edinburgh.—ETUDIANTE: For the general rules of pronunciation, see Cassell's "Series of Lessons in French," p. 2, line 35. T. DIXON (Shaw): It is our intention to include the Calculus.—R. PEARCE (St. Austell): The eldest son of the Sovereign of Great Britain is born *Prince of Wales*.—J. K. L. (Ipswich): "Four printers have completed fifteen sheets of a book in 16½ days, working 10 hours a-day; how long would 6 printers take to complete 9 sheets of a book which requires double the labour, if they worked 12 hours a-day?

$$\left.\begin{matrix} 6 : 4 \\ 15 : 9 \\ 1 : 2 \\ 12 : 10 \end{matrix}\right\} :: 16\tfrac{1}{2} \text{ days} : 11 \text{ days. Ans.}$$

J. FRAMPTON: There are some Phonetic short-hand writers among the reporters to the public press; but Taylor's system improved is we understand more generally used among them. We intend giving a view of different alphabets, as a finish to the Lessons on this subject.—W. T. F. (Newcastle): The solidity of a cube whose diagonal is 30 inches, is $3000\sqrt{3}$ or 5196 cubic inches and a fraction of an inch.

LITERARY NOTICES.

ATHEISM CONSIDERED THEOLOGICALLY AND POLITICALLY. This Volume, consists of thirteen Lectures, by the Rev. LYMAN BEECHER, D.D. (father of Mrs. H. B. Stowe.) These Lectures enter fully into the momentous question now at issue, or, at least, under discussion, between "Secularism" and Christianity. For close reasoning and eloquent declamation, these Lectures have rarely been surpassed. The Volume, just issued, is well printed, and is sold for 3s. 6d. bound in cloth. It is important as ordering this work, that John Cassell's edition should be specially named, as it contains an Introduction from his pen.

GIN AND WATER; a pair of pictorial designs by Kenny Meadows, portraying the effects arising from the indulgence of those potent liquids. In the first, GIN, we have the interior of the drunkard's home, with a glimpse of the horrors which belong peculiarly to such homes; in the second, WATER, we see how comfort, cleanliness, and peace attend the steps of the temperate man. The contrast is well sustained, and the pictures—which measure 24 inches by 16 inches—cannot but be popular. We have had too many songs and pictures in praise of the drinking customs of our country, and we are glad to perceive that our poets and artists are beginning to discover that they may get inspiration even out of water—

> "Wine, wine, thy power and praise
> Have ever been echoed in minstrel lays;
> But water, I deem, hath a mightier claim
> To fill up a niche in the Temple of Fame!"

These pictures, which should be framed and hung over every cottage chimney-piece, and on the walls of every factory, and workshop, and ragged school throughout all the land, can be obtained of every bookseller for one shilling. They are exquisitely engraved on wood, by Messrs. Henry Linton and William Measom.

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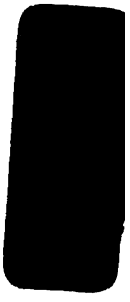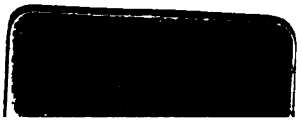
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